Ideas in Practice: A Modified FOCUS Model

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ABSTRACT: This article details the adaptation of the FOCUS (Fundamentals of Conceptual Understanding and Success) model (Mireles, Acee, & Gerber, 2014) implemented to improve student success in general education and developmental mathematics at a four-year rural university. The model has been demonstrated successful when implemented at a four-year large urban university in the south.The modification of the model described herein has also addressed another standard approach for improving student success used by many postsecondary institutions: drop-in Mathematics Tutoring Centers (MTCs), which provide extra learning support for students enrolled in developmental and general education mathematics courses (Gallimore & Steward, 2014). This article details the development and implementation of a modified FOCUS model to improve student success, specifically in mathematics. Students' success before and after the changes are implemented is compared. Findings indicate that the redesign via a modified FOCUS model addressed many barriers to MTC use and coincided with an increase in positive student outcomes in developmental and general education mathematics courses.

Students often struggle to pass the developmental mathematics courses meant to prepare them for college level mathematics.

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It is well established that mathematics success is key to postsecondary success (see Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006 among others). One challenge to postsecondary institutions in supporting student success is the high number of students needing developmental mathematics (sometimes called "remediation"; Walker, 2017). Despite decreases in high school dropout rates in recent years (DePaoli, Balfanz, Atwell, & Bridgeland, 2018), the number of students inadequately prepared for college-level mathematics is increasing (Boatman & Long, 2018). Furthermore, these students often struggle to pass the developmental mathematics courses meant to prepare them for college level mathematics, failing preparation courses puts them at higher risk for dropping out of college (Adelman, 2006). Specifically, Bailey (2009) has reported students attending four-year universities who needed remedial courses are less likely to complete a degree, with a success rate of only 52% compared to a success rate of 78% for students who do not need remedial coursework. It is therefore necessary for institutions to do all they can to help students in precollege-level mathematics courses be successful.

Different strategies and approaches are used to aid students in remedial mathematics courses. One approach presented by Mireles, Acee, and Gerber (2014) centers around a FOCUS (Fundamentals of Conceptual Understanding and Success) model that includes the components of credit-bearing courses supported equally by developmental mathematics, learning support, and academic support services. As part of the FOCUS intervention, students enroll in college algebra while simultaneously completing developmental mathematics coursework and participating in required learning support and academic services support. The benefit of a just-in-time teaching approach over multiple developmental courses has been demonstrated prior to the FOCUS model (Hern, 2012). However, in addition to just-in-time instruction, the FOCUS model adds important learning support, such as group activities to relate mathematics to real world applications, and effective use of academic support services, such as required tutoring. The use of the FOCUS model was demonstrated to correspond with improved mathematics proficiency, lower course withdrawals, and improved course grades (Mireles et al., 2014).

Review of Literature

A different standard approach utilized in many institutions of higher learning to aid students struggling with remedial mathematics centers around making support available to students through drop-in Mathematics Tutoring Centers (MTCs; Gallimore & Stewart, 2014). This approach to student support has been called the "drop-in tutoring model" (Cooper, 2010). Mathematics Tutoring Centers are sometimes referenced as Mathematics Support Centers; this article will use the term tutoring center.

Different approaches to staffing the MTC can be used. However, a common approach, due to its affordability, is the use of student tutors (Cooper, 2010). Subsequently, when students are used as tutors, drop-in MTCs are also a form of the "peer-to-peer mentoring" model (Gallimore & Stewart, 2014). In contrast to the emphasis the FOCUS model places on instruction techniques

and in-class support, MTCs are a place where students can receive assistance and tutoring with their mathematical skill development outside the regularly scheduled class time. The main objective of these MTCs is to address issues related to students' transition to postsecondary mathematics and to assist students with their mathematic skill development across the curriculum (Matthews, Croft, Lawson, & Waller, 2013). In one study, students who frequented a drop-in tutoring center had approximately 10% higher rates of persistence and approximately 0.2 points higher average GPAs than students who did not (Cooper, 2010). An important feature of the drop-in tutoring approach is that participation by students is optional. Thus, the benefit of drop-in MTCs is tempered by a lack of willingness on the part of some students to use drop-in MTCs (Grehan, Mac an Bhaird, & O'Shea, 2011). Institutions can evaluate MTCs by gathering feedback about student confidence, student abilities, services provided, and general information regarding possible improvements to MTCs (Gillard, Levi, & Wilson, 2010).

