

Impact Report of the Quality Enhancement Plan

I. EXECUTIVE SUMMARY

The Wallace Community College Quality Enhancement Plan (QEP) emerged from an on-going and broad-based conversation with College stakeholders, including faculty and staff members, administrators, students, and the community. The goal of the QEP is to improve student performance and success rates in developmental mathematics courses by redesigning Basic Mathematics (MTH 090), Developmental Algebra I (MTH 091), and Developmental Algebra II (MTH 092).

To achieve this goal, the QEP focuses on the following objectives:

- (1) To ensure that knowledge and skills learned in a developmental mathematics course are adequate for success in the gateway mathematics course, Intermediate Algebra (MTH 100).
- (2) To establish programs and services to strengthen students' developmental mathematics skills and knowledge.
- (3) To implement tools, policies, and methods enabling students to improve their study behavior in mathematics courses.

To reach these objectives, the QEP incorporates a major course redesign, using emporium-style mastery learning facilitated with a cutting-edge technology platform, Assessment and LEarning in Knowledge Spaces (ALEKS). Pedagogical modifications also include a flexible self-paced system of advancement through the developmental mathematics material, allowing those that master skills to move on and those needing remediation more time on task. Developmental mathematics material will be modularized into more manageable "chunks" of information to aid student learning and offer students a motivating sense of accomplishment as they progress through the new system.

The plan also incorporates more financial and human resources. Each of the two campuses of the College will feature a high-tech developmental math lab, staffed by a lab director, which will serve as an extension of the classroom. Through ALEKS, students will receive immediate feedback and frequent assessment. In addition, students will have more one-on-one interaction with instructors, case workers, and student tutors. Instructors and case workers will carefully monitor student progress and identify students likely to have difficulty with the new method of instruction, and student tutors will provide peer support.

The QEP will proceed in phases, launching on the Sparks Campus with redesigned MTH 091 courses in fall 2011 and redesigned MTH 092 courses in spring 2012. The redesigned course format will proceed on the Wallace Campus in academic year 2012-2013, beginning with MTH 091 courses in fall 2012 and continuing with MTH 092 courses in spring 2013. These two courses were chosen as the pilot courses because they have the highest enrollment of all the College's developmental math courses, and their redesign will have the greatest impact on student success. However, once proven successful with MTH 091 and 092, MTH 090 and MTH 100 will integrate this method as well.

Title and Brief Description of the QEP as Initially Presented

The Wallace Community College Quality Enhancement Plan (QEP) emerged from a collaborative effort of College stakeholders, including faculty and staff members, administrators, students, and the community. After much data analysis and stakeholder discussion, it was determined that a significant number of students who enrolled in Wallace Community College were underprepared for college mathematics and that these students would greatly benefit academically from a redesigned and restructured developmental math program. *Hooked on Outrageous Technology (HOOT)* was chosen as the name for the QEP, and the slogan "We give a HOOT about mathematics" was selected as a promotional strategy.

The QEP called for a redesign of developmental math courses (MTH 090, MTH 091, and MTH 092). A mastery learning approach was implemented using an Emporium-style learning environment along with a technology platform known as "Assessment and Learning in Knowledge Spaces" (ALEKS). The Emporium-style learning model required the implementation of a flexible, self-paced program where students could move through the course material at their own pace allowing them to complete up to three courses (MTH 090, MTH 091, and MTH 092) in one term. This model would facilitate more remediation for students in need of additional assistance and would allow faster progression for students who were able to master topics more quickly. Students would complete assignments presented through the ALEKS program which was available to them in a classroom computer lab or outside of the classroom through internet access. Students could acquire assistance and understanding by studying ALEKS examples, viewing related videos, and/or requesting instructor or tutorial assistance on a one-on-one basis.

Key components of the QEP included a notebook to assist with organizational and study skills, an ALEKS modular completion requirement of 80% before testing, mini-lectures focusing on key topics, and student satisfaction surveys to provide student input on the redesigned courses. The QEP would involve additional staffing to include lab directors, case workers, and peer tutors for both campuses (Wallace and Sparks). In addition, the Sparks Campus would require a remodel to accommodate QEP classes, and the Wallace Campus would require construction of a new facility to house the computer labs for the program.

