DURHAM TECHNICAL COMMUNITY COLLEGE

TLC

# Learning Matters

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# LEARNING MATTERS

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## Editor's Note

The sixth volume of *Learning Matters* continues Durham Technical Community College's contribution to the scholarship of teaching and learning. *Learning Matters* is a reminder that the college's mission, "to enrich students' lives and the broader community through teaching, learning, and service," is put into practice every day by the talented and dedicated faculty on our campus.

During the 2013-14 academic year, when faculty were teaching more classes and larger class sizes than ever, the TLC Advisory Committee announced a call for submissions to *Learning Matters* with some question of whether we would get any response. It is a testament to the dedication of Durham Tech's faculty that several instructors were willing to give even more of their time and expertise.

The success of the Teaching-Learning Center is due to the support it receives from faculty through their presentations, participation, and contributions to *Learning Matters*. In particular, the work of the TLC would not happen without the dedication of TLC Advisory Committee, and the accuracy of this volume of *Learning Matters* would not happen without the editorial support of Mary Anne Grabarek, the founder of the TLC.

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# Student Failure or Success? Results and Reflections from the PRESS Grant Program

**Lance Lee**

Success can be defined in various ways, such as overall personal happiness, work satisfaction, and financial stability. It can also be defined in smaller ways, such as completion of a single difficult task. Said difficult task might just be the completion of a particularly challenging Spanish course, which I happen to teach. The PRESS for Completion Grant Durham Tech applied for and received from the Walmart Foundation, in affiliation with Achieving the Dream, gave my colleagues and me the structured space to reflect on the question of why Spanish, and eleven other so-called gatekeeper courses, have been potential roadblocks to student success. Before you embark with me as I reflect on the PRESS experience, a framework would be helpful.

PRESS stands for Persistence, Retention, and Student Success. Walmart funded this grant after partnering with Achieving the Dream. The organization, as explained on the Achieving the Dream (ATD) website, is "a national nonprofit that is dedicated to helping more community college students, particularly low-income students and students of color, stay in school and earn a college certificate or degree." ATD is "evidence-based, student-centered, and built on the values of equity and excellence." Only ATD Leader Colleges, like Durham Tech, were eligible to apply. Walmart wanted the 15 Leader Colleges chosen to broaden the work of ATD by engaging a wider group of faculty and staff in the work of student success. Among other requirements, Walmart requested a data-driven, innovative approach to figuring out how to increase student success. Each grant recipient had the flexibility to spend the grant money as that institution deemed necessary in order to accomplish Walmart's grant goal. Consequently, no two colleges implemented the grant in the exact same way, as I fully discovered after attending the ATD DREAM Conference in February 2013.

In August 2012 at a beginning of semester Student Success Convocation, Durham Tech began the PRESS process by introducing the grant program and having faculty and staff recommend, via online form after the meeting, a course for review that presented a significant challenge to student success. Faculty and staff submitted suggested courses based mostly on instructional experience, anecdotal evidence, and personal interest. Although my

colleagues and I in the Foreign Language Department were aware of data illustrating which of our courses students often failed, we didn't need to pore over detailed grade breakdowns to know instantly that *Spanish 112 Elementary Spanish II* should be one of the courses proposed for review. Almost every semester I have taught the course, many students either withdraw from or fail the course. My experience is not unique.

Although the PRESS implementation leaders at Durham Tech did not mandate that we suggest only the most widely failed courses for evaluation, the 12 courses ultimately selected did happen to have hard data showing high rates of failure and/or withdrawals. Those 12 courses were: *ACC 120 Principles of Financial Accounting, Adult High School Diploma Basic Math, BIO 168 Anatomy and Physiology I, CHM 130 General Organic and Biochemistry, EDU 119 Introduction to Early Childhood Education, ENG 111 Expository Writing, MAT 171 Pre-calculus Algebra, NA I Nursing Assistant I, NET 125 Networking Basics, PSY 150 General Psychology, SPA 112 Elementary Spanish II*, and *SUR 111 Introduction to Surgical Technology.*

The implementation leaders structured teams for each course based on faculty and staff interest as indicated by the online forms. They designed each of the 12 teams with four principal members. The team lead, in most cases, was a full-time faculty member who taught the course on a regular basis. I served as the team lead for *Spanish 112*. In order to promote engagement across a diverse group from the college, the implementation leaders tried to have at least one staff member and at least one part-time faculty member on each team. Interested faculty and staff who were not assigned to a team could still work in an ex-officio advisory capacity on each team.

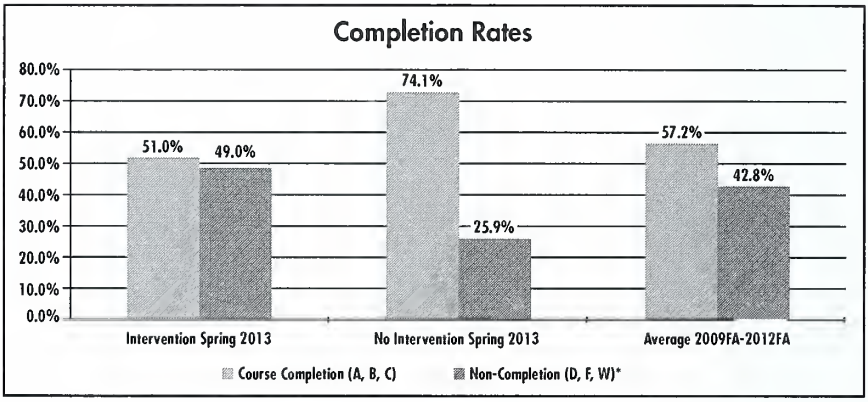
The *Spanish 112* team at the beginning consisted of the following Durham Tech employees: a staff member, reference librarian Susan Baker; two full-time faculty members, Lindsey Carpenter, and me; and one part-time Spanish faculty member, Jennifer McDuffie. Toward the end of the project, a part-time faculty member, José Ocaña, joined the team. Everyone but José and Susan had taught the course in the past.

At various workshops over the course of the next year and a half, the teams discussed and implemented a range of strategies to improve student success. In fall 2013, we focused on data analysis and strategy development. Spring 2013 saw the first implementation of interventions to improve student success. In fall 2013 and spring 2014, we continued reviewing data, modified

strategies, and scaled up some of our strategies. Note that in spring 2013 the only instructors to implement the strategies in *Spanish 112* were PRESS participants, Lindsey Carpenter, and me.

So, now that you have the basic framework, you probably want to jump right to the conclusion of our study. Did the interventions we came up with to improve student success work? Let's look at the data.

Below, the far left bars indicate completion and non-completion rates for the spring 2013 *Spanish 112* sections that received the interventions. The middle bars indicate the spring 2013 sections that did not receive interventions. The far right bars show the historical completion and non-completion rates from fall 2009 through fall 2012.

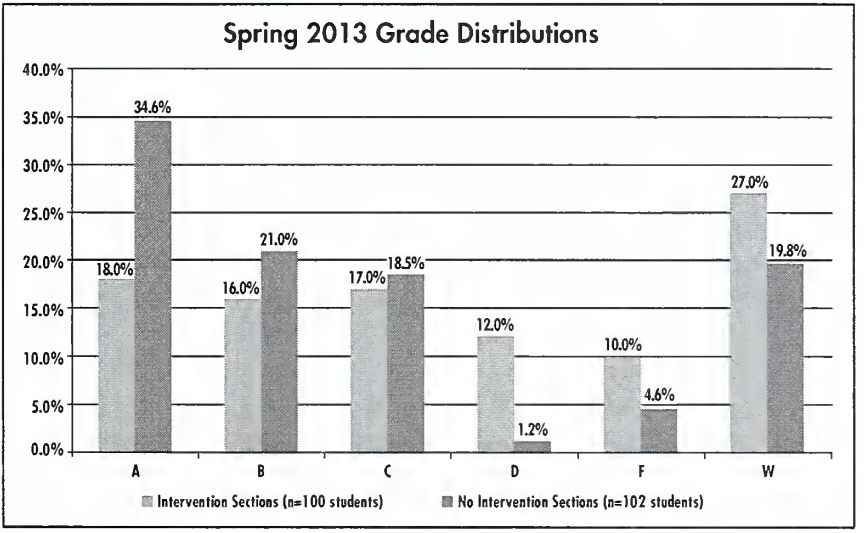



*Completion is defined here as achieving a grade of A, B, or C. Course completion rates are the left bars in the pairs. Course non-completion rates are the right bars in the pairs. 100 intervention students and 112 non-intervention students make up the sample studied above.