Poor student attendance in the MTCs has been a common problem and, as a result, a number of studies have examined this issue. Mac an Bhaird, Morgan, and O'Shea (2009) discovered that students who needed help did not always seek it. Furthermore, results from another study indicated that even though students presumably knew that they were struggling and aware that help was available, they still chose not to attend the MTC (Matthews, Croft, Lawson, & Waller, 2013). In yet another study, students needing assistance often did not admit their need until it was too late (Grehan et al., 2011).

Literature has also identified a number of barriers that keep remedial and general education students from attending drop-in MTCs. Some of these barriers included students' confidence in their own skills and knowledge, learning experiences, location, operating hours, and attitudes of support center staff (Matthews et al., 2013). Symonds, Lawson, and Robinson (2008) also identified the barriers of lack of awareness of the MTC and a fear of embarrassment. In addition, Grehan et al. (2011) identified specific categories of fear that create barriers such as fear of failure, fear of the unknown, fear of being singled-out, and fear of showing a lack of knowledge or ability. These fears inhibited students' relationships to peers or tutors and affected engagement and coping strategies (Grehan et al., 2011). Furthermore, unawareness of their learning styles, negative attitudes towards the MTC, and mathematical support were contributors to lack of success (Matthews et al., 2013).

Others have also suggested ways to increase student engagement and use of MTCs. Specifically, MTCs should be versatile, cater to individual learners, and provide a welcoming and engaging environment (Gillard, Levi, & Wilson, 2010). Requiring training of peer tutors has also been suggested (Cooper, 2010). Educators must not only inform students of MTCs but also make them as easy to access as possible.

Focus-Based Approach

Because it emphasizes activities required of all students, a FOCUS-based approach to improve student success can be hypothesized to address many of the issues associated with the use of a MTC as the primary way to improve student success. Therefore, this study presents a modification of the FOCUS approach and examines its impact on student success in developmental and general education courses.

Before presenting the specific modifications and outcomes, the background at the institution is discussed, including the self-reported reasons students were not using the drop-in tutoring lab at this institution. Then the subsequent changes made to implement a modified FOCUS model are detailed. Finally, a comparison of the effectiveness of only implementing drop-in tutoring versus implementing a modified FOCUS model is provided.

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Institutional Background

A midsize public university located in the rural south central part of the United States is the setting for the study. The institution has a large population of first-generation college students, slightly over 50% of the student population. In addition, the university has a large number of students from low income families with median family income in the bottom 20% of peer institutions. For many years, academic support has been available for all students, regardless of major, in the form of mentoring, various meetings and retention efforts, and tutoring. For over 15 years, the institution has used a drop-in MTC. The MTC uses peer-to-peer tutoring. Students with a strong background in mathematics, primarily mathematics and engineering majors, are hired as tutors. Tutors are given brief training and assigned shifts in a room dedicated for the purpose of tutoring. Tutoring hours include daytime and evenings as well as weekends.

Additionally, the university has implemented a state driven "pathways" initiative. Under a pathways approach to curriculum, depending on their major, students take either a College Algebra course or College Mathematics course (also called Quantitative Literacy or sometimes College Algebra for non-STEM majors). The design follows the pathways approach to curriculum for developmental mathematics and general education mathematics courses described by Asera (2011), such as providing math pathways for non-STEM majors. Prior to the change to the modified FOCUS model, College Algebra, College Mathematics, and developmental mathematics courses were each separate courses taught primarily in a traditional 3-hour format.