Initial Goals and Intended Outcomes

The central goal of the QEP was to improve student performance and success rates in developmental mathematics courses by redesigning Basic Mathematics (MTH 090), Developmental Algebra I (MTH 091), and Developmental Algebra II (MTH 092) in order to improve student performance in Intermediate Algebra (MTH 100). To achieve this goal, the QEP focused on the following objectives and related outcomes for each:

1. To ensure that knowledge and skills learned in a developmental mathematics course are adequate for success in the gateway mathematics course, MTH 100.
 - Students' success rates for each redesigned course will meet or exceed the national average.
 - Students' success rates for each redesigned course will increase 5% annually from baseline statistics collected prior to redesign (2010-2011 fall and spring).
 - The percentage of students successfully completing MTH 100 in the

- first attempt will meet or exceed the national average.
 - Students successfully completing MTH 100 in the first attempt will increase 5% annually starting from the baseline statistics collected prior to the redesign (2010-2011 fall and spring).
2. To establish programs and services to strengthen students' developmental mathematics skills and knowledge, and
 - 100% of students will complete 80% of each module prior to moving to a subsequent module.
 - Students enrolled in the developmental mathematics program will utilize the developmental math lab on average at least 1.25 hours per week.
 - 80% of students will answer "Satisfied" or "Very Satisfied" to question #2 concerning satisfaction with sufficient staffing.
 - 80% of students will answer "Satisfied" or "Very Satisfied" to question #5 concerning satisfaction with the benefits of supplemental resources.
 - 80% of students will answer "Satisfied" or "Very Satisfied" to question #8 concerning satisfaction with their increased math confidence levels.
 3. To implement tools, policies, and methods enabling students to improve their study behavior in mathematics courses.
 - 100% of students taking a module exam will complete at least 85% of the notebook for that module. To allow for "fast tracking," students scoring 80% or better on the initial module assessment are exempt from this requirement.
 - 80% of students will answer "Satisfied" or "Very Satisfied" to question #7 concerning satisfaction with the improvement of their organizational skills.
 - The completion rate in developmental mathematics courses will increase 5% annually from baseline data collected prior to redesign (2010-2011 fall and spring).
 - The persistence rate for each redesigned course will increase 5% each semester.

Changes Made to the QEP and Reasons for Making Those Changes

- A. The original QEP required comparison of success rates of developmental math students to national averages and to Wallace Community College averages for baseline data. The QEP team searched for national averages for developmental math success rates, but definable and comparable success rates were not available. Consequently, the College decided to use College success rate data as the baseline for comparison for the redesigned developmental courses and to analyze success rate improvements from the baseline success rates for developmental math students in MTH 090, MTH 091, and MTH 092.
- B. The original QEP called for the optional inclusion of MTH 100 in the Emporium Model during the fourth year of implementation. The first objective of the QEP was to ensure that knowledge and skills learned in developmental mathematics courses are adequate for success in the subsequent mathematics course. Since the implementation of the QEP, the success rates of students enrolled for the first time in MTH 100 (the first subsequent math course) had increased from the baseline rate

of 56% during the 2010-2011 academic year to 75% during the 2014-2015 academic year when MTH 100 was scheduled for inclusion in the QEP model. As a result, the College decided to delay the inclusion of MTH 100, as success rates for that course were already showing substantial improvement. Instead, MTH 100 became a bridge course between developmental and college-level math courses. MTH100 students would use ALEKS for all homework and testing and would have instructor lectures with scheduled due dates for assignments and tests. Additional efforts were made to focus on improving the success rates of the MTH 090, MTH 091, and MTH 092 courses as these rates were not consistently showing the level of improvement as evidenced in the MTH 100 course.

