The Learning Assistance Review

NATIONAL COLLEGE LEARNING CENTER ASSOCIATION

NCLCA

ISSN 1087-0059 | Volume 24 | Number 1 | Spring 2019

About *The Learning Assistance Review*

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NCLCA's Definition of a Learning Center

The National College Learning Center Association defines a learning center at institutions of higher education as interactive academic spaces which exist to reinforce and extend student learning in physical and/or virtual environments. A variety of comprehensive support services and programs are offered in these environments to enhance student academic success, retention, and completion rates by applying best practices, student learning theory, and addressing student-learning needs from multiple pedagogical perspectives. Staffed by professionals, paraprofessionals, faculty, and/or trained student educators, learning centers are designed to reinforce the holistic academic growth of students by fostering critical thinking, metacognitive development, and academic and personal success.

Editorial Board

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Letter from the Editor

You should be writing.

I know what you're going to say because I hear a version of it every time I say that to practitioners in our field. You'll smile and nod your head as you stall a bit, searching for the correct words or some clever retort. "I know," isn't enough and you know it. You should be writing, so "I know," rings hollow. Learning center professionals should document our successes – and our failures. We should crunch the numbers and tell the stories of our centers through data and purple prose.

Yeah, you know it. I see you grinning that sheepish grin.

Perhaps you're thinking, "My dissertation did me in, buddy," if you have a terminal degree and the trauma is still fresh, the ink drying on that expensive piece of paper. Even if it isn't, the thought of returning to that style of writing locks you up.

Maybe you're thinking, "Hey, I haven't done anything sexy enough. Who wants to read about what's happening in my center? It's just… work."

But what you're really thinking:

"I don't have time to write."

Maybe you're like me. I am the co-director of the Bear CLAW (Center for Learning and Writing) at Missouri State University. My official duties include supervising the Writing Center and the Peer Assisted Study Session (PASS) Program – our version of Supplemental Instruction. In addition, I run the Absent Professor Program, the workshop arm of the Bear CLAW. I present workshops, often custom-written, on study skills, academic and creative writing, motivation, and citation methods at area schools and to any department that requests one. Between these three units, I supervise forty to fifty student workers. All of them require ongoing training.

I also teach a study skills class and run a theatre troupe, the

In-School Players, which is an official class in the Theatre & Dance Department. On occasion, I teach the first-year experience course, a Shakespeare course, and almost anything else any department asks me to teach. I advise the Comic Book Club. I'm on the Student Success Committee, the First-Year Experience Committee, and the Bear Power Committee, working to strengthen the experience of first-generation students from underserved groups. I'm a frequent guest speaker for the Panhellenic Council. I conduct scholarly presentations at two conferences a year when my center's budget is strong. I also conduct workshops and presentations for the local library circuit, often talking about publishing, creative nonfiction, and graphic novels.

Oh, yeah… and I edit this journal. This issue marks the first time I did the layout by myself, too. On the side, I write for two publishing houses, plugging away on a few comic book scripts for one and writing a contracted novel for the other. I write the forwards to the re-releases of books by Harold Robbins. I also work for a marketing firm, writing letters to prospective student-athletes for coaches.

Sleep gets in the way of my productivity, and disconnecting is tough, but I manage to catch a movie once a week and waste plenty of time perusing Netflix. When the workload lightens during the summer months and I'm free of committees and workshops, I write. I plan. I edit. Whatever it takes.

That's part of the calling, right?

For me, it started when I was a junior faculty member in the Collegiate Reading and Learning Program. When I was hired, I was told to research, present my findings at national conferences, and write. A lot. That didn't stop when I moved to the "dark side" of middle-management and took a staff director position running the campus Writing Center. It didn't stop during the development of the Bear CLAW ten years ago and has continued to snowball. For the past twenty years, I arrive in my office three hours before my staff so I can write.

Sometimes the writing is productive and the words flow. Other times, the prose barfs onto the page in fitful bursts. I save it all. Some of it is usable for future projects. Often, it isn't. I write anyway. That's how articles are born.

This relatively new field we're in needs us. Even if you're a staff member at your institution, you should think like a faculty member. Document everything. Write your story. Solicit feedback from peer-reviewed journals. Take the chance… I mean, why not? You can even use your campus Writing Center – I train ours and they're my first line of defense. I mean, you trust them… right? If you're rejected, try again. And again. And again. Consider the feedback you receive a gift of the reviewer's time and expertise. Keep writing, even if you only have ten minutes between commitments. Practice what you preach. You know as well as I do that learning didn't end because you have a piece of paper that claims you a master or a doctor.

Write about what you're doing well at your institution. Articulate your failures, too. Turn your reports into short articles. You'd be surprised at how engaging your narrative and data is to other practitioners. What works for your campus doesn't always work at other campuses, so don't pigeonhole yourself into believing you don't have something to contribute. The people between these pages didn't, and I'm proud to share their work.

Enjoy!