A recent analysis of drop-in MTC usage data at this institution indicated that a significant proportion of developmental and general education mathematics students were not using the institution's MTC. In particular, during the spring of 2017 only 13% of 528 students enrolled in developmental and general education mathematics attended the MTC at least once. The MTC structure required students to be proactive and take the initiative in accessing available support. The instructors in the mathematics department strongly encouraged the use of the MTC and posted information on classroom boards, on the course management system (Blackboard), and in the course syllabi. Even with this encouragement, the MTC remained underutilized by students in these courses. This phenomenon, combined with a desire to improve student success, was a primary motivation for this research.

Exploring the Problem: Reasons for an Underutilized MTC

After examining success rates of many courses and the underutilization of the MTC, a survey providing multiple-choice and open response questions facilitated the investigation of why students were not utilizing the available resources. During the spring semester of 2017, each instructor for the 28 different sections of remedial and general education mathematics courses disseminated the anonymous survey during class time. The instructors informed students that the purpose of the survey was to improve the MTC experience, and they were encouraged to think seriously about each question and write down any ideas they formulated. The students completed the survey before they departed their classrooms. The survey essentially consisted of three, open-ended questions: 1. If you have not attended the MTC, why not? (454 students responded to this question.) 2. What would get you to attend the MTC? (333 students responded to this question) 3. If you have attended the lab, what improvements would you suggest? (84 students responded to this question). Note that students were allowed to give

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more than one answer for each question. The data were then collected and categorized according to themes that emerged in the responses.

A look at the frequencies of different student responses in the data revealed some insights into lack of MTC use. Table 1 summarizes the reasons students gave for not attending the MTC for the 454 students who responded to this survey question. The most frequently self-reported reasons for not using the MTC included the belief that they do not need help, the notion that they do not have enough time for the MTC, and the fact that they lack specific details about how to obtain help (such as the hours and location of the MTC). A summary of student responses concerning what would make them attend the MTC is presented in Table 2 for the 333 students who answered this survey question. The most frequently suggested changes included improving the atmosphere of the tutoring lab, advertising the tutoring lab, and expanding availability (longer hours of operation). A summary of the improvements suggested by students who have attended the MTC is given in Table 3 for the 84 students who responded to this survey question. The most frequently given responses to this question included no improvements suggested, more knowledgeable tutors, and more availability (longer hours of operation).

These findings have been found to align with the research findings of Matthews et al. (2013), Symonds et al. (2008), and Grehan et al. (2011) mentioned earlier in this article. Notably, although Matthews et al. (2013) found operating hours as a barrier to MTC use, the survey given at this institution found lack of time in general to be a major reason for not attending the MTC. Despite fairly long hours of operation--including daytime, evening, and some weekend hours--MTC operating hours were likewise among the most frequently suggested changes for increased use. In further examination of the verbatim responses, a sizable number of respondents indicated they did not have time to go to MTC due to work schedules. Although the frequency of these responses were surprising, this result was consistent with internal data collected by this institution that a larger number of students work full time than what would be typical for other universities.

The results of the survey left the institution looking for a solution that would help students who did not have time for voluntary tutoring, who did not have knowledge about the MTC, and who perhaps incorrectly believed they did not need help. One potential solution that emerged was to require supplemental class time that would give assistance and additional activities on current course topics. At about the same time, the institution was also considering implementation of just-in-time development courses. An approach was needed to address the problem of students not using drop-in tutoring, while simultaneously implementing just-in-time review for developmental courses.