At first glance, our interventions appear to have resulted in a higher non-completion rate than the sections without interventions. You can see upon further examination, however, that the intervention sections had completion rates that were closer to the historic averages. If you take into account historical trends, then the high rate of completion in spring 2013 in the non-intervention sections does seem to be a fluke. Additionally, there are other factors that could have contributed to the differences, such as the times and days of the classes and the format (hybrid versus traditional). And, of course, one must keep in mind that correlation does not equal causation.

The data from fall 2013 showed a different story from spring 2013. 38.1% of *Spanish 112* students in sections that received the intervention did not successfully complete. Similarly, 35.1% of students in the non-intervention sections did not successfully complete. Lindsey was the only team member teaching *SPA 112* in fall 2013. So, perhaps I was the root of all evil after all: the spring semester, when we were both implementing the success strategies, had higher non-completion rates in the intervention sections than in the fall when Lindsey was the sole instructor using the interventions.

We found it curious that the number of withdrawals in the intervention sections for *Spanish 112* in spring 2013 was higher than in the non-intervention sections:




Did our interventions have an undesired effect? Perhaps it wasn't even the interventions. Could it be that Lindsey and I had just never been aware of our grade distributions in comparison to other instructors? Maybe we were cruelly and unusually difficult instructors? These are all questions that would be intriguing to consider in the future. But at first, the only consolation for me was that many other teams had similarly ambiguous data. No one discovered a simple answer that would perfectly solve the student completion puzzle once and for all.

If you take these data as the sole measure of success for PRESS, you might think the project was a failure. However, the sample size was rather small,

and the research would need to be performed on a more long-term basis to draw better conclusions. Furthermore, the cold data fail to show the collaboration and dialogue that occurred among faculty, staff, and students as a result of PRESS. They do not show the inquiry skills everyone developed along the way. They do not show the real and positive changes that actually took place.

In terms of dialogue across the college, I found PRESS to be a resounding success. In fact, interest in the project after the initial convocation was so high that there were more volunteers than necessary to make 12 teams of four. By coming together during the workshops, faculty and staff could get out of their boxed-in routines to talk to one another. It's not that folks at Durham Tech avoid each other, but without the careful and planned decision to structure collaboration, we do not communicate with one another as we should. This is not a unique phenomenon across the educational world.

Working on PRESS provided those involved the opportunity to break the chains of the routine isolation of the day-to-day in order to collaborate on improving student success. Over the course of eight official workshops, PRESS participants met up to learn from one another and share their perspectives. Aside from the official workshops, individual PRESS teams organized meetings as they saw fit to brainstorm strategies and how to implement them.

The first few workshops provided the framework for PRESS and allowed teams to begin examining data and creating strategies. At these workshops, teams were tasked with examining data, identifying possible stumbling blocks for student success, and ensuring equitable practices. A theme emerged from these first workshops that would continue throughout the *Spanish 112* team's experience on PRESS: one idea would quickly lead to two more. For example, considering equitable practices in terms of scheduling classes, we thought about how times of day and time off between *Spanish 111* and *112* might affect student success. We who had taught *Spanish 112* had observed that students who did not take *Spanish 111* and *112* in consecutive semesters frequently seemed lost in *Spanish 112*. We knew, though, we could not force all students to take the courses back-to-back. The faculty members who had taught the class also shared with the groups that certain *Spanish 111* students with previous Spanish study sometimes felt bored because the level of the class was too low for them.

One solution to prevent students from forgetting material started forming during an individual team meeting and during the next PRESS-wide workshop regarding strategy development. Creating a sequence of *Spanish 111* and *Spanish 112* courses to be taken as mini-sessions over the course of one semester, an idea that had been considered before by the Foreign Language Department, developed into one of the strategies the team implemented to improve student success. The first time students could take the mini-session classes was fall 2013.

Students took *Spanish 111* and *Spanish 112* over the course of a full sixteen-week semester. The classes met four days a week, and the two had to be taken together even though they were technically separate eight-week courses. Students with two years of high school study of Spanish or other background in the language, such as independent study or travel abroad, were the only ones allowed in the course. Due to its accelerated pace, we limited the course to students who had some prior Spanish knowledge. Because of this prior knowledge, the instructor, Lindsey, spent less time on basic *Spanish 111* material and more time on *Spanish 112* content. In fact, *Spanish 111* in the mini-session format actually covered some material from *Spanish 112*. Students gave positive feedback for the course. As one fall 2013 student put it, "The material is always in your mind, since the class is almost daily. It's important to be practicing constantly while learning a language, and the mini-session is great for that."

Our team was not content to stop at one strategy. We had many other ideas that we wanted to try out. We did realize if we chose to implement multiple strategies it would be harder to determine which specific strategy contributed to improved student success. However, we concluded that there are so many factors influencing student success that studying just one semester of results would not be enough to declare that a strategy has been effective. Since we had identified, through instructor observation, that forgetting material from *Spanish 111* presented a major obstacle to success in *Spanish 112*, our strategies centered on reviewing material and skills from *Spanish 111* that students need in *Spanish 112*. We chose to focus on this strategy because it was one instructors could control, to a degree.

To review both content and study habits, we created two review quizzes to be completed on Sakai. One quiz reviewed the basic grammar of *Spanish 111* and provided multiple links to additional practice and study materials.

The second quiz reviewed study skills for foreign language. In the second quiz, we provided students a link with detailed guidelines on how to study for foreign languages, since study methods for other classes do not always work for foreign languages. Also, we gave a rationale for answers when students viewed instant feedback after submission. Students could take both quizzes as many times as they desired within the first two weeks of class. The review quizzes have thus far been implemented only in the classes of those on the PRESS team. In the future, we hope to share the quizzes with all Spanish instructors via a departmental Sakai site.

The other front-loaded intervention was an optional review workshop of *Spanish 111* material for students. We encouraged all *Spanish 112* instructors to promote the workshop in their classes, and we also posted signs around campus to announce the workshop. After spring 2013, we began announcing the workshop on the Durham Tech website as well. We offered two days for the workshop at different times during the second week of classes in order to accommodate a variety of schedules. The combined turnout for both workshops has stayed around 15 to20 students each semester we offer it.

Our final two strategies were open lab hours and study skills information sheets. Since students taking the hybrid version of *Spanish 112* do not have a seated lab, we thought having time when students could come each week and ask questions would be helpful. Due to low student interest and attendance, we implemented this strategy only for spring 2013. For fall 2013, our team had compiled four different review sheets that address the four major skills in foreign language: reading, writing, listening, and speaking. We shared these documents with other Spanish instructors not on the PRESS teams to scale up our efforts. As a side note, I now use them as a resource for students in all levels of my Spanish courses.

You may have already pinpointed a potential problem with these interventions. Inevitably, some students will not read the links provided in the quizzes, they will breeze through the quizzes just to get the right answer, they will not attend the review workshop, and they won't hear you when you reference--for the fifth time in two weeks--the study strategy worksheets. A few students in each class did not even complete the online quizzes. Even though they could take them multiple times and they counted toward the final course grade, some students simply did not do them. Still, there were some positive unforeseen outcomes. While we thought that perhaps only

overachieving students would take full advantage of the quizzes and the review workshops, anecdotal evidence from students indicated that a variety of students benefitted from the extra help.