Michael Frizell, MFA
April 1, 2019

Assessing Impact of Academic Interventions Through Student Perceptions of Academic Success

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Richard Parlier
Talisha Adams
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Abstract

In Fall 2016, the Student Success Center at the University of Tennessee, Knoxville began a two-year study to assess participant impacts of three key academic success programs: academic coaching, tutoring, and Supplemental Instruction (SI). Survey results revealed that participants perceived academic impacts in all three programs and that students who attended more frequently had higher levels of perceived academic impact. The following article provides an overview of the study purpose, methodology, data collection, analysis and study findings. Study conclusions are presented along with implications and next steps for future research.

Introduction

Why do some college students struggle while others succeed? As faculty, staff, and higher education practitioners, this is a question we hear regularly. Researchers have made significant progress in the last decades in answering this question (Astin, 1993; Bain 2012; Dweck, 2006; Duckworth, 2016; Kuh, 2008; Pabloma & Banton, 1999; & Tinto, 2012). However, for practitioners in higher education, knowing how these programs directly impact participants and influence student success is a challenge. The following paragraphs outline how the Student Success Center (SSC) at the University of Tennessee, Knoxville used student surveys to assess the impact of three key academic interventions, academic coaching, Supplemental Instruction (SI), and tutoring, to gain a better understanding of the ways in which these programs impact student success.

Study Context: Student Success Center

Founded in 2005, the Student Success Center's vision is "to foster a campus culture of engaged and capable learners who are co-creators and designers of their own path to graduation and future success in a diverse and global society" (Student Success Center Website, 2017). The Center's mission is "to ensure that all students have the opportunity to succeed by providing campus leadership and advocacy for student success at UT, identify and implement academic success programs that support progress toward graduation, and enrich the undergraduate student experience" (Student Success Center Website, 2017). The SSC accomplishes these goals through high impact academic support programs: academic coaching, SI, tutoring, and other programmatic support initiatives. The SSC measures impact through analysis of overall contacts and number of students utilizing SSC services; frequency of use of SSC services; comparisons in success indicators such as retention, GPA, and academic standing between comparable groups, SSC users, and the general population; student surveys; and staff needs assessments (Student Success Center Comprehensive Assessment Report, 2018).

Previously gathered SSC data has regularly shown that students who participate in support programs perform better academically than students who do not participate (SSC Comprehensive Assessment Report, 2018). Evidence of this success is reflected through both higher retention rates and higher grade point averages for participating students, as evidenced in Figure 1 and 2 below, which illustrate that students who participate in these services perform better academically. Additionally, students show that they value SSC services through repeat and increasing usage, with a 60% increase in academic coaching visits, a 31% increase in SI visits, a 90% increase in tutoring visits, and an overall usage increase of 34% over the last four years, and through satisfaction ratings of 93% or higher (SSC Comprehensive Assessment Report, 2018).

Figure 1: Spring 2018 SI Participant Attendance and GPA Comparison

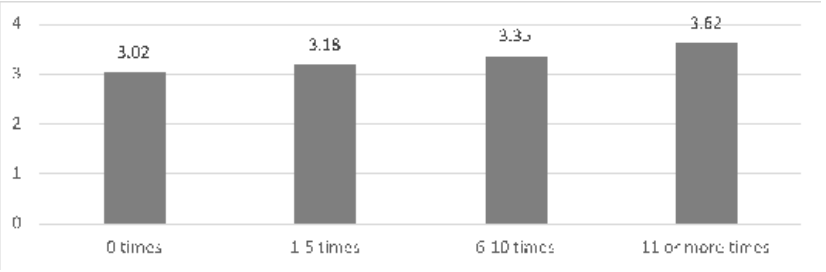
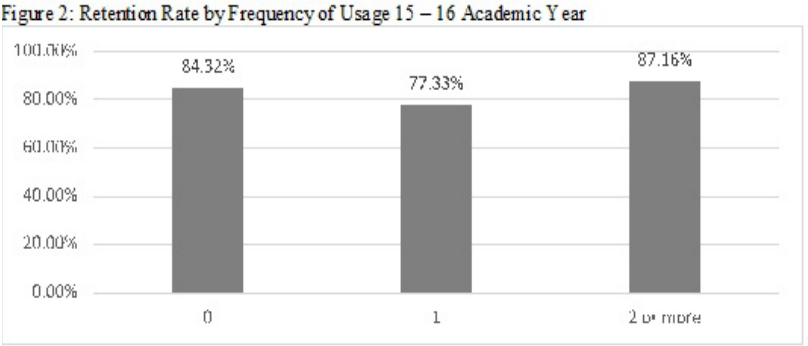


Figure 2: Retention Rate by Frequency of Usage 15 – 16 Academic Year



Study Need and Purpose

The purpose of this study was to assess academic impacts on student success after participation in academic coaching, tutoring, and / or SI. SSC staff also sought to better understand what students perceive as most impactful to their academic success after attending any one of the three academic interventions most used by undergraduate students. Specifically, this study seeks a better understanding of what specific actions, changes, or behaviors occur in students due to participation in these services, to assess the levels at which these actions, changes, or behaviors occur, and to determine what changes, if any, were needed to improve the program.