- C. Changes to specific components of the QEP were made based on student concerns, QEP survey results, and course success rates.
1. A course notebook was initially required in an effort to improve organizational and study behaviors in mathematics courses as well as across the curriculum. Students were required to complete sample math problems, access their textbook to answer questions, and keep notes in the notebook. In addition to the notebook, students were required to complete coursework in the ALEKS software program before testing to move to the next module in the course. It became apparent that time constraints would not allow students to complete the required notebook work and the ALEKS work during a given term. Therefore, the notebook requirement was modified to require less time consumption while maintaining the intent of improving study behaviors. Students are now asked to maintain a notebook with tabbed dividers for the purpose of organizing instructor handouts, pacing guides, benchmark calendars, instructor goal sheets, ALEKS examples, notes, and student work.
 2. Mini-lectures were initially implemented to assist students voicing a need for a traditional lecture-based environment and to ease the transition into an Emporium Model. However, attendance for these lectures was very poor, and it became evident that students did not see value in the mini-lectures as they began to realize that they could get individualized instruction during a class meeting or at any time in the math lab. This lecture component was terminated at the beginning of the fall 2012 semester.
 3. Instructor-created videos were added to the supplementary materials as a result of an initiative promoted by the Dean, Instructional Affairs in the spring 2013 term. A short video was created for each topic covered in the ALEKS coursework. A web-page was created to store the videos so that students could access them from any internet- capable computer. During the fall 2014 term, an option became available to directly link videos to individual topics within the ALEKS program for more convenient student access. Instructors recreated videos using ALEKS examples for insertion directly into the ALEKS program.
 4. Attendance was quickly viewed as a major obstacle to success under the Emporium Model. Students seemed to falsely believe that they could work as well from home as they could in a classroom setting and that there was no reason for attending class other than testing. Compounding this attitude was the fact that many of these courses had a hybrid component allowing students to complete a portion of the required class meeting time in the lab at their discretion. The additional lab time was verified through a Campus Track card-swiping system for keeping attendance.

A case worker was to be hired and charged with the responsibilities of working with students who were deemed to be at-risk of failing based on poor attendance and slow progression through the course material. On the Sparks Campus, the smaller student population allowed the lab director to carry out the duties and responsibilities of the case worker. On the Wallace Campus, an early intervention program was implemented in spring 2013, and an academic coach was hired to fulfill the duties of a case worker for developmental students in math, English, and reading. The academic coach would be responsible for handling instructor requested referrals based on slow progression through the program or other obstacles to learning (i.e. transportation issues, childcare issues, etc.) and poor attendance. A data base was designed to send a report to the academic coach each morning listing all students who were missing three consecutive classes or missing more than 70% of the class meetings at any given time during the term. During the AY 2012-2013, 113 developmental math referral students were contacted through e-mail, telephone calls, and/or meetings. There was a 27% success rate of coaching these at-risk students through the completion of their course. Table 1 shows the numbers of students contacted in subsequent years for the fall and spring semesters and the success rates achieved by the academic coach in assisting those students through the completion of their course. There was a 25% drop in student enrollment in developmental math courses during AY 2015-2016, which is reflected in fewer student contacts during that year.

Table 1
Academic Coach Success Rates

Academic year	Student contacts	Number of students successful after contact	Percent successful after contact
2013-2014	482	153	31.7%
2014-2015	785	301	38.3%
2015-2016	587	208	35.4%

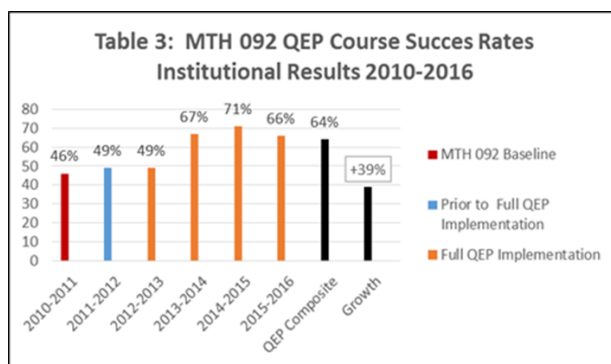
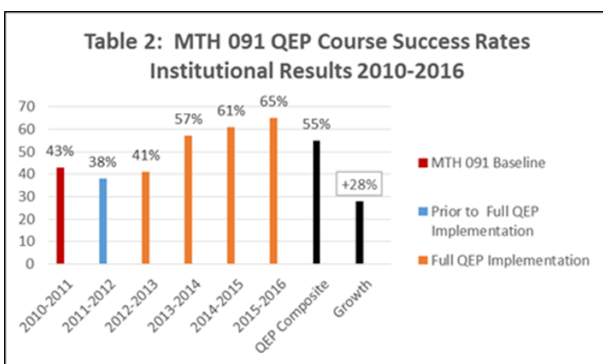
- D. After the first year of QEP implementation, it became clear that the multiple-course-completion option was not being fully utilized by many capable students. The Administrative Council agreed to offer a tuition waiver for MTH 100 to students completing multiple developmental courses in one semester. Research (Jaggers, Edgecombe, & Stacey, 2014, p. 6; Vandal, 2016) indicates that students who complete developmental math obligations in an accelerated manner increase their likelihood of obtaining a credential. The waiver has incentivized substantial increases in the number of students completing multiple courses and moving more quickly through the developmental math coursework. During the year prior to implementation of the tuition waiver, 64 students completed multiple courses in a single semester. After the waiver was implemented, the number of students completing multiple courses in one term increased to 222 (178% increase) for the subsequent year.
- E. One of the intended outcomes for the QEP stated that students would utilize the developmental math lab on average 1.25 hours per week. When the QEP was implemented, the developmental math classes were scheduled in a computer lab. Students met in the lab setting for 2.50 hours per week every week as a requirement for attendance during the scheduled class, thus exceeding the intended outcome of 1.25 hours per week.