Table 1

Student Responses for Reasons They Do Not Attend the MTC

Reason	Number of Students	Student %
Do not know	7	1.5
MTC hours	1	0.2
Indifference	7	1.5
Later hours	1	0.2
Nervous	4	0.9
Subject tutoring NA	2	0.4
No need	231	50.9
No time	115	25.3
Not enough help	1	0.2
Other help	27	5.9
Bad experience	3	0.7
Miscellaneous	1	0.2
Study alone	1	0.2
Unaware/location	41	9.0
Unsure	12	2.6
Grand Total	454	100

Table 2

Student Responses for What Would Make Them Use the MTC

Responses	Number of Students	Student %
Advertise	58	17.4
Improved atmosphere	79	23.7
Child care	1	0.3
Better Tutors	22	6.6
Bonus points	11	3.3
Time with one tutor	4	1.2
Class-like structure	12	3.6
Subject necessity	2	0.6
More availability	49	14.7
Require it	35	10.5
Nothing	54	16.2
Miscellaneous	1	0.3
Resource availability	2	0.6
Money reward	3	0.9
Grand Total	333	100

The Proposed Solution: A Modified FOCUS Model

As previously mentioned, the FOCUS model has been demonstrated effective in improving student success in College Algebra and developmental courses (Mireles et al., 2014). The FOCUS approach was investigated as a potential solution to the problems of lower than desired student success and lack of use of academic support in the form of the MTC. Particularly appealing features of this approach were the just-in-time development in tandem with the credit-bearing course, learning support strategies such as group work and real-life activities, and mandatory use of academic support services.

Why was there a need to modify the FOCUS Model approach? The need to modify the FOCUS approach stemmed from specific concerns of the institution. The institution has served a large number of students requiring developmental mathematics, and individual students within the cohort had diverse abilities, so a one-course fits all approach was not deemed appropriate. In addition, insights from the survey regarding the MTC use placed emphasis on adding required tutoring opportunities to students most in need of such help. Further, the institution was under a state initiative for use of the Math Pathways model. Finally, limited university resources and a large number of students from low-income families required the strategic and efficient addition of requirements to courses.

Table 3

Suggested Improvements for the MTC

Suggestion	Number of Students	Student %
Advertise	3	3.6
Atmosphere	7	8.3
Extra credit	1	1.2
Better lab	8	9.5
Access availability	9	10.7
No changes	27	32.1
Private tutoring	2	2.4
Knowledgeable tutors	27	32.1
Grand Total	84	100

Details of the Modified FOCUS Implementation

The FOCUS model was implemented in essentially two variations to existing courses. The first variation consisted of 6-hour courses designed to be very similar to the FOCUS approach described in Mireles, Acee, and Gerber (2014). In addition to regular course content, these newly designed

6-hour courses included just-in-time review, learning support in the form of group work, activities to relate mathematics to real-world applications, and opportunities for tutoring with peers and instructors. Thus, the new course format effectively included "required tutoring." Peer tutors (student workers from the MTC) were brought into larger classes to augment availability during the additional 3 hours of course time.

The second variation of the new course did not contain just-in-time review and attempted to target students most in need of support such as tutoring. This course consisted of a 5-hour developmental course. In addition to regular course work in a 3-hour developmental course, the 5-hour courses focused on learning support in the form of group work, activities to relate mathematics to real-world applications, and opportunities for tutoring with peers and instructors, but it did not include just in-time developmental instruction. Without developmental instruction, the idea was this course would have more time available for required tutoring.

To implement the modified focus model, we first obtained the approval of the Vice President of Academic Affairs. He approved the modified focus model curriculum as data has shown that it increases student success rates in gateway courses and thus would be favorable in the calculations of the state funding formula. Next, we developed four curriculum proposals, one for each course that was going to be delivered under a new structure. Our proposals were then brought before the curriculum committee and approved. We then worked with the registrar office in adapting the course schedule to accommodate our newly structured courses. For logistic reasons, we had to match the corequisite courses with corresponding section numbers which had the same instructor. We listed the first few sections on the schedule as the corequisite courses, the next sections as the courses with supplementary labs, and the last sections as stand-alone courses.