There were three guiding research questions for this study as outlined in the table below, along with the method of analysis for each.

Table 1. *Research Questions and Methods of Analysis*

Research Question	**Method of Analysis**
1. To what extent do students perceive positive academic impact from participation in coaching, tutoring, and/or SI?	Descriptive Statistics and One-way ANOVA
2. Is there a relationship between rates of participation and perceived levels of impact?	One-way ANOVA
3. Are there group differences between student demo/biographic variables and perceived levels of impact?	One-way ANOVA and T-tests

Literature Review

Practitioners in higher education have struggled for decades to determine how best to evaluate programs and assess student academic success (Pabloma & Banta, 1999). In many instances, practitioners and researchers have found that survey research can be beneficial in answering this question (Fowler, 2009). This can be particularly true when assessing academic support programs such as academic coaching, tutoring, and SI.

The field of academic coaching, being relatively new (Robinson, 2015), has a limited number of studies. Several research studies on academic coaching in higher education find that academic coaching can "be a powerful intervention in encouraging student academic success" (Dalton & Crosby, 2014, p. 59). Research by Bettinger and Baker (2011) illustrates that coaching can potentially increase student persistence (assessed as being enrolled one year after participation in coaching). Chamblis and Takacs (2014) argue that developing relationships with campus staff (such as those that form during academic coaching) can have a positive impact on student success. However, the pool of research for this academic support program is still quite small. Given the limited but compelling research, more assessment in this field is clearly needed.

In contrast, SI and tutoring research is ubiquitous. Research on supplemental instruction has found that SI can have significant short- and long-term impact on student success (Ogden et. al. 2003). Additional studies have shown that SI impacts both short-term success in the specific course as well as having positive benefits on student retention and persistence (Ramirez, 1997). Research on the

impact of tutoring is also wide-spread. Arco-Tirado and associates (2011) found that participation in tutoring in their study resulted in improved grade point averages, success and performance rates, and increased learning strategies for participating students. Additionally, Topping's (1996) article provides an extensive overview of the results in assessing tutoring and their findings. Missing from this research, however, is a discussion of student perceived levels of impact from participation. The following study aims to address these gaps.

Methods

To conduct this study, SSC staff designed a two-year-long study focused on best practices in survey research. The study began in the Fall 2016 semester and continued through the Spring 2018 semester. Initial design efforts included meetings with Assistant Directors and coordinators of each program to gain insight into what questions and topics should be addressed in the survey. The team drafted initial questions for each program related to impact on student success and mapped out a basic outline and structure for the study, as described below. When designing this study and instrumentation, specific care was taken to consider use and the ways in which this study could be beneficial to SSC staff and stakeholders (Patton, 2012).

Participants

Study participants included undergraduate students at the University of Tennessee, Knoxville who had participated in any of the three academic interventions during that academic term. Through SSC usage data, the researcher was able to contact, via e-mail, any student who participated in any of the three academic resources to ask if they would consent to participate in the study. The electronic survey with an embedded informed consent was sent to students between mid-terms and finals, a timeframe that staff felt would be most conducive both in terms of response rates and to see evidence of impact. This study followed a prescribed UTK IRB protocol, which allowed students to choose not to participate or to opt out at any time. Participants were informed of any potential risks, informed of the confidentiality of their data, and were provided information on how to view results at the culmination of the study.

Instrument

After the initial survey content was developed by staff, the researcher formulated these topics into Likert scale questions organized by program (Appendix A). Questions focused on elements of academic impact that staff felt were most likely to occur for each intervention, as described in the below table. Additionally, each section asked for one open-ended response related to any other areas of perceived impact related to that initiative. The survey concluded with demographic and biographic questions. Reliability was assessed through analysis of subscales for academic coaching, SI, and tutoring; all three subscales for the instrument demonstrated high reliability: Academic coaching ($\alpha = .93$), supplemental instruction ($\alpha = .94$), and tutoring ($\alpha = .95$). Face validity was achieved through item development based on previous SSC data.

Table 2. Example Survey Questions and Corresponding Intervention

Survey Question	Intervention
I feel more prepared for my classes	Academic Coaching
I am more proactive	Academic Coaching
I manage my time better	Academic Coaching
I have a clearer understanding of my academic goals	Academic Coaching
I have a clearer understanding of academic policies	Academic Coaching
I am more proactive	Academic Coaching
I manage my time better	Academic Coaching
I am a better student now than I was prior to attending [this resource]	Tutoring and SI
I plan on using one or more of the learning strategies discussed today	Tutoring and SI
I am more likely to review and study course material	Tutoring and SI
I am more likely to attend class	Tutoring and SI
I have better understanding of the course material	Tutoring and SI
I am more likely to ask my professor questions	All
My course grade(s) has/have improved	All
I am likely to continue using [this resource]	All
I am likely to refer my friends to [this resource]	All
I have greater confidence	All
Overall, [this resource] has positively contributed to my academic success	All

Data Analysis

At the end of each term, researchers analyzed descriptive statistics and shared results with staff. After two years, a summary of descriptive statistics was calculated and analysis of variance (ANOVA) was conducted. Response rates were tracked each semester, with overall response rates of 8.56% in the 16 – 17 academic year and 10.49% in the 17 – 18 academic year.