The Impact of the QEP on Student Learning and Environment Supporting Student Learning

The central goal of the QEP was to strengthen student performance and success rates in developmental mathematics courses (MTH 090, MTH 091, MTH 092) in order to improve student performance in MTH 100. In an attempt to reach this goal, the QEP established three primary objectives, each with measurable outcomes. Each objective and the associated outcomes are addressed below with the exception of outcomes which were removed from the QEP. Outcomes which were removed from the QEP were discussed earlier in the "Changes Made to the QEP and Reasons for Making Those Changes" section of this report.

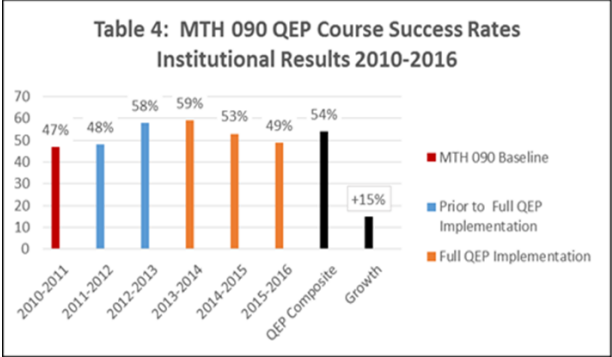
Objective 1: To ensure that knowledge and skills obtained in developmental math courses are adequate for success in subsequent mathematics courses (MTH 100)

The implementation of the QEP followed a "roll out" strategy with implementation occurring on the smaller Sparks Campus during the first year. MTH 091 was initiated during the fall 2011 term, and MTH 092 followed during the spring 2012 term. Meanwhile, construction of a new Center for Academic Success which would house developmental classes began on the Wallace Campus. MTH 091 and MTH 092 were first offered in the Emporium Model on the Wallace Campus during the fall 2012 term. MTH 090 was included in the implementation for both campus locations in the fall 2013 term. As noted in Tables 2 and 3, when MTH 091 and MTH 092 were fully implemented for both campuses, there was a drop in success rates. Efforts were made to address this drop in success rates which included adjustments to course requirements and content organization of each developmental course in the QEP. With these modifications and the improvement of student attitudes toward this new pedagogy, course success began to rise. The original QEP outcome for this objective dictated that a 5% increase would be expected each year from the baseline year. There was a large increase in success rates during the AY 2013-2014. Increases have been less substantial in successive years and have fluctuated as enrollment trends have varied. A composite of success rates for the years after full QEP implementation was calculated to summarize the QEP impact. The overall success rates show that MTH 091 (Table 2) has increased 28% and MTH 092



(Table 3) has increased 39%.

The overall success rates for MTH 090 (Table 4) have increased 15%. The MTH 090 success rates began to decline during AY 2014-2015 as an unprecedented increase in MTH 090 enrollment numbers occurred. Data will continue to be analyzed to determine the impact of placement trends, adjunct instructor success rates, and content revisions on the decline of MTH 090 success rates.



The “National Study of Developmental Education II: Baseline Data for Community Colleges” (Gerlaugh, Thompson, Boylan, & Davis, 2007) was used for national average comparison data and was based on students successfully completing MTH 100 in the first attempt after completing developmental math courses prior to registration for MTH 100. These numbers did not include students enrolling in MTH 100 from placement. Using this criteria, the average of MTH 100 success rates before implementation of the QEP were calculated to be 51% as compared to the national average in 2007 of 58%. Table 5 compares the composite of MTH 100 success rates after full implementation of the QEP with the national average from the year 2007, evidencing a 37% overall improvement. The success rates for AY 2015-2016 indicated a decline caused by a change in assessment methods. Student evaluation in MTH 100 had been based on ALEKS comprehensive assessments which gave credit for knowledge of past and future topics in the course. Evaluation was changed to randomize testing over previously mastered topics, and this caused a lower rate of success while students struggled to remember all past content as they progressed through the course. Further modifications to chunk the information into smaller units for testing is showing promise in reestablishing the improvements in these success rates while maintaining the comprehensive mastery-learning component of the program.