As detailed in Tables 4 and 5, students were placed into one of five scenarios based on mathematics placement and pathway. The American College Test Enhanced (ACTE) math subscore was used to place students. As the university has historically done, scores on the mathematics portion of the ACT exam were used to place students into the appropriate level of course. The ACT cut-off values used for placement were based on historical data at the university and current practices among peer institutions. Placement practices could be refined and likely improved with multiple measures of student mathematical aptitude.

It should be noted that academic support remained in place after implementation of the new courses. Specifically, the mentoring program for all students, various meetings and programs meant to increase retention, and continued peer-tutoring in the MTC remained available. However, under the newly designed courses with either 2 or 3 additional hours, time was built-in to allow for "required tutoring" from either the course instructor or a peer tutor helping in the course.

Table 4

Implementation of Course Changes for Majors Requiring College Algebra

ACTE Math Score	Primary Enrolled Course	Additional Required Hours
21 and above	College Algebra (3 hours)	None
19 and 20	College Algebra (3 hours)	2 Hour Additional Course Time
17 and 18	College Algebra (3 hours)	3 Hour Additional Course Time*
16 and below	Developmental Math	2 Hour Additional Course Time

Note. *includes just-in-time developmental material.

Table 5

Implementation of Course Changes for Majors Requiring College Math (non-STEM)

ACTE Math Score	Primary Enrolled Course	Additional Required Hours
19 and above	College Mathematics (3 hours)	None
18 and below	College Mathematics (3 hours)	3 Hour Additional Course Time*

Note. *includes just-in-time developmental material.

Initially, with the modified curriculum, students were being placed in the wrong courses according to math ACTE scores or NextGen Accuplacer scores, so we had to vet each one of the students over the summer and place them correctly. As a result, before the next semester, we set the enrollment numbers to zero and gave the advising center, which advises freshmen and sophomores, permission to override students into the courses according to a placement document we updated and gave them each semester. For other students like transfer students, the faculty advisor contacted the mathematics department where the admin instructed them how to place the student.

Each semester the math placement policy with the noted sections of each type of course was emailed to the advising office and department heads to disperse to their faculty. If an advisor had a student with questionable background information to decide placement, then they called for approval from the mathematics department head. In the mathematics department, committees were formed according to which type of course a faculty member was teaching. This helped to coordinate and make improvements throughout the semester on the modified FOCUS model courses.

What is similar and different in the modified FOCUS approach when compared to the FOCUS model as described by Mireles, Acee, and Gerber (2014)? The newly designed 6-hour courses followed the FOCUS model closely, that is these courses emphasized the three "legs" of just-in-time developmental instruction, learning support activities in the classroom, and required academic services support. The difference in the modified FOCUS approach is that there was more than one type of course based on student placement and pathway. In particular, students could be placed into a traditional 3-hour course, a 5-hour course, or a 6-hour course based on Math ACTE performance. The newly designed 5-hour course still emphasized learning support activities in the classroom and required academic services support but did not include just-in-time developmental instruction. Although time was set aside to help students in both the 6-hour and 5-hour courses, emphasis in the 5-hour course was given to availability of tutoring during class time as these students had been identified by standardized testing as most in need of help.

Modified Model Evaluation

The modified FOCUS model met the objective of giving students placed in the newly created 5-hour and 6-hour courses exposure to learning support and required tutoring (and in some cases just-in-time developmental material). However, the question remained did this additional learning support and required tutoring result in improved student success? Thus, the following question guided the evaluation of outcomes related to the model's implementation: Did the student success

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increase after the implementation of the modified FOCUS model?

Procedure

This question was investigated by examining student outcomes. Specifically, the proportions of successful students before and after the implemented changes were compared using standard two-population proportions tests. It should be noted that, other than the implementation of the modified FOCUS approach, there were no major changes at the institution. Specifically, mathematics instructors teaching the courses remained largely the same before and after implementation of the changes. Also, student body makeup and size remained largely the same before and after implementation of the changes (there were no changes in admission policies at the university, etc.).