Composited averages were calculated for academic coaching, SI, and tutoring subscales and utilized as dependent variables for analysis of variance. Group mean differences for number of visits and demographic characteristics were tested for each dependent variable. After testing the assumptions for each ANOVA, it was determined that the residuals for all three dependent variables were slightly skewed between the number of visits and demographic variables. However, as ANOVA tests are generally robust to violations of normality (Tiku, 1975; Ito, 1980; Tan, 1982), the dependent variables remained unchanged. In cases when homogeneity of variance was violated, the Welch correction was implemented. Table three below provides an overview of descriptive statistics from this analysis.

Table 3. Frequencies and Percentages of Participants

Variable	n	%
Class Level		
First Year Freshman	219	48.7
First Year Transfer	23	5.1
Second Year Student	108	24.0
Third Year Student	67	14.9
Fourth Year Student	33	7.3
Expected Education Level		
Some college	37	8.3
Bachelor's degree	118	26.5
Master's degree	124	27.8
Doctoral or professional degree	167	37.4

Parents Education Level		
Did not finish high school	5	1.1
High school diploma/ G.E.D.	73	16.3
Attended college but no degree	37	8.3
Associate's degree	42	9.4
Bachelor's degree	123	27.5
Master's degree	109	24.4
Doctoral or professional degree	58	13.0
Gender		
Man	110	24.5
Woman	333	74.2
Another gender identity (specify)	4	0.9
I prefer not to respond	2	0.4
Race/Ethnicity		
American Indian or Alaska Native	1	0.2
Asian	28	6.3
Black or African American	29	6.5
Hispanic or Latino	13	2.9
Native Hawaiian or Other Pacifiic Islander	1	0.2
White	338	75.8
Other (please specify)	6	1.3
I prefer not to respond	10	2.2
Mixed Race (please specify)	20	4.5
Distance from U.T.		
0-60 miles	137	30.9
61-120 miles	51	11.5
121-180 miles	74	16.7
181-240 miles	74	16.7
More than 240 miles	107	24.2

Results

At the end of each term, descriptive statistics showed that students who participated in all three resources reported high perceived impact on their academic success, and the final analysis of combined data illustrated similar results. Students participating in any of the three programs perceived impact on their academic success, with the highest levels of the perceived impact occurring for students who attended more frequently. There were no differences when analyzing levels of perceived impact across demographic or biographic student characteristics. Figures 3 through 5 below provide an overview of student perceived impact on their academic success

from participating in these services. These results illustrate that students perceive high levels of impact on their academic success in many key actions and behaviors related to academic success.

Figure 3: % of Students with Agree or Higher of Perceived Levels of Impact from Academic Coaching

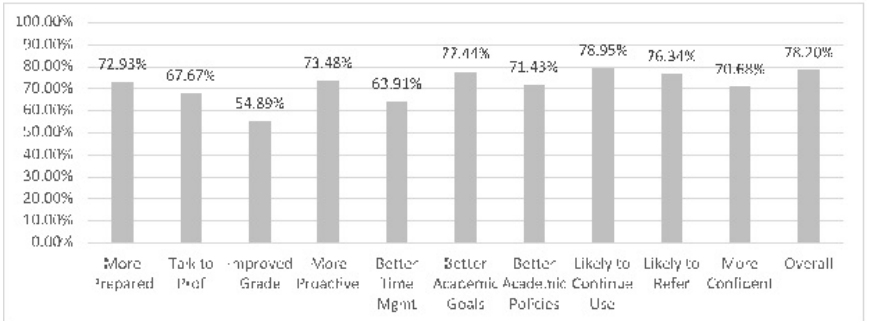


Figure 4: % of Students with Agree or Higher of Perceived Levels of Impact from SI