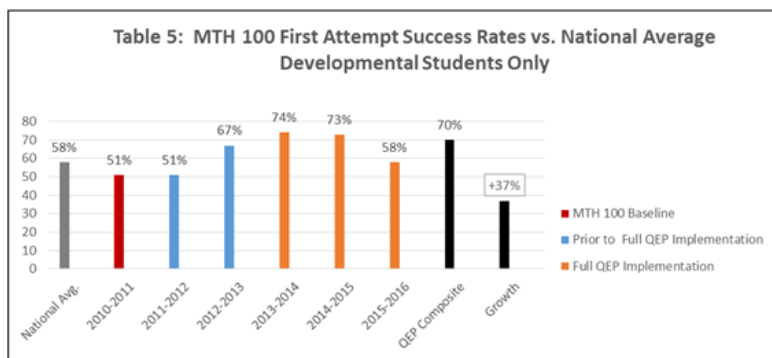
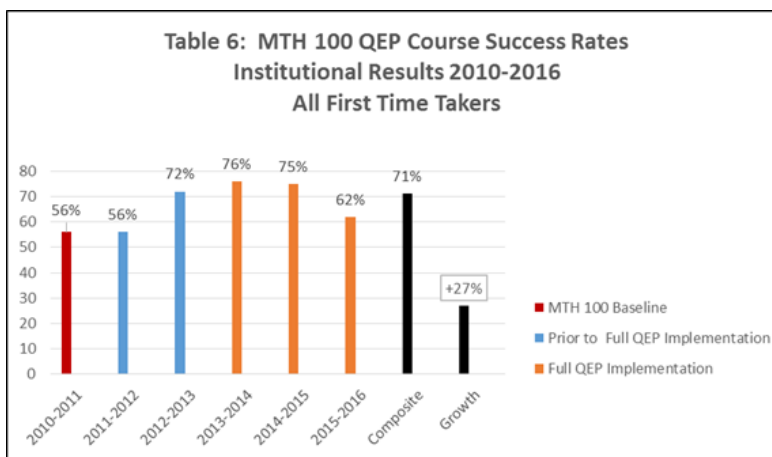


Table 6 indicates that the goal of increasing MTH 100 success rates by 5% annually has been partially achieved. The composite of the success rates for all students (students from placement and from developmental math) enrolled in MTH 100 for the first time increased by 27% from the baseline year. Statistics for AY 2015-2016 show a drop in success rates. Corrective measures have been taken to reestablish higher levels of success through revision of testing protocols as outlined in the previous outcome.



Objective 2: To establish programs and services to strengthen students' developmental mathematics skills and knowledge

In the process of developing the QEP, conversations within the mathematics department often centered upon "how" to convince and encourage students to practice more mathematics for better understanding and retention. The selection of ALEKS as a software platform provided the basis of a mastery component which would ensure that students actually performed more mathematics. All students are currently required to demonstrate 100% mastery (instead of the proposed 80%) of each module before testing. After mastery of a module, students take an exam which requires a 70% score and enough bonus points to obtain an 80% score in order to progress to the next module. Students are required to retake exams until they pass. The bonus component is included as a way of incentivizing students to complete coursework in a timely manner and encouraging students to complete additional assignments as requested (i.e. notebooks, surveys, attendance goals, etc.). Each subsequent exam includes topics learned in previous modules, making each developmental course comprehensive.

A student survey has been implemented to seek information about how this program may be assisting students based on their perspectives, and a goal was set to show that 80% of students would answer "Satisfied" or "Very Satisfied" to the questions listed in Table 7.

Student responses indicate that the QEP is currently meeting or exceeding the 80% goal.