At the end of spring 2013, foreign language students, not just those from *Spanish 112*, responded to an optional departmental survey reflecting on their language experience. The Foreign Language Department had regularly conducted the survey in the past for departmental use, but we added a few PRESS-specific questions for *Spanish 112* students, such as "If you were not as successful as you hoped to be in *SPA 112*, what factor(s) affected your success?" Below are the responses to that question. Note that there were 50 respondents and multiple options could be selected.

| **Factor Impeding Success** | **Student Responses** |
|---|---|
| Time management | 15 |
| Poor study skills | 12 |
| Personal issues | 9 |
| Other | 7 |
| Too much time since last language experience | 5 |
| Attendance | 3 |
| None of the above. I am satisfied with my success. | 18 |

Our PRESS team expected that "personal issues" might rank a little higher in terms of why students thought they did not succeed. Anyone who teaches at a community college knows that a typical student works (sometimes full-time), takes multiple classes, and often has family responsibilities as well. The categories, however, do lend themselves to respondent interpretation. "Time management" could have been selected by some to indicate what others consider a "personal issue," such as having to work many hours a week while attending school. Even though the survey would need to be conducted repeatedly for stronger conclusions, it is worth noting that "too much time since last language experience" did not seem to be as widespread a problem as our team had thought, at least from the students' perspective.

By fall 2013, many PRESS participants, including me, felt frustrated upon receiving such inconclusive results. The grant was, after all, focused on success as defined by student completion. If we could not help our students improve dramatically over the course of a year, then what was the point? I concluded that the point was the process. Just as I tell my students, learning and growth takes place during a determined process of experimentation,

failure, and success. The "P" of PRESS (standing for persistence) is something we all should have kept in mind during the ups and downs of the PRESS journey.

Despite inconclusive quantitative data, the *Spanish 111* and *Spanish 112* mini-sessions, *Spanish 111* review workshop, review quizzes, and study strategy handouts will persist. If even a few students benefitted from these additions, they are worth keeping. However, continuing to expand the work of PRESS on a less-structured basis may present a challenge. A formalized process of careful collaboration, such as PRESS, provides a space and a positive accountability for faculty and staff to improve student success. Change cannot be something that is simply hoped for, with nice words said about needing it from time to time. Change should not simply happen haphazardly or by accident. The process must be intentional, methodical, collaborative, and creative. Change is frustrating and hard, yet it is also stimulating and rewarding. In order to see real improvement, we must persist in changing our hopes for our students and ourselves into realities.

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Charts and Graphs based on specific research conducted by the author.

# Building an Honors Program at Durham Tech

**Tracy J. Mancini**

In the past several decades, hundreds of community colleges across the country have created honors programs to challenge highly motivated, academically talented students and to provide an academic distinction for students wishing to transfer to selective four-year institutions. In fact, a 2013 Peterson's study showed that "[o]f the more than 800 schools belonging to the National Collegiate Honors Council, about 20 percent are community colleges" and that "more than a third of two-year colleges offer honors programs equal to any honors track found at a smaller university" ("Community"). Durham Technical Community College has been part of this trend. In 2010, a task force within the Arts, Sciences, and University Transfer (ASUT) Department was charged with researching honors programs and recommending a program for Durham Tech.

The task force was comprised of faculty from the ASUT Department, relevant Student Services personnel, and two members of ASUT's external Advisory Committee, one of whom was a Durham Tech graduate who transferred to Duke University and is now employed at Duke. The yearlong process started with an exploration of existing honors programs with a web presence in North Carolina – at the time, only three: Southwestern Community College, Wake Technical Community College, and Wayne Community College. Our group convened a conference for all four schools. Some of the honors program representatives attended the meeting at Durham Tech in person; others were telephone-conferenced into the room. The conversation allowed us to identify common features and decisions schools make about how to structure their honors programs.

One fundamental decision had to do with whether to offer designated honors courses – essentially to create a subgroup of students all of whom were participating in the program – or to operate on an "honors contract" basis where students would work with an instructor on an honors-level project while enrolled in a regular course. In a 2013 national survey of honors program characteristics, 60 percent of honors programs reported using honors contracts and 87 percent said they offered stand-alone honors courses (Scott). Some of the community colleges we talked with (in and out of North Carolina) espoused the contract model, while others used a combination of designated courses and contract options. Durham Tech's task force

determined it was more in keeping with the philosophy of the college to espouse the honors contract model to avoid pulling strong, motivated students out of classrooms where there is mutual benefit for students with diverse experiences and abilities to learn from and motivate one another.

Another fundamental decision involved faculty. Who would work with our honors students, and what was the incentive to do that work? Having undertaken this new initiative under tight budget conditions, it was clear there would be no additional compensation or course-release time available for honors program faculty. Still, Durham Tech's ASUT faculty were overwhelmingly in favor of proceeding with a program that would acknowledge and offer enrichment to strong-performing students. Based on our research of other institutions, we determined that faculty participation should be voluntary and that it would not be fair to ask adjunct (part-time) instructors to take on the additional work and time commitments of the honors program in an unpaid capacity. The benefits, we determined, would be the joy and privilege of working with highly motivated students on projects in the faculty's fields of expertise. In addition, we would defer to faculty wishes with regard to the number of students they would work with in any given semester.

Finally, we needed to make sure the program was promoting student success. While it might sound appealing to a student to participate in an honors project with an instructor, we did not want the project to detract from the student's mastery of the regular course material or to interfere with the student's successful completion of his or her other courses that semester. In addition to gathering information from already established honors programs about their participation criteria, our task force became familiar with the National Collegiate Honors Council (NCHC) and the guidelines and resources it offers to create uniformity within a reasonable range of creativity among honors programs across the country. Among the best practices for honors programs listed by the NCHC, the first proposes institutions use "[a] clearly articulated set of admission criteria (e.g., GPA, SAT score, a written essay, satisfactory progress, etc.) [to identify] the targeted student population served by the honors program" and that the program should "[clearly specify] the requirements needed for retention and satisfactory completion" ("Basic").

To that end, we established that students with completed Durham Tech courses should have a minimum 3.0 GPA, a strong letter of recommendation

from a former instructor, a record of completing courses (not regularly withdrawing or earning below a C), and a clearly articulated proposal that shows initiative and focused intellectual curiosity. New students to the college would be eligible, too. They needed to provide a strong proposal and letter of recommendation from a former teacher/instructor. To receive credit for an honors project, the student would need to earn an A or B in his or her regular course work in addition to satisfactorily completing the proposed honors project and participating in an honors symposium to share the project and results with a larger audience of students, staff, and faculty. Students who satisfactorily met the completion criteria would receive honors course completion designation on their transcripts. Students who completed 12 credit hours of honors course work would be eligible to graduate from Durham Tech "with Honors." The office of Student Information and Records graciously agreed to work with us to make notations on transcripts.

After gaining department, advisory board, division, and college approval to proceed, we launched our Honors Program in fall 2011 and are now in the midst of our sixth semester. The response has been strong. Some memorable honors projects to date have been a *MAT 285 (Differential Equations)* project to model air flow and temperature effects on growth/population of terrarium plants; a *HUM 120 (Technology and Society)* exploration of gender roles in video games and gaming culture; a *BIO 111 (Introduction to Biology)* study of the effects of smoking and other habits on mouth bacteria; an *ENG 231 (American Literature I)* project to create a web site repository of Native American literary resources and criticism; a *HIS 132 (American History II)* investigative history of the State Employee's Credit Union in the context of the national credit union movement; and a *BIO 169 (Anatomy and Physiology II)* project on why food allergies seem to be more and more common. Students start with a research question and receive guidance from their instructors about how to fine-tune or proceed with their research.

Through spring semester 2014, 78 students have submitted honors contract proposals. Of those, 69 were accepted. A multidisciplinary committee reviews the proposals and makes the final decision about whether or not to approve a proposal. Through fall semester 2013, 32 of 55 participants satisfactorily completed their projects (58 percent). Fourteen projects are currently in progress. Student completers report feeling a real sense of accomplishment both in terms of learning applications of course-specific material and completing/presenting an undergraduate research project. 25 full-time ASUT faculty members have worked with these students. Faculty

report their experiences working with honors program students to be rewarding and enjoyable.

Since the program's inception, Durham Tech has added enrichment opportunities for participants, including a popular "How to Avoid Death by PowerPoint: Making Effective Presentations" workshop with Dr. Douglas James, assistant dean of The Graduate School at Duke University and co-director of Duke's Preparing Future Faculty program. Students have used the tips provided by Dr. James to create impressive, professional visual aids to accompany their end-of-project presentations at our honors symposia. This semester, we hope to add a workshop on "Surveys 101: The Basics of Sound Survey Design," since many student projects involve surveying members of the Durham Tech and Durham communities for primary research.