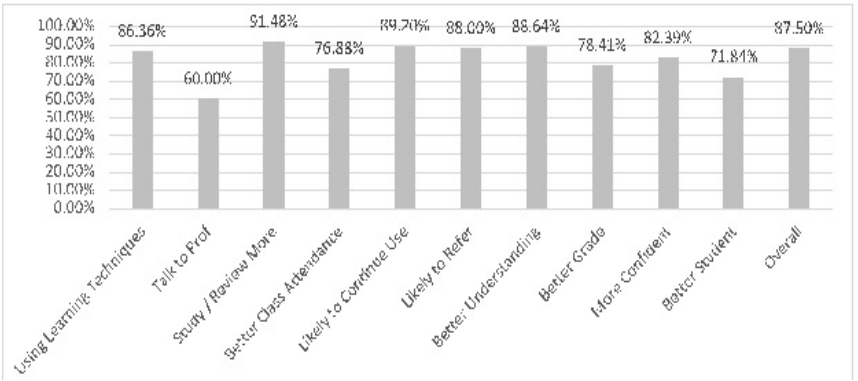
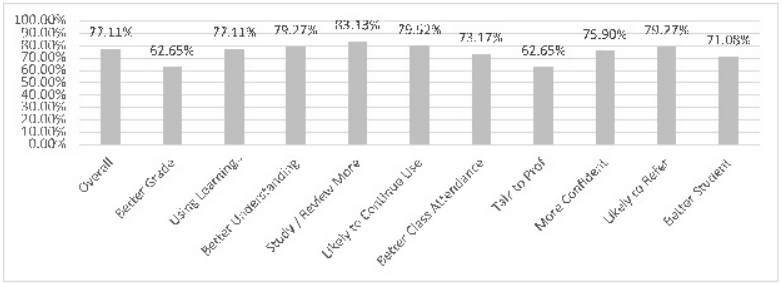


Figure 5: % of Students with Agree or Higher of Perceived Levels of Impact from Tutoring



Academic Coaching

The analysis of variance indicated a significant main effect for the number of visits on academic coaching, $F(2, 290) = 8.29$, $p < .001$, $\eta_p^2 = .05$. A posthoc analyses utilizing Tukey's HSD demonstrated that academic coaching impact was higher ($p < .001$) for students who had visited 5 or more times ($M = 4.22$, $SD = .63$) than for students that had only visited 1 to 2 times ($M = 3.78$, $SD = .83$). Cohen's effect size value ($d = .60$) suggested a moderate to high practical significance. Students visiting 3 to 4 times showed no significant mean differences with the other two groups in academic coaching.

Supplemental Instruction

There was a significant main effect for the number of visits on SI, $F(2, 308) = 17.92$, $p < .001$, $\eta_p^2 = .10$. Tukey's HSD demonstrated that SI impact for students who had visited 10 or more times ($M = 4.52$, $SD = .64$) was significantly higher ($p < .05$) than students that had visited 5 to 9 times ($M = 4.26$, $SD = .74$). Cohen's effect size value ($d = .39$) suggested a small to moderate practical significance. Students who had visited 10 or more times was also significantly higher ($p < .001$) than students who had visited 1 to 4 times (M = 3.94, SD = .80). Cohen's effect size value ($d = .80$) suggested a high practical significance. Furthermore, students who had visited 5 to 9 times also reported higher SI impact ($p < .05$) than those who visited 1 to 4 times. Cohen's effect size value ($d = .40$) suggested a small to moderate practical significance.

Tutoring

A Welch's F test was conducted as the homogeneity of variance assumption was not met ($p < .05$) between the number of visits and tutoring impact. Results indicated a significant difference in group means for number of tutoring visits, Welch's $F(2, 100.42) = 4.20$, $p < .05$, $est\ \omega^2 = .04$. A Games-Howell post hoc procedure was performed to determine specific group mean differences. Results indicated that tutoring impact for students who had only visited 1 to 2 times ($M = 3.78$, $SD = 1.06$) was significantly lower ($p < .05$) than for students that had visited 3 to 4 times ($M = 4.19$, $SD = .61$) and significantly lower ($p < .05$) than students who had visited 5 or more times (M = 4.19, SD = .82). Cohen's effect size values were .48 and .44

respectively indicating a small to moderate practical significance for both group comparisons.

Discussion

The perceived impact of academic coaching proved significant between the number of visits when comparing students who visit infrequently (1 to 2 times) to students who visit frequently (5 or more times). This data is consistent with descriptive statistic findings that show higher grade point averages for students who use academic coaching frequently (SSC Comprehensive Assessment Report, 2018). These findings suggest that students perceive the highest levels of impact from academic coaching when visiting 5 or more times.

Supplemental Instruction (SI) also provided conclusive findings. Students attending SI 10 or more times experienced significantly higher impact than all other groups. As SI sessions occur twice weekly throughout the semester, this high rate of attendance connected to perceived impact is reasonable. Differentiated from academic coaching, even students that attended 5 to 9 times still experienced a significant impact, although not as high as those that attended 10 or more times. Again, the conclusion from this finding is that more participation in these services equates to higher levels of perceived academic impact.

Tutoring likewise, showed significant findings for the groups with more visitations. Students who visited 3 to 4 times or 5 or more times demonstrated higher impact than only attending tutoring 1 to 2 times. However, there was no differentiation in significance between the higher two visiting groups. In addition, significant results could not be confirmed through additional testing with a log-transformed dependent variable or non-parametric test.

A lack of significant differences across groups in student demographic and biographic characteristics, in this case, is positive. Regardless of race, background, or other factors, students who attend these academic support programs perceive levels of impact at the same rates.