Data Collection

For the purposes of this research, success was considered a student completing the respective course with a grade of A, B, or C. The proportion of successful students before and after the changes were implemented is summarized in Tables 6-9. Student records accessed through Institutional Research provided the data for pre-postcomparison; entering Math ACTE scores were used to determine comparison groups.

Findings

For both College Algebra and College Mathematics, the changes corresponded with a significant increase in success rates. Prior to the changes, students with a Math ACTE score of 18 or below on the College Mathematics pathway would be required to pass a developmental course with a C or better before continuing on to the credit-bearing College Mathematics course in a subsequent semester. In the Fall 2016/Spring 2017 sequence, only 36% of 147 students with a Math ACTE score of 18 or less were successful in doing this. However, in fall of 2017 66% of 104 students with a Math ACTE score of 18 or less successfully completed the developmental material and College Mathematics course in a single semester utilizing the modified FOCUS approach (see Table 6). Similarly, for the College Algebra pathway, prior to the changes, students with a Math ACTE score of 18 or below would be required to pass a developmental course with a C or better before continuing on to the credit-bearing College Mathematics course in a subsequent semester. In the Fall 2016/Spring 2017 sequence, only 14% of 428 students with a Math ACTE score of 18 or less were successful in doing this. However, in fall of 2017 52% of 185 students with a Math ACTE score of 18 or less successfully completed the developmental material and College Algebra course in a single semester utilizing the modified FOCUS approach (see Table 7). Furthermore, overall College Algebra success for all students (regardless of placement) significantly increased (see Table 8).

Table 6

Comparison of Success Rates Before and After Modified FOCUS Implementation for College Mathematics

Student Data	Before Modified FOCUS*	After Modified FOCUS
Placement	Math ACTE ≤18	Math ACTE≤18
Percent successful	36%	66%
Number in course	147	104

Note. *reflects two semesters due to development course requirement prior to changes.
p (two sample proportion test) < 0.001

Table 7

Comparison of Success Rates Before and After Modified FOCUS Implementation for College Algebra Students with Math ACTE < 18

Student Data	Before Modified FOCUS*	After Modified FOCUS
Placement	Math ACTE ≤18	Math ACTE≤18
Percent Successful	14%	52%
Number in Course	428	185

Note. *reflects two semesters due to development course requirement prior to changes.
p (two sample proportion test) < 0.001.

Table 8

Comparison of Success Rates Before and After Modified FOCUS Implementation for College Algebra (All Students)

Student Data	Before Modified FOCUS	After Modified FOCUS
Placement	All students	All students
Percent successful	55%	65%
Number in course	536	513

Note. p (two sample proportion test) < 0.001.

Table 9

Comparison of Success Rates Before and After Modified FOCUS Implementation for College Algebra Pathway Developmental Mathematics

Student Data	Before Modified FOCUS	After Modified FOCUS
Placement	Math ACTE ≤18	Math ACTE≤16
Percent successful	54%	53%
Number in Course	428	360

Note. p (two sample proportion test) < 0.6014

Success rates for the College Algebra pathway developmental course before and after the modification of this course from a 3-hour course to a 5-hour course remained steady (see Table 9). However, it should be noted that the population of students in this course changed according to the modification of placement Math ACTE cut-off scores. Prior to the implemented changes, this course consisted of students with Math ACTE scores of 18 or less; after the implemented changes it only consisted of students with Math ACTE scores of 16 or less.

Discussion

Key to the modified FOCUS approach outlined in this paper is the correct placement of students. Placement was made based entirely on Math ACTE standardized test scores. There are numerous potential pitfalls in student placement, and studies have shown the limitations of standardized tests (see Ngo & Kwon, 2015 among others). Future research is needed to explore the impact of different methods of placement and different stratifications of students; including questions like what role advisors and students themselves should have in course placement.

Another consideration when evaluating the implications of this study is the specific nature of the university in which it was conducted. As previously mentioned, the institution is a midsize public university located in the rural south central part of the United States that services a large number of first-generation college students originating from low-income families. Modifications were made to adapt the model to the specific cultural and structural characteristics. Findings demonstrate how the FOCUS model can be adapted to a different institutional scenario.