In 2013, Durham Tech signed two agreements with four-year universities to ensure our students' honors program credits will transfer as honors courses at those institutions. Appalachian State University and the University of North Carolina – Asheville are eager to welcome our honors program students who transfer to those institutions into their Honors Programs. In January 2014, three honors program students and two advisors from UNC-Asheville visited Durham and exchanged program insights and project results with students and faculty who had completed honors projects at Durham Tech. The UNC-Asheville representatives were impressed with the depth of our students' projects.

In addition, Durham Tech has joined the North Carolina Honors Association, an organization comprised of four-year universities and community colleges that offer honors programs, and we hope to allow Durham Tech Honors Program students the opportunity to present their research at the NCHA's annual conference in fall 2014. A grant from the Durham Tech Foundation this year should help us continue to provide enrichment opportunities to honors program participants.

While Durham Tech's Honors Program has come a long way in a few years, we have identified opportunities for improvement and the need to make some changes to increase participants' completion rates. This semester, spring 2014, a task force will convene to recommend changes for the program as it moves forward. For more information on the Durham Tech Honors Program, visit **www.durhamtech.edu/honorsprogram**.

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# Assessing Learning for Maximum Benefit to Students and Instructors

**Tina Bryant-Allen and Gabby McCutchen**

Many instructors struggle to know how much students understand in class. Students' nodding heads and glazed eyes can indicate only so much. The first graded assignment can reveal students' comprehension of the course content, but it is difficult for some students to recover from a low grade on the first test. By then it is too late for many students. One relatively easy strategy to check students' learning is to use Classroom Assessment Techniques (CATs). This article will describe the strategy and provide several examples of effective CATs from the *ACA 122 College Transfer Success* curriculum.

Before we discuss the function and benefits of using Classroom Assessment Techniques (CATs), we must first establish a clear understanding of what classroom/course assessment is. Classroom/course assessment is the collection, review, and use of information for the purpose of improving student learning. Although the term is often used interchangeably with evaluation, assessment and evaluation are two completely separate activities.

Assessment is the means by which information is gathered to make a variety of decisions. In the classroom, instructors might assess a student's skill, knowledge, or reasoning. Evaluation takes place when value is placed on accumulated assessment data when an instructor places a value (a grade) on a test, project, or assignment. All evaluations include assessments, but not all assessments necessarily include evaluations.

Classroom assessment establishes a continuous feedback loop between the students and the instructor providing a gauge for the progress and learning in the course. This type of feedback is important for adjusting curriculum and lesson plans for each course's individual needs. Course assessment can be broken down into two types: formative and summative. Formative assessment is the gathering of information on student learning during a class. It helps the instructor identify concepts or skills that students are not learning well. Then the instructor can take steps to improve student learning while the course is still in progress. Formative assessment is often referred to as classroom assessment. Summative assessment, on the other hand, is the

gathering of data on student learning at the conclusion of a course and/or program. The data collected is used by the instructor to make improvements to curricula and lesson plans in subsequent courses. Both formative and summative assessments are important for improving student learning.

Formative assessment strategies include Classroom Assessment Techniques (CATs). CATs give instructors information on the prior knowledge and skills of the students in a particular course and on the students' understanding of or reaction to a particular session or reading. There are a myriad of examples of CATs ranging from one-minute papers to classroom opinion polls that can be used to provide valuable feedback regarding how well the class objectives were met. Determining the appropriate CAT to use depends heavily on the student learning outcomes associated with the topic or subject matter presented during the class.

CATs are beneficial to the student as well as to the instructor. When students are asked to provide feedback during class, the responsibility of learning is shifted from the instructor to the student. Their level of involvement increases, and they become empowered to monitor their understanding of course content. CATs are especially useful to part-time instructors who may have limited contact with students outside of class and to instructors of large lecture-style classes who may not have many opportunities to interact with students sufficiently to gauge how effectively students are learning.

The *ACA 122 College Transfer Success* course is a one-credit hour, one-contact hour course that features an ambitious set of learning outcomes. Every minute of the course is packed with information about how students can succeed in higher education, opportunities for self-assessment, and active learning techniques that engage all students in the course content. Because of the pace and breadth of instruction, CATs are especially useful. ACA instructors use CATs to discover how much students are learning from a particular class meeting and to foster the habit among ACA students of monitoring their own learning. One of the goals of ACA is to help students develop the strategies they need to succeed in higher education; CATs demonstrate one way in which students can be active participants in their own education. ACA instructors use CATs at the end of almost every class meeting. The four described below represent some of the most commonly used and most effective CATs in the college classroom.

We combine two common CATs for the end of the second instructional day in ACA. On the second day of class, instructors introduce students to advising concepts, including academic programs, plans of study, pre-majors and study tracks, credentials, and pre-requisite and co-requisite courses. We also challenge students to apply all of these concepts and resources in an assignment that requires them engage in long-term planning of the sequences of classes they will take to achieve their particular credential. This class meeting can be overwhelming for students who have limited experiences with higher education. At the end of the class meeting, instructors pass out index cards and ask students to complete a "one-minute paper" on one side and ask a "lingering question" on the other. We use this prompt: "What is the most important concept or idea you learned in class today?" to generate responses for the one-minute paper. This activity helps students to process the information and to prioritize the new information in a meaningful way. Students' answers also indicate to the instructors the most resonant course content. When students write information that is incorrect, instructors can clarify these misunderstandings in the next class meeting. On the other side of the index card, we ask students to respond to this question: "What question(s) do you have now about your academic program and/or goals?" Often students ask questions that we intend to answer in future instruction, for example, in the lesson on options for transferring to a senior institution. But when students ask clarification questions about course content that we just presented, instructors get immediate feedback on what elements of the lesson were confusing to students or what content needs to be revisited.

We use students' muddiest point CAT cards in the fourth day of instruction as a warm-up activity that serves two purposes. First, it gives students the opportunity to hear the answers to some of the most commonly asked questions and to realize that they have learned the answers to many of their questions. Second, it demonstrates to students that their participation in the CATs is relevant to course instruction. Students work in pairs either to answer the lingering questions or to identify the resources students can use to answer the lingering questions.

Another CAT that ACA instructors commonly use is the "student-generated test question." On another particularly content-heavy day of instruction, ACA instructors introduce students to a variety of textbook reading, note taking, study, and test-taking strategies. We use a jigsaw activity to actively engage students in the process of teaching and learning from one another.

When students prepare for the jigsaw activity before class, the group discussions are rich and effectively address the most important learning strategies.

At the end of the class meeting, ACA instructors ask students to write a multiple-choice or short answer test question about one of the learning strategies they discussed in their jigsaw groups. They are also instructed to include the correct answer. Students' responses to this prompt can indicate the course concepts that were particularly interesting or useful to them. The answers to their own test questions can indicate the level of their understanding of the course content. The activity also models the test preparation strategy of self-testing, which is one of the techniques that ACA instructors teach students to use to prepare for tests.

The final example of a CAT in the ACA classroom is one that ACA instructors developed. While there are a variety of CATs expertly described in resources such as *Classroom Assessment Techniques: A Handbook for College Teachers* by Thomas A. Angelo and K. Patricia Cross, instructors can create their own CATs to achieve very specific goals in their own specific contexts. At the end of the class meeting in which ACA instructors introduce students to effective strategies for time management, instructors ask students to personalize the course content by writing a goal statement. Each student gets a post-it note and is asked to respond to this prompt: "Write a goal statement that includes a specific time management strategy." ACA instructors encourage students to begin their statements with the words "I will" and to be specific about what they will do. As students write, instructors walk around the room and encourage greater specificity in student responses than "I will stop procrastinating" or "I will manage my time better." Then instructors encourage students to put the post-it note somewhere they will regularly see it such as on the bathroom mirror or the dashboard of the car or on a laptop screen. Instructors do not collect this CAT, but they do ask for volunteers to read their goal statements in class to check for specific time management strategies and to check for the ideas that may need further clarification or elaboration.