Overall, the combination of descriptive statistics from previous SSC data analysis, descriptive statistics from this survey, and results

from analysis of variance show that all three of these programs have a substantial impact on student academic success. Students perceive participation in these programs to positively impact student success, and descriptive statistics and increased usage further illustrate this point.

Limitations and Next Steps

Limitations for this study include concerns related to participant response rate and the lack of non-convenience sampling. However, these limitations are mitigated some by recent research that shows that low response rates can still provide beneficial data (Fosnacht, et. all 2017; Kano et. all 2008). Additionally, the pairing of survey results with previous SSC data analysis, and the consistency of these results when compared provide some alleviation to the concerns of participant response bias.

We believe the framework and process used in this study can be replicated by student success centers and support programs within higher education to assess impact and student academic success. It is our hope that this study can be used to replicate results in similar contexts to provide more information and reporting abilities for higher education practitioners. In that vein, we plan to replicate this study in the future with other SSC support services and programs.

References

Arco-Tirado, J., Fernandez-Martin, F.D., & Fernandez-Balboa, J-M. (2011). The impact of a peer-tutoring program on quality standards in higher education. *Higher Education. 6*(62). P. 773-788.

Astin, A. W. (1993). *What matters in college: Four critical years revisited*. San Francisco, CA: Jossy-Bass Publishers.

Bain, Ken (2012). What the best college students do. Cambridge, MA: President and Fellows of Harvard College.

Deci, E. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, *18*(1), 105 – 115. doi: 10.1037/h0030644

Dweck, C.S. (2006). Mindset: The new psychology of success, how we can learn to fulfill our potential. New York: Ballentine Books.

Duckworth, A. (2016). Grit: The power of passion and perseverance. New York: Scribner Books.

Fosnacht, K., Sarraf, S., Howe, E., & Peck, L.K. (2017). How important are high response rates for college surveys? *The Review of Higher Education (40)*2, pp. 245 – 265).

Fowler, F.J. (2009). Survey Research Methods. Sage Publications: Thousand Oakes, California.

Harlow, H. F, Harlow, M.K. & Meyer, D.R. (1950). Learning motivated by a manipulation drive. *Journal of Experimental Psychology, 40(2),* 228 – 224. doi: 10.1037/h0056906

Headden, S. & McKay, S. (2015). *Motivation matters: How new research can help teachers boost student engagement*. Stanford, CA: The Carnegie Foundation for the Advancement of Teaching. Retrieved from www.carnegiefoundation.org.

Ito, K. (1980). Robustness of ANOVA and MANOVA test procedures. In Handbook of Statistics, Vol. 1, (P. R. Krishnainh, ed.), Amsterdam, Holand, 1980.

Kano, M., Franke, T., Afifi, A.A., & Bourque, L.B. (2008). Adequacy of reporting results of school surveys and nonresponse effects: a review of the literature and a case study. *Educational Researcher (37)*8, pp. 480 – 490.

Kuh, G. (2008). *High-impact educational practices: what they are, who has access to them, and why they matter*. Washington, D.C: Association of American Colleges and Universities.

Ogden, P, Thompson, D., Russell, A., Simons, C. (2003). Supplemental Instruction: Short and long-term impact. *Journal of Developmental Education 3*(26). P 2-4,6,8.

Palomba, C.A. & Banta, T.W. (1999). Assessment essentials: planning, implementing, and improving assessment in higher education. *Jossey-Bass*, San Francisco.

Patton, M. Q. (2012) *Essentials of utilization-focused evaluation*. Los Angeles, CA: Sage Publications.

Prospero, M., & Vohra-Gupta, S. (2007). First generation college students: Motivation, integration, and academic achievement. *Community College Journal of Research and Practice*, *31*(12), 963 – 975. doi: 10.1080/10668920600902051

Ramirez, M. (1997). Supplemental Instruction: Long-term impact. *Journal of Developmental Education 1*(21). P2-6.

Robinson, C.E. (2015). *Academic / Success Coaching: A description of an emerging field in higher education*. (Doctoral dissertation). Retrieved from http://scholarcomons.sc.edu/etd/3148.

Ryan, M. R. & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology 1*(25). Pg. 54-67.

Pink, D. H. (2009). Drive: The surprising truth about what motivates us. New York: Riverhead Books.

Student Success Center. (2018). Comprehensive Assessment Report. Retrieved from studentsuccess.utk.edu/assessment.

Student Success Center. (2018). Student Success Center Website. Retrieved from studentsuccess.utk.edu/about.

Tan, W. Y. (1982). Sampling distributions and robustness of t, f and variance-ratio in two samples and ANOVA Models with respect to departure from normality. Communications in Statistics-Theory and Methods, 11:2485–2511.

Tiku, M. L. (1975). Laguerre series forms of the distributions of classical test statistics and their robustness in non-normal situations. In Applied Statistics (R. P. Gupta, eds), New York, American Elsevier.

Tinto, V. (2012). Completing college: Rethinking institutional action. Chicago, IL: The University of Chicago Press.