Table 7
Percent of Students Surveyed Answering "Satisfied" or "Very Satisfied"

Questions:	FA 11	SP 12	FA 12	SP 13	FA 13	SP 14	FA 14	SP 15	FA 15	SP 16
Are you satisfied with the level of staffing in the mathematics QEP program?	93	100	96	96	95	94	99	94	97	98
Are you satisfied with the supplementary materials provided in the QEP program?	86	81	88	90	93	89	91	97	93	95
Is your level of mathematics confidence increasing as a result of this course?	79	69	84	86	90	89	92	94	94	94

Objective 3: To implement tools, policies, and procedures to encourage the development of better study habits in mathematics courses

Students in the developmental math program often need to be reminded of simple things that may increase their likelihood of success. Principles such as consistent and punctual attendance, organization of materials, and goal-setting are essential. Strategies in the QEP have focused on the development of basic tools to address these needs.

For example, benchmark dates are provided to assist students in pacing their work to successfully complete one or more courses in a given term. Test preparation guides are provided to assist students in practicing a structured method of studying for tests. In addition, instructors have designed modular goal/testing forms to provide individualized

goals to assist in motivating students toward early course completion.

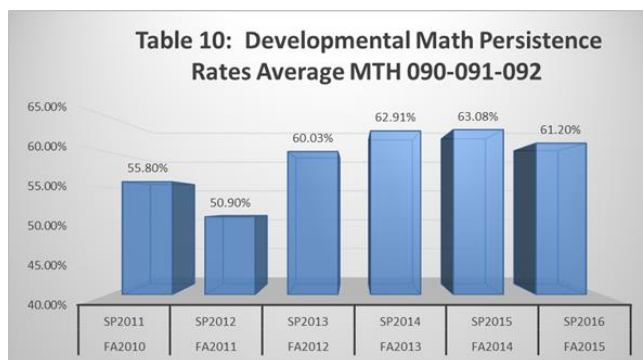
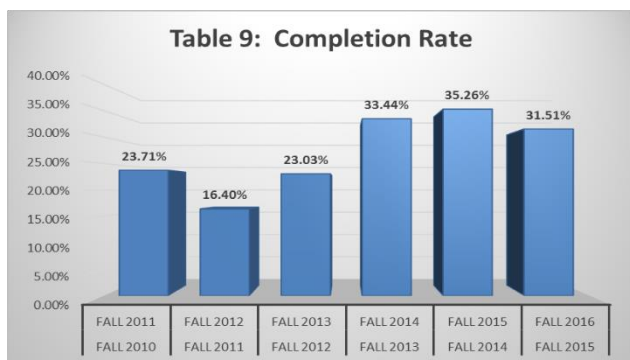
Students must also keep a notebook containing benchmark calendars, current module goal sheets, and test prep guides. In addition, students are asked to keep work in the notebook separated by course modules in order to stress the importance of structure and organization in the learning process. The data in Table 8 indicates that students believe these tools are helping to improve their organizational skills.

Table 8
Percent of Students Surveyed Answering "Satisfied" or "Very Satisfied"

Question 7:	FA 11	SP 12	FA 12	SP 13	FA 13	SP 14	FA 14	SP 15	FA 15	SP 16
Do you find the use of the Instructor Goal Sheets (Modular Planner/Test Form) and your Student Notebook helpful in improving your organizational skills?	71	88	88	88	89	89	97	97	96	98

Completion and persistence rates were compared in order to measure the success of QEP. Completion rates shown in Table 9 were measured annually by evaluating the number of students who successfully completed their developmental math sequence and registered for an upper-level math course (MTH 100 or MTH 116). Completion rates initially showed a decline from the baseline year but have indicated improvement in successive years.

Persistence rates shown in Table 10 were measured by evaluating the number of students who registered for a developmental math course in a semester and then registered the next semester in the same course or a subsequent course. The persistence rates have shown considerable increases during the QEP, indicating that this program is encouraging more students to complete their developmental math requirements and continue on to enroll in college-level math courses.



Unanticipated Outcomes

- Prior to implementation of the QEP, there was a Mathematics Division at Wallace Community College which encompassed all math courses and instructors. After the QEP was implemented, it became apparent that a separation of the upper level math instructors and the instructors facilitating the changes for the developmental math program was needed. A Developmental Studies Division was created to better focus on the needs of all students placing in developmental

courses.