Classroom Assessment Techniques are flexible formative assessments that can be adapted to any learning environment and discipline of study. The benefits to students and instructors outweigh any concerns about loss of instructional time (which is usually minimal) or additional preparation time (which varies from minimal to moderate). When instructors effectively use

CATs as formative assessments, they can better design, better prepare students for, and better predict the results of their summative assessments.

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# Fieldwork is Fun: Occupational Therapy Assistant Students Rock!

**Christine Gunnigle**

Imagine walking into an elementary school library and observing children between the ages of five and seven working one-on-one with an adult. Everyone is smiling, laughing, and actively engaged in fun activities. The tasks include: playing the game Operation, playing cards, creating a colorful fish aquarium out of a paper plate and rocks, coloring, cutting with scissors, drawing, and painting. Are these children playing? Are they learning? Or are they in the middle of an occupational therapy treatment session? The answer is all of the above!

Occupational therapy (OT) is a helping profession, focused on facilitating optimal participation in meaningful life activities, also known as occupations. Here at Durham Tech we have a stellar Occupational Therapy Assistant (OTA) program. I had the honor of joining this talented faculty and teaching the pediatric course and adjoining fieldwork class in the fall of 2013. Durham Tech has long-standing relationships with many elementary schools and with pediatric OT practitioners in the Research Triangle. In the fall we partnered with Durham and Wake County Schools, as well as with Immaculata Catholic School in Durham, North Carolina, to provide a wonderful clinical experience for our Durham Tech students. I was energized and inspired to have such an exceptional experience in my first semester as a full-time instructor. I am happy to have the opportunity to share my experience.

Fieldwork education is the bridge between an OTA student and a competent OTA practitioner. It is a time for instructors to watch our students blossom, use new clinical skills, and transform into entry-level practitioners. In addition, the OTA students change throughout the fieldwork: confidence grows, excitement is in the air, clinical reasoning skills are utilized, and treatment planning is successfully implemented! There are two levels of fieldwork (internships) within occupational therapy academic programs: *Fieldwork level I* is concurrent with academic work and allows students to practice what they are learning in the classroom (AOTA: COE, 2009). Throughout *Fieldwork level I* students have assignments to optimize their learning experiences and to guide them on their professional journey. *Fieldwork level II* is a full- time internship that occurs at the end of the two-year

education program. These clinical experiences empower students, and the benefits of fieldwork education are vast. Advantages of fieldwork include: the opportunity to connect with our surrounding community, increasing student confidence and clinical skills and, at times, the opportunity to provide services that would otherwise not be delivered. As stated by the American Occupational Therapy Association (AOTA), "Fieldwork is a crucial part of the preparation of the occupational therapy assistant and is best integrated as a component of the curriculum design" (AOTA: ACOTE, 2007). Fieldwork allows students to perform professional responsibilities under the supervision of an experienced practitioner.

*Fieldwork level I* education varies significantly among OT/OTA programs in the United States even though it is a required part of every program curriculum. The length of fieldwork and the focus on its importance differ according to the program philosophy (AOTA Commission on Education, 1999). In the Durham Tech OTA program, *Fieldwork level I* is highly valued and well integrated throughout the program to enhance and improve student learning. Students have opportunities in four fieldwork classes throughout the two-year program to practice in the field under the supported supervision of an instructor or another licensed practitioner. A benefit for me as a new instructor was to evaluate the effectiveness of my classroom teaching. I was able to observe which concepts and ideas students understood well and ones in which they needed more instruction. It was also energizing to watch our students in practice, changing lives with the well-planned sessions that were independently created. In addition, as a new member of the Durham Tech family, it was heartwarming to see that the OTA program is congruent with the mission of the college which states: "We will create a culture where all institutional actions are focused on improving student learning and success and leading to student goal completion" (Durham Tech). Our program also embodies the "unifying" core value of Durham Tech by having our students work with and for the Triangle community.

The pediatric class (*OTA 150: Life Span Skills I*) focuses on the age range of birth through adolescence covering multiple subjects. Topics include: typical growth and development, common diseases, conditions and disabilities, screening for potential delays, assessment of occupational performance, treatment planning, and treatment implementation. Play, education, and activities of daily living are important areas of occupation for children in the United States. Many occupational therapy practitioners work in school settings and incorporate play into sessions. This practice is extensively covered

in class. The "occupation of education" includes a child's ability to participate in academic activities as well as to function in the learning environment (AOTA: OTPF 2, 2008). OT practitioners work in school settings as part of an interdisciplinary team, a design which helps to increase a child's academic performance, improves social participation, and allows for active engagement in classroom tasks (AOTA: FAQ, 2002). *OTA 150* is concurrent with a class dedicated to *OTA 163: Fieldwork level I.* The course description for *OTA 163* states the purpose of the class is "for Occupational Therapy Assistant students to have an introduction to clinical training, improve observation skills, and interact with clients under the supervision of a clinical supervisor." (Durham Tech)

Eleven Durham Tech OTA students spent three hours a week for six weeks in the Durham and Wake County school systems working under the supervision of licensed occupational therapy practitioners. The Durham Tech students then spent the next six weeks (three hours per week) working at Immaculata Catholic School in Durham under my supervision. Concurrent with this fieldwork experience (*OTA 163*) was extensive work in classrooms and labs (*OTA 150*) focusing on pediatric practice. Each OTA student was assigned to work one-on-one with a school-aged child who was identified with fine motor delays, attention problems, and/or low self-confidence that impeded school performance. In addition to this fieldwork experience, The OTA students were required to complete a standardized fine motor assessment called the "Miller Fun." Part of this assignment was to write a report of the results for the school, as well as a summary for the child's parents. The Miller Fun assesses performance skills related to schoolwork occupations such as writing, pencil use, cutting with scissors, and drawing (Pearson Clinical, 2014). The Miller Fun is frequently used in assessment within the field of occupational therapy (in school settings) to identify potential fine motor delays and coordination dysfunction (Pearson Clinical). The experience was wonderful for both the Durham Tech and Immaculata students! Based on the knowledge gained in the classroom and on previous fieldwork experiences, the eleven OTA students planned and implemented six treatment sessions at Immaculata (one for each week). Each session was focused on fine motor coordination and school-related performance skills. In class we held a fieldwork preparation session to brainstorm through ideas and projects and to create a "fine motor kit" to take to Immaculata. The first treatment session was designed to get to know the child and assess his/her strengths, weaknesses, and areas of concern. Each OTA student was well prepared, professional, and full of great ideas. They had crafts, games, and

well-planned activities to assess the child's fine motor, attention, and social interaction skills. As a new instructor who has been supervising students in the clinical world for years, I was impressed with the level of competence and professionalism each OTA student displayed.

During each treatment session the OTA student analyzed and assessed the occupational performance of the child and adjusted and planned the next session accordingly. If an OTA student noticed a deficit or area for improvement, the next session would focus on that performance skill. As the clinical supervisor, I was available for collaborating, brainstorming ideas, and processing the observations they made. The activities with the children varied but included paper crafts, pictures made from the fall leaves, beaded necklaces, clay projects, games like Connect Four and Dominos, and sport-themed art. Each activity focused on performance skills such as attention, fine motor, motivation, emotional regulation skills, cognitive skills, communication skills, and social skills (AOTA: OTPF, 2008). Each OTA student knowledgeably used therapeutic use of self, which is defined as "an occupational therapy practitioner's planned use of his or her personality, insights, perceptions, and judgments as part of the therapeutic process" (Punwar & Peloquin, as cited in AOTA: OTPF 2). The therapeutic relationships formed between the Durham Tech and Immaculata students were amazing for me to witness. The OTA students planned each session based on what each child liked and on areas of strengths/weaknesses, and they made this process therapeutic but also fun for the children. It was energizing to see each child run happily to his/her OTA student partner and actively participate in and be excited in each session. The therapeutic rapport grew stronger with each session as the OTA student chose challenging activities and adjusted the level of difficulty up or down to enable success. This adjustment increased the level of confidence of the Immaculata students and facilitated active participation. The Miller Fun assessments were completed on the last two days of fieldwork at Immaculata. By that time the children were comfortable with the OTA students which led to optimal performance on the standardized test. The Durham Tech students demonstrated competence in administering this standardized test and performed all tasks with excellence. In addition, the written reports for the school and the summary letters for the parents were thorough, professional, and very well done.