Topping, K.J. (1996). The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *Higher Education. 3*(32). pp.321-345.

Volet, S. E. (1991). Modeling and coaching of relevant metacognitive strategies for enhancing university students' learning. *Learning and Instruction, 1*(4), 319 – 336. doi: 10.1016/0959-4752(91)90012-W

Appendix A: Survey

Student Success Center Impact Survey: Assessing Impact of Primary Services
The University of Tennessee, Knoxville

Academic Coaching

How many times did you attend academic coaching within the last academic year?
0 times
1-2 times
3-4 times
5 or more times

Were you required to attend academic coaching?
Yes
No

Please respond with your level of agreement to the below statements based on your experience of academic coaching.

As a result of attending academic coaching: (Likert Scale Strongly Disagree – Strongly Agree)

I feel more prepared for my classes.
I am more likely to ask my professor questions before, during, or outside of class.
My course grades have improved.
I am more proactive.
I manage my time better.
I have a clearer understanding of my academic goals.
I have a clearer understanding of academic policies.
I am likely to continue utilizing academic coaching.
I am likely to refer my friends for academic coaching.
I am more confident now about doing well at UT than I was prior to attending academic coaching.
Overall, coaching has positively contributed to my academic success.

Supplemental Instruction

How many times did you attend supplemental instruction (SI) within the last academic year?
0 times
1-4 times
5-9 times
10 or more times

Please respond with your level of agreement to the below statements based on your experience of supplemental instruction (SI).

As a result of attending SI: (Likert scale Strongly Disagree – Strongly Agree)
I plan on using one or more of the learning techniques (strategies) discussed.
I am more likely to ask my professor questions before, during, or outside of class.
I am more likely to review and study course material.
I am more likely to attend class.
I am likely to continue utilizing supplemental instruction if available.
I am likely to refer my friends to supplemental instruction.
I have a better understanding of the course material.
My course grade has improved.
I am more confident now about doing well at UT than I was prior to attending SI.
I am a better student now than I was prior to attending SI.
Overall, supplemental instruction has positively contributed to my academic success.

Tutoring
How many times did you attend tutoring within the last academic year?
0 times
1-2 times
3-4 times
5 or more times

Please respond with your level of agreement to the below statements based on your experience of tutoring. As a result of attending tutoring: (Likert scale Strongly Disagree – Strongly Agree)

I plan on using one or more of the learning techniques (strategies) discussed.
I am more likely to ask my professor questions before, during, or outside of class.
I am more likely to review and study course material.
I am more likely to attend class.
I am likely to continue utilizing tutoring.
I am likely to refer my friends for tutoring.
I have a better understanding of the course material.
My course grade has improved.
I am more confident now about doing well at UT than I was prior to attending tutoring.
I am a better student now than I was prior to attending tutoring.
Overall, tutoring has positively contributed to my academic success.

Additional Thoughts
After completing this portion of the survey, is there anything you would like to add about the impact of academic success from attending academic coaching, supplemental instruction, or tutoring?

Demographic Information

What is your class level?
First-year Freshman
First-year Transfer
Second Year Student
Third Year Student
Fourth Year Student

What is the highest level of education you ever expect to complete?

Some college but less than a bachelor's degree
Bachelor's degree
Master's degree
Doctoral or professional degree

What is the highest level of education completed by either of your parents (or those who raised you)?

Did not finish high school
High school diploma / G.E.D.
Attended college but not complete degree
Associate's degree
Bachelor's degree
Master's degree
Doctoral or professional degree

What is your gender identity?

Man
Woman
Another gender identity (please specify)
I prefer not to respond

What is your racial or ethnic identification (select all that apply)

American Indian or Alaska Native
Asian
Black or African American
Hispanic or Latino
Native Hawaiian or Other Pacific Islander
White
Other
I prefer not to respond

Which of the following best describes your sexual orientation?

Heterosexual
Gay
Lesbian
Bisexual
Another sexual orientation (please specify)
Questioning or unsure
I prefer not to respond

What is the distance of UT from your home town?

0 – 60 miles
61 – 120 miles
121 – 180 miles
181 – 240 miles
More than 240 miles

Mind the Gaps: An Online Learning Center's Needs Assessment

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Abstract

A needs assessment was conducted at a learning center at one completely online institution to understand administrator, faculty, and student perceptions of the center's services and resources to uncover gaps between the current state and intended outcomes (personalized support, clarity of services, and shared accountability for student success). Through gap analysis, findings suggested that there is a need to empower students through personalized support, prevent struggling students from feeling overwhelmed, and direct students to specific services and resources based on their unique needs. Next steps and implications for future research are discussed.

Introduction

Scholars have argued that the best outcomes are achieved when learning center professionals (LCPs) collaborate with faculty members to promote student success (Arendale, 2010; Masiello & Hayward, 1991; McGuire & McGuire, 2015). Although they exist at nearly every higher educational institution in the United States, learning centers historically have been developed and continue to function in the margins (Arendale, 2010; Boquet, 1999). Therefore, they are often the best-kept secret on campus, despite their being invaluable resources to students and faculty members alike (Arendale, 2010; Boquet, 1999; McGuire & McGuire, 2015).