Implementation of the modified FOCUS approach coincided with vast improvements in student success. Further, this is the largest known increase in student success the mathematics department at this institution has seen over a 1-year time frame. As previously mentioned, past studies have demonstrated the potential for increased student success when implementing the FOCUS model (Mireles et al., 2014) and

for students receiving tutoring (Cooper, 2010). Therefore, given the nature of the changes made with the modified FOCUS model, the results seen in this study are consistent with past research. In addition, the increase in success corresponding to the implementation of the modified FOCUS model has been far from typical, being the largest known increase in student success in developmental and general mathematics at Arkansas Tech University.

Limitations

Not all factors that can contribute to student success were controlled in the study; thus, the improvement in success cannot be explicitly proven to be a result of the implementation of the modified FOCUS model. Also, the generalizability of findings is limited because the study was conducted at a single institution; results may vary by institution. Finally, the scope of this study did not include an evaluation of student placement methods based on standardized placement tests or the adaptations made to cut scores.

Implications for Practice

There are a few implications for practice worth mentioning concerning the implementation of the modified FOCUS model detailed in this study. First, the implementation of the modified FOCUS model shows great promise as an approach for delivery in developmental and general education mathematics courses as it coincided with improved student success. Also, the modified FOCUS model can increase student use of tutoring services and address many of the barriers associated with a drop-in MTC by requiring students to attend additional class time. Further, the FOCUS model can be tailored to fit the different scenarios and challenges faced by institutions.

The importance of working with colleagues across the campus is another implication for practice evident from the study. From the onset, support from other entities across the institution should be nurtured, stressing the potential improvement to student progression and success. Coordination for appropriate testing and placement, class scheduling, and availability of tutors during the scheduled in-class hours is essential to the modified FOCUS model implemented in the study. Institutional placement protocols might be considered by other institutions modifying the model. Strong and open communication with advisors is imperative, and we recommend continuous collaboration with the advising team prior to and throughout implementation in order to streamline and improve appropriate placement. Scheduling courses with a mandatory, in-class tutoring component in a location with close proximity to the tutoring center may also be helpful.

Although the primary purpose of this paper is not to consider financial impact, it should be noted there are costs associated with increasing the weekly contact time between instructors and students as detailed in the modified FOCUS model. The costs come in the form of student time, faculty work load, and the increased use of classrooms. However, the increase in student success that coincided with the implementation of the modified FOCUS largely offset these costs in subsequent semesters at this institution. Specifically, the enrollment for all general education and developmental mathematics courses in the semester immediately following the implementation of the modified FOCUS model (Spring 2018) significantly decreased (approximately 25% lower). As revealed by spring enrollment data, this decrease was a result of fewer students retaking the course and the increased efficiency through merging college-level and developmental courses using just-in-time instruction. Sharing such information with administrators may help program directors garner the fiscal support and buy in of administrators.

Other student services... might be examined to identify modifications most appropriate for particular institutions.

Conclusion

This study examined techniques for potentially addressing the important problem of student success in developmental and general education mathematics courses in postsecondary education. The modified FOCUS model is an adaptation of the FOCUS model that uses standardized exam scores to place students in different course variations. This approach shows promise as an approach to improve student success. Of particular interest in this study was addressing the underuse of a drop-in MTC. Issues identified by the institution regarding the underuse of the MTC included knowledge of the MTCs location and hours, the limited hours of the MTC, student perceptions of its usefulness, the atmosphere of the MTC, and expertise of the tutors. The modified FOCUS effectively addresses many of these issues by making instructor tutoring available and extending weekly course hours to students most in need of this help. Other student services that are not well used across campus might be examined to identify modifications most appropriate for particular institutions. The promise shown by the modified FOCUS approach suggests other institutions may benefit from similar practices.

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