On the last day of fieldwork we were all sad to say good-bye. The school was welcoming, supportive, and extremely happy with Durham Tech throughout this fieldwork experience. The school social worker stated: "I hope it was a

very positive experience for them (Durham Tech students). It was for Immaculata!" (*Personal communication with Wendy B., 2014*). In addition, a parent wrote a thank you note to an OTA student who had been working with her daughter. The card stated:

> I wanted to send a sincere thank you for your kindness and excellent work with Mia [name changed]. Never in my wildest dreams did I imagine how positive this experience would be for her—we see it with her work and her teacher sees it… Good luck and I know you will help many, many children over the years (Handwritten note from parent, 2014).

In summary, fieldwork is a crucial part of occupational therapy education. The experiences that OTA students have are invaluable to them as they become competent practitioners and apply classroom knowledge in the clinical world. I am pleased to see the strong focus and importance placed on fieldwork opportunities at Durham Tech. Having hands-on experience with clients while still in the role of a student allows for a supported, supervised, and dynamic learning environment to solidify "book" knowledge. The Durham Tech OTA program focuses on allowing the students "to do" instead of just to observe.

There is also a high value placed in occupational therapy on client-centered care. In one study of OT practitioner students, it was found that students valued client-centered care, focusing on holistic practice, building rapport with clients, individualized treatment plans, and empowering the clients to take ownership of the process (Davis, 2007). The Durham Tech approach to fieldwork is congruent with research findings in our profession. In addition, the philosophies of the OTA program are in agreement with Durham Tech's core values of "learning and engaging."

I will close with the definitions of these core values, as this is what guides and motivates us as instructors and staff members at Durham Tech. I am glad to be part of this wonderful college!

"Learning: We value learning through rigorous quality instruction, focused student support, and appropriate student activities" (Durham Tech).

"Engaging: We value an engaging, collegial atmosphere with professional, ethical, and respectful interactions that enhance learning" (Durham Tech).

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# Grades Galore

**Wilma M. Herndon**

## Introduction

In the classes I teach there is an extremely diverse group of students. Many are international students from a variety of countries. Some students are still in high school, and other students have already obtained a college degree. They may all be in the same classroom. Some of these students, who may have up to twenty years of work experience as health professionals, are preparing for enrollment into graduate programs. Other students are enrolled in developmental math and English courses; or they may have just completed the GED requirements, matriculating from another program that is housed on the campus of Durham Technical Community College (Durham Tech). Many of these students are enrolled in the Associate Degree Nursing program studying to obtain an associate's degree at Durham Tech. The high school students are in an accelerated program in a public high school located on the campus of Durham Tech. About 50 percent of the enrollees are in the University Transfer program at Durham Tech. Four of the class groups are comprised of students who have been employees at the same company at which I taught on the corporate campus in a hybrid (classroom and online) format in an eight-week term. All are enrolled in *Personal Health and Wellness.*

## Background

I encourage my students to be wise consumers of health services and products. My hope is that they will be proficiently health-literate so they can support their loved ones in monitoring health and health care needs. Assignments account for 70 percent of their grades. In four to six class sessions students take quizzes (usually short answer format) with maximum value of five points each to check for vocabulary proficiency. I want students to understand data collection and data analysis as they keep track of their scores.

There are two major tests each academic term, the midterm exam and the final exam. Together they account for 30 percent of the final grade for the class. The testing format is multiple-choice questions which require one best answer from four options for each question. The 14 to 16 multiple-choice questions, valued at five points each, are extracted from a bank of 120 possible questions. Students can check for the correct response in the back

of the textbook (Hales, 2013, p.672) up to the date of the exam. The only other test question type is essay. Students handwrite one essay during the in-class testing session. For the final exam, I use the Health Change Plan assignment part two and use the rubric where students can earn up to 100 points. Then I convert this score to a 15-point value as an essay score on the final exam.

**Method**

I periodically hold "human bingo" activities where students are up moving around the room talking to each other finding the answer to a topic discussed in the course. Students demonstrate their knowledge of course reading and at the same time build community by learning about each other. On each bingo strip, I add at least one question about personal social behavior: find someone who "has taken a family vacation outside of North Carolina," "lives with their parents," "has siblings," or "is a parent" (Herndon). Students can earn up to four points as class participation or extra credit points as a part of exam review sessions. Another in class activity is "What Color Am I?" (Stovall). "Color" in this sense does not refer to skin color. Students are given a template with a description of each color type characteristics, and they self-identify which color fits them. There is a list of communication tips for each color type. This colors information is valuable to me as another way to learn more about who is in the room: "adventurous orange," "visionary green," "traditional gold," and "nurturer blue." (Stovall) The focus is to build community and address social health. Communication, substance abuse, and violence are major health issues addressed again in separate assignments.

The overall design is student-centered. Students are recording data about their behavior often compared to what the text, or other sources that I present, state about the topic. In the first major assignment, the Food Log, I require all students to record the number of servings they are consuming each day from the suggested amount on the food pyramid. I supply students with a form for recording data. Students can create their own form if they desire but must reflect a simple recording method showing daily servings per food group. After each week, they have to write two or three sentences reflecting on the data and complete a goal-setting plan for the upcoming week. At the end of the data collection period, I supply a set of questions to prompt students to reflect on the entire experience of analyzing their data.

I then assess for mastery. The Health Change Plan assignment has two parts. In the first part, the plan, students are given a contract form to complete. With the contract, they select what health-related behavior they want to change. I also instruct them to develop a tracking instrument for the six- to eight- week period and count that form as 15 of the possible 100 points for this entire assignment. Using authentic assessments is important to me. In the second part, the results, students use a rubric to guide them through starting with why they selected this behavior, what they learned, and what behavior they will retain as they move forward. I do ask questions about their penalty and rewards goals and whether they made any changes to their goal. I ask if they had to call on people from their support system that was identified in the plan.

Course content mastery is assessed with the case study group assignment. Students are required to build a wellness plan for an assigned family. They are to extract information from what has been discussed over the term demonstrating their knowledge of health literacy, meal planning, physical education sessions, and effective communication in a family meeting. There are both individual and group assignments, primarily for scaffolding potential. I concentrate on the weight of assignments as well as the method of assessment to build many successful experiences while expanding the learning.

**Literature Review**

Why do we assess student learning? "Traditional reasons that teachers assess students [are] (1) to diagnose students' strengths and weaknesses (2) to monitor students' progress (3) to assign grades to students (4) to determine instructional effectiveness (Popham, 2008, p.11).

There are several initiatives going on at Durham Tech. What goes on in the classroom is important as one of the array of projects to promote institutional advancement. There has to be a partnership between the learner and the institution. We should have a plan for affective assessment factors also. Student values, attitude, and interest matter when it comes to student success (Popham, 2008). "While limits and consequences are often needed, difficult students need to know that they are wanted. We must make it as hard as possible for students to reject their education (Mendler, 2000, p. 48).

**Results**

Evaluation of the culminating assignment is converted to a value of 15 points that is one portion of the final exam grade. In the past, I have waited until at least after the midterm exam before I gave students the rubric for the second part, the results. After Fall 2013 and planning for the 2014 spring semester, I provided students the rubric for the second part of the Health Change Plan assignment when the concept is first introduced and students select a behavior to change. The process was monitored for six to eight weeks.

I truly understand that the students are not all motivated in the same way, nor do they value the same things. I provide a value auction activity where students spend fake money to buy from a list of things and outbid their classmates. Samples from the list are fame, wealth, love, pleasure, and peace. They get very involved with this activity, and students learn a lot about each other along the way since this is also a group activity where they have to map out how they will spend as a group.

**Conclusion**

I request feedback from my students about the actual set of assignments at the end of the term when I am preparing for the next term. For each class group, about 99 percent of the students have recommended that I keep the same set of assignments. There have been strong comments in favor of and about the value of the Food Log assignment. I will continue to offer this assignment, being aware that tweaking the length of data recording may be necessary.