- After realizing increases in success rates for the developmental math program as a whole, it was determined that the QEP had also impacted subpopulations of the student body. A comparison was made between success rates of low-income students (identified by their eligibility for Pell Grant) and high income students (students not eligible for Pell Grant). Official statistics indicated that during the fall 2011 term, there was a 20% difference between success rates of low and high income students. As of the fall 2014 term, there was no gap between the success rates of low and high income students.
- The developmental math instructors have averaged a 98% "Strongly Agree" student response for the fall-spring course evaluations with regard to whether or not these students would recommend their instructor to others. The nature of the Emporium Model lends itself to more one-on-one time between instructors and students and seems to be creating an atmosphere of team work between students and developmental math instructors.
- Initial research for the QEP topic yielded concerns in both developmental math and writing abilities, but since approximately 84% of Wallace Community College students place in developmental math, it was determined that this area would have more impact on student success. With the identification of writing as an additional challenge for students, and the positive impact of the tutoring services offered through the QEP, the College received a Title III grant to establish the Center for Writing and Writing Instruction focusing not only on tutorial assistance for developmental and first-year writers but also offering assistance to writers at all levels and in all subjects. Additionally, the Center offers programs, events, and group sessions to help student writers, and it also assists faculty in all subject areas incorporate writing-to-learn pedagogy in their classes.

Conclusion and Reflection

The QEP supported the Wallace Community College 2010-2013 Strategic Plan "to demonstrate the College's commitment to quality teaching and learning through increased student success and continuous improvement in instructional programs." Specifically, the QEP addressed the Strategic Plan goals for increasing success of students in transitional classes, offering alternative instructional delivery, and establishing student success centers to provide tutorial assistance for all students in the areas of writing, mathematics, and study skills. These goals were targeted for inclusion in the QEP because an average of 84% of incoming students were placing in developmental math, and improvement in this area would have a great impact on the student population as a whole. Developmental math placement meant that these students would be required to take two or three developmental math courses before beginning credit-bearing work, and, in many cases, they became frustrated to the point of withdrawal from the College before completion of developmental math coursework. This was seen as an obstacle to the attainment of a college credential or degree.

In support of the Strategic Plan of the College, the QEP offered alternatives for accelerated progression through developmental coursework and was tailored to meet the needs of both weaker students and more capable students. The QEP incorporated mastery learning for better skills retention and offered a structured framework for the attainment of study skills in preparation for the next level of college coursework. Free tutorial services were made available to these students and were extended to all

students needing assistance with mathematics college-wide. The initial research for the QEP topic brought attention to the need for student support in the area of writing skills, and through the identification of this need, a writing center was created to offer assistance not only to developmental English students but to all students needing assistance with writing assignments college-wide.

Since implementation of the QEP, institutional data have shown improvement in success rates, persistence rates, completion rates, and withdrawal rates (from 25% down to 13%) for students enrolled in developmental math. Retention rates for developmental math students have steadily increased during the years impacted by the QEP from 44% during AY 2011-2012 to 55% during AY 2015-2016. These rates closely correlate with the retention rates of the College which increased from 44% to 56% during these same years. Over the time span of the QEP, the number of students earning an AA or AS degree increased by 67%, and the number of students earning a degree or certificate of any kind increased by 37%. During AY 2012-2013, statistics evidenced a closure of the socio-economic gap for developmental math students based on a comparison of Pell/non-Pell eligible students.

Comparison of success rates for developmental students with students placing in MTH 100, the next level math course, showed that the majority of students who worked their way through developmental math outperformed students who placed in MTH 100 since the inception of the QEP, and the success rates for MTH 100 have increased by 27% for the duration of the QEP.

In reflection, analysis of the QEP data indicates that more student engagement, more student-instructor interaction, and more intrusive intervention for at-risk students can make a significant difference in guiding students through the successful completion of developmental course requirements. Anecdotal evidence has shown that students working through the developmental math coursework under the QEP have gained a measure of success, have learned or strengthened study skills, have made lasting connections with instructors and support personnel, and have gained a foundation for the successful attainment of their desired college certificate or degree.

References

- Gerlaugh, K., Thompson, L., Boylan, H., & Davis, H. (2007). National study of developmental education II: Baseline data for community colleges. *Research in Developmental Education*, 20(4).
- Jaggars, S. S., Edgecombe, N., & Stacey, G. W. (2014). What we know about accelerated developmental education. New York, NY: Columbia University, Teachers College, Community College Research Center. Retrieved from <https://ccrc.tc.columbia.edu/media/k2/attachments/accelerated-developmental-education.pdf>
- Vandall, B. (2016, February 12). Betting on U of Nevada. [Blog post]. Retrieved from <http://completecollege.org/tag/developmental-education/>