Research on how to build a bridge between the classroom and these centers is limited (McGuire & McGuire, 2015; Payne, Hodges, & Hernandez, 2017). Consequently, best practices to enhance or

develop learning centers are not widely available (Casazza & Bauer, 2006; Payne et al., 2017). Furthermore, no one adult learning theory appears to address online learner needs completely when looking for guidance in the development of best practices (Cercone, 2008). Given this lack of guidance in the literature, LCPs might first seek to understand (and clarify as needed) the perceptions of center services and resources among key external stakeholders, including administrators, faculty members, and students (Arendale, 2010; Payne et al., 2017). In response to the call by Payne et al. (2017) to employ a needs assessment to understand and meet students' needs relating to their academic success, the aim of this work was to examine gaps between the current state of learning center services and resources and the intended outcomes of personalized support, clarity of services, and shared accountability for student success.

Background

In the past decade and a half, the greatest gains in enrollment have occurred at open-access or nearly open-access institutions; however, evidence of their success in terms of retention and graduation rates is mixed (Aud et al., 2011; Gayton, 2015). These mixed results might be partly due to the various types and perceptions of support structures that are in place to help students to navigate institutions of higher education (Aud et al., 2011; Casazza & Bauer, 2006; Engstrom & Tinto, 2008; Gayton, 2015; Tinto, 2012). Online students desire many of the same support services that are traditionally offered to students at brick-and-mortar institutions, including online tutoring and coaching (LaPadula, 2003; Payne et al., 2017). Further, research is scarce regarding what supports are needed for master's students and, to an even greater extent, doctoral students (Artino & Stephens, 2009). Positive outcomes are associated with students' engaging with LCPs, including a higher grade point average (Arendale, 2010; Aud et al., 2011) as well as increased persistence (Bettinger & Baker, 2013; Lehan, Hussey, & Shriner, 2018), retention (Arendale, 2010; Aud et al., 2011), and completion (Bettinger & Baker, 2013) rates. Showing students what they must do to achieve academically is necessary, yet alone it is insufficient to promote their success (Casazza & Bauer, 2006; Kuh, Kinzie, Schuh, & Whit, 2010;

Manning, Kinzie, & Schuh, 2006). LCPs who engage in purposeful collaboration with faculty members and professionals in other departments positively contribute to students' degree completion (Arendale, 2010; Payne et al., 2017).

Despite the established relationship between students' working with LCPs and the aforementioned positive outcomes, the research examining the mechanisms by which learning centers can best support student success is still "in its embryonic stages" (Griffiths, 2015, p. 24). Furthermore, it is still unclear how to promote understanding of the value of learning center services to institutional stakeholders to effectively offer learning center services to support online students (Gayton, 2015; Milman, Posey, Pintz, Wright, & Zhou, 2015). Therefore, researchers focusing on student support have increasingly called for the development of an inventory of best practices to assist professionals when planning and developing support programs and outreach initiatives (Casazza & Bauer, 2006; Payne et al., 2017). A logical step when working toward building collaboration between LCPs and faculty members is conducting a needs assessment (Payne et al., 2017).

Methods

According to Grant (2002), in the context of learning needs assessment, gap (or discrepancy) analysis is a formal method used to compare performance with stated intended outcomes to inform planning. The purpose of this needs assessment was to examine gaps between the current state of learning center services and resources and the intended outcomes of personalized support, clarity of services, and shared accountability for student success. The current state was examined with a focus on student knowledge, faculty knowledge, and the curriculum relating specifically to writing, statistics, and learning center services and resources. To obtain a more robust interpretation of gaps, the perspectives of administrators, faculty members, and students were solicited, as Lee, Altschuld, and White (2007) argued that multiple stakeholders should participate in a needs assessment. An instrumental single-case study design was employed to gain greater insight into a single, unique phenomenon (Stake, 1995).

Participants

To understand the various stakeholders' perceptions, all administrators who could thoroughly report on the students, faculty members, and curricula in their school (School of Education, School of Business, School of Social and Behavioral Sciences) were invited to participate in an interview via email. Four administrators agreed to participate (two from one school, one from each of the other schools). Interviews with these administrators were completed separately by school due to potential school-level differences. For example, administrators in one school also worked directly with a small number of students in a faculty role, whereas those in the other schools did not. Additionally, faculty members who were teaching the first three foundational courses in each school were invited via email to participate in a group interview. This group of faculty was selected because results of research (e.g., Willging & Johnson, 2009), as well as university-specific data, indicated that students who drop out of their online program are most likely to do so in the first few courses. Therefore, it seemed that these faculty members, in particular, might offer important insights into how meaningful learning learning assistance can be provided to promote student success.

Of the 22 faculty members who met the inclusion criteria, five volunteered to participate. They were then