I am most concerned when one or two students submit an assignment very late or not at all. For this group of students, I expect that I may get feedback at the end of each assignment and again at the end of the term to see how this data compares. Suggestions for adjustment will probably come from the make-up of a specific class group. In the past I have not required that students put their name on the survey. At this time, I am asking students to give me feedback on each assignment after I have assigned grades. I then ask them to put their name on the form and send the form to the digital drop box. On the first day of class, I asked students to fill out a form indicating whether they have used SAKAI and/or Blackboard. I want some indication about whether Durham Tech's campus-wide adoption of the SAKAI learning management platform (January 2014) is a major problem for students as they move through this course. My goal is to analyze all of my assignments looking for improvement as I plan why, when, or how to assess course outcomes.

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# Innovation in Education: Mastery Learning and Computer-based Technology in Developmental Mathematics

**Karen Jackson**

"Undeniably, innovation stems from individual talent and creativity. But whether or not individual skills are activated, exercised, supported, and channeled into the production of a new model that can be used, is a function of the organizational and interorganizational context." (Kanter, 1988, p. 205).

Advances in technology bring new challenges for the education community. Consumers of education, who are experiencing an influx of technological leaps in their daily lives, expect the same upward and forward moves in education. As the quote from Kanter implies, the ability to activate, exercise, support, and channel individual skills in order to bring about organizational change can determine the usefulness of an educational innovation. Therefore, computer technology-based education and the manner in which educators and educational leaders respond to its implementation has become an important issue to consider. The changes taking place in educational settings as the use of technology in education becomes more common require a reframing of our thinking as educators. This situation also calls for faculty and administration to investigate how these computer technologies will enhance their organizations with the intention of creating, developing, and effectively implementing innovative education programs. Developmental mathematics redesign which involves the use of educational computer-based software to deliver course content is one such innovation.

## Developmental Math Course Redesign: The Modified Emporium Description

Developmental course redesign is being encouraged by community college stakeholders as a method of improving student academic success in math (ATD, 2012; Bailey et al., 2010; Boylan et al., 2007; Horn & Skomsvold, 2011; McClenney, 2012). Directly impacting developmental course redesign at community colleges is the emporium (or modified emporium) model. This model, which requires students to master course material, is comprised of interactions between the student, instructor, tutor, and a computer-based course management system. Additionally, some studies show that the flexibility that this model provides for instructors to individualize student

instruction is the key to increasing student success in developmental mathematics (Silverman & Seidman, 2011; Squires, et al., 2009; Tong, et al., 2012; Twigg, 2005).

An evaluation performed in 1999 in collaboration amoung the Pew Charitable Trust, the Center for Academic Transformation at Rensselaer Polytechnic Institute in addition to a group of universities, colleges, and community colleges focused on course completion, student retention, student attitudes, and cost to the institution for 30 participating universities, colleges, and community colleges across the nation. At the 20 institutions whose introductory courses in the humanities, quantitative subjects (including mathematics), social sciences, and natural sciences were studied and found to be successful, six common characteristics emerged. They were whole course redesign, active learning, computer-based learning resources, mastery learning, on-demand help, and alternative staffing. One of the successful whole course redesign models was the emporium model (Bassett & Frost, 2010; Mills, 2010; Twigg, 2003).

The emporium model originated at Virginia Tech (Twigg, 2003). At the core of the model are students who, through open attendance, are given flexibility in choosing when, where, and how to study and complete their math assignments. The students have access to a computer lab that is staffed by an instructor, graduate teaching assistants, and peer or professional tutors, all of whom are there to address students' individual needs. The goal of instruction is to equip the students to help themselves; therefore, emporium instructors and tutors direct students to resources they can use to answer their own questions. As other institutions have begun to replicate the original emporium model, it has been modified in a variety ways, some of which are to require student attendance or a scheduled group meeting time each week (Twigg, 2003).

The modified emporium course consists of a physical computer lab setting and a computer course management system. In the physical computer lab, it is recommended that there be anywhere from 25 to over 100 computers. The recommended tutor-to-student ratio is 1:25 (www.thencat.org). Class sections can consist of 25 to 45 students so that, in the larger labs, more than one class can be held at a time. There is one instructor assigned for each class section. Courses are four credit hours, and attendance is mandatory (it counts as 5% of the student's overall grade). Courses can consist of multiple

modules. All tests and quizzes are proctored, but homework and watching videos can be done in the classroom or at home.

Students' interactions with instructors and tutors about the math can be more focused on the student's individual needs. Students work through a series of assignments beginning with a pre-test, the results of which determine what topics the student needs to cover in order to master a particular module. Since students move through the coursework at their own pace, a pacing guide is given to students with the expectation that they complete one module every four weeks. If a student achieves mastery (80 percent on the pre-test), then they are free to move on to the next module. This is different from traditional math courses in which students who may be able to progress faster are forced to sit through an explanation of material they already know. If students do not achieve mastery on the module pre-test, then they watch the online instructional videos, take notes using note shells created by faculty, and complete the homework and quizzes inside the module. The mastery score for homework is 100 percent and is 80 percent for quizzes. Once those assignments are complete, the student then takes a post test, on which they must achieve mastery at 80 percent. Remediation in the emporium model is continuous and frequent. Students go over problems missed on homework, quizzes, and tests with the instructor and/or tutor individually or in small groups. If a student does not achieve mastery on the first posttest, they can retake the posttest after intense remediation. The modified emporium method of instruction supports findings of developmental education teaching and learning research which demonstrate that including computer-based instruction, maximizing student-faculty contact, engaging students in active learning, expecting students to master course content, providing prompt feedback, and capitalizing time-on-task are best practices (Blair, 2006; Chickering & Reisser, 1993; Smittle, P., 2003).

**The Developmental Math Student**

While a new design for developmental mathematics is being supported by national, state, and local policy makers and stakeholders in two-year institutions as a way to address developmental math reform, the voices of the students affected by these changes are faint. A recent study (Stigler et al., 2010) sought to find out what developmental math students understand about the mathematics that underlie the topics they've been taught and whether these students use reasoning in answering mathematical questions. The results indicate that students' knowledge of procedures taught in the

traditional environment is firmly rooted in some cases in a faulty way, which adds to students' frustration.

The transition from a traditional math course to one taught in a computer-based environment can add external pressure for students who already face a variety of work and family responsibilities and multiple academic failures that have led to lack of confidence (Bueschel, 2008; Duggan et al., 2007; Dweck, 2010; Howard & Whitaker, 2011; Middleton & Spanias, 1999). However, some students have found that innovative course environments have stimulated the learning process for them. One student from Los Medanos College put it this way:

> College is about having a career after high school, after college, so you want students to understand the material and not just get good grades in class. I feel like it'd be better for the students to actually understand the material and for the teachers to change their teaching so that the students get a real understanding. (Bueschel, 2008)

**Students' and course expectations: Teaching and learning.**
Mastery learning as exhibited in the modified emporium model is a process that finds its foundation in Bloom's (1968) Learning for Mastery (LFM), a process wherein a curriculum is divided into units that are taught, formatively assessed, and, if necessary, retaught and reassessed until mastery is achieved (Gusky, 2007; Rehberger & Yopp, 2009). Keller's (1968) Personalized System of Instruction (PSI) is a system of mastery learning very similar to LFM; however, in PSI, students move through the material at their own rates. In some cases, both LFM and PSI have been characterized as resulting in high dropout rates and instances where learners spend multiple semesters struggling at their own pace (Kulik et al., 1990). In contrast, some studies demonstrate that the feedback offered in a mastery learning environment has an impact on increasing student achievement (Blair, 2006; Kulik et al, 1990; Marzano, Pickering, and Pollack, 2001). The most effective feedback is corrective, timely, and criterion-referenced (Marzano et al., 2001). Bloom (1968) concluded that mastery has to have a subjective conceptual value to the student and it must be recognized publicly.

Computer-instructed courses, which create environments that provide the opportunity for timely feedback and mastery learning, have been received with mixed feelings and ambivalence in the higher education community. Quality of instruction delivered by computer is a concern (Grubb & Cox,

2005), and it should be if instructors are just transforming their lecture-based courses into online versions. The expectations and integrity of the course, course progression, course completion, and performance in subsequent math courses are all concerns when considering implementation of a predominantly computerized system of teaching developmental mathematics (Jaggars & Bailey, 2010).

When considering delivering computer-based instruction to students in developmental math, course designers and instructors must also consider the unique characteristics of this student population. A study of developmental math students taking their course in a computer-based format versus a lecture-based format concluded that students in the computer-based format were more likely to withdraw from the course (Ignash & Zavarella, 2009). The reasons most cited for dropping out of a computer-based course include unexpected challenges and not fully understanding what it takes to learn in a developmental math course presented in a computer-based format (Ignash & Zavarella, 2009). Interestingly, Bloom (1968) argues that if schools frustrate students in the areas self-development and ideas, the students will resort to hedonism and interpersonal relations.

Adult students who are entering a developmental math course may already feel incapable of being successful math students (Middleton & Spanais, 2012; Silverman & Seidman, 2011; Yopp & Rehberger, 2009). In the past, these adult students were put in a position in which they were sitting passively listening to the "resident expert." In some cases, this arrangement adds to the students' beliefs that only people like the instructor are supposed to be able to do math (Mesa, 2012; Middleton & Spanais, 2012; Yopp & Rehberger, 2009). Add the fact that these students who are placing into developmental mathematics have traditionally been taught using this lecture format in which often they repeatedly do not complete homework assignments and fail tests (Hodora, 2011). Continuous failure has destroyed their belief that they can be successful in developmental math (Dupeyrat & Marine, 2004; Dweck, 2010; Eccles & Jacobs, 1986; Fike, 2008; Howard & Whitaker, 2011; Mesa, 2012). In contrast, a few assumptions made by adult learning theorists support adult students' abilities to perform well in the mastery learning computer-based environment (Hodora, 2011, Ignash & Zavarella, 2009; Marzano et al., 2001; Mesa, 2012). Abela (2009) concluded that adults are "independent and self-directing, have experience, have learning integrated into their daily lives, are interested in problem

solving, and are motivated more by internal drives than external drives" (as cited in Weinstein, 2011, p. 11).

Now, redesign proponents are proposing that these adult students who lack self-confidence regarding their ability to do mathematics as a result of past failures in mathematics courses in the lecture format take a developmental math course that is facilitated by an instructor and depends heavily on the student's ability to self-regulate (Edgecombe, 2011; Morrisey & Liston, 2011; Schraw, 2007; Twigg, 2005). In the new mastery learning environment, the role of the instructor as well as the design and delivery of the course is new for many students (Schraw, 2007; Silverman & Seidman, 2011). Students are also being asked to be active in their own learning with structure and support provided instead of direct lecture (Chickering & Reisser, 1993; Twigg, 2005). The combination of these factors for students who may be classified as non-traditional or underprepared could create a scenario where the students disengage from the course (Bailey et al., 2010; Ignash & Zavarella, 2009; Tinto, 2007).

However, some research supports the fact that change in students' perceptions of their ability to be successful in developmental math occurs when they are empowered by the success that they achieve in a mastery-based model (Grubb & Cox, 2005; Hodora, 2011; Mills, 2010; Siverman & Seidman, 2011; Squires, et.al., 2009; Twigg, 2003). This model gives the students the ability to obtain success since they have to achieve mastery in a module before moving on. In the traditional lecture format, students fail test after test with no built-in remediation; and when a student is failing, there is a subtle expectation that they will seek assistance outside of class during the instructor's office hours or at the tutoring center. So, though a study by Jaggars & Bailey (2010) indicates that learning in an online environment may stunt the progression of low-income and academically underprepared students unless additional supports are put in place to promote academic growth, the mastery learning model just may be providing the supports that will provide the medium for academic growth.

Several studies indicate that in addition to being academically underprepared, the developmental education students' skills, attitudes, habits, and behaviors contribute to low success rates (Karp & Bork, 2012; Rosenbaum, Deil-Aman, & Person, 2006). Successful community college students as defined by Byrd and MacDonald (2005) can advocate for themselves in

order to get help, have strong time-management skills and goal orientation, and understand college systems and procedures. A CCRC (2012) study of community college student roles found that community college instructors expect community college students to "engage in self-directed and timely help-seeking behavior." This same study indicated that community college instructors expect students to know how they study best (Karp & Bork, 2012). The modified emporium model, which is characterized by its multiple methods of students support; computer-based learning environment; mastery learning; and frequent faculty-student interactions, creates a formula for student academic success.

**Student, instructor, and course expectations for success: Relationships.** Rigor, relevance, and relationship (Brothen & Wambach, 2001) create a lens through which we can view the interactions between the student, instructor, tutor, and the coursework in a developmental math, computer-based, mastery learning environment. The rigor, which refers to levels of knowledge acquisition, is directly impacted by the design and delivery of the coursework. Relevance, which is the degree to which a student applies the acquired knowledge, is measured through course assessments. Both rigor and relevance are determined by the instructor.

Tinto (2007) suggests that students who spend more time and are more involved in their courses learn more when the educational environment is one where expectations for achievement are high, feedback is provided frequently, and students are actively sharing their learning with others. Though students do not typically get an opportunity to provide input in the course design, delivery, or assessment, they are expected to acclimate and achieve in the classroom environment. However, the computer-based learning environment provides a unique opportunity for students to participate in their learning experience because instructors can provide a foundation for building relationships by monitoring student progress and giving frequent and individualized feedback (Blair, 2006; Boroch et al., 2007; Boylan, 2002; Fabry, 1997; Siadat et al., 2008). The actual interactions between student and instructor, student and student, student and tutor, as well as the student and the coursework itself all determine the relationship component (Blair, 2006; Boroch et al., 2007; Boylan, 2002; Fabry, 1997; Siadat et al., 2008). The combined relationships that foster the exchange of information among the student, the instructor, the tutor, and the course reveal that the prior knowledge, the past experiences, the beliefs, the attitudes, and the perceptions all ultimately predict the performance in the course (Eccles & Jacobs, 1986;

Eccles & Wigfield, 2002; Marzano et al., 2001; Wadsworth et al, 2007). Some studies demonstrate that the relationship between student and instructor which allows instructors to understand student thinking leads to instructors making better instructional choices that result in increased math achievement (Ball & Bass, 2000; Bueschal, 2008; Hodora, 2011; Karp & Bork, 2012). Expectations for feedback, learning strategies, self-regulation, and self-efficacy are all developed or conveyed through the relationship among student, instructor, tutor, and course delivery, course design, and course assessment (Blair, 2006; Fabry, et al., 1997; Tong, et al., 2012). It is this relationship that impacts students' perception of their performance in the emporium learning environment.

**Discussion and Conclusion**

Knowledge of the research on students' observational, emulation, self-control, and self-regulatory skills could assist in making curriculum decisions regarding the implementation and sustainability of mastery learning computer-based developmental mathematics environments within community colleges. The collision of the culture of innovation and the culture of pedagogical best practices is becoming apparent as the innovation of mastery learning computer-based developmental mathematics is moving from adoption to pilot to full implementation. This statement is significant when one considers that the faculty are the individuals who incorporate the computer technology-based education into their classrooms' day-to-day pedagogical processes. The faculty's subjective reality is important to consider if educating developmental mathematics students through the use of computer technology and mastery learning is to become an instrumental and effective innovation.

Kanter's (1988) view of the innovation diffusion process supports the fact that faculty should be highly involved in the process. Additionally, community college administration should realize that innovation diffusion is an extensive process and faculty need support and resources to execute the implementation in order to effectively help students' learning in developmental mathematics. The use of the innovation of mastery learning computer-based developmental mathematics and ultimate change in the organizational structure require change in the people, activities, patterns, and structure of instruction (Kanter, p.199). Community college administration's ability to anticipate and to address the adjustments faculty will have to make results in a more efficient transfer between traditional and mastery learning computer technology-based developmental mathematics environments for developmental mathematics faculty and developmental mathematics students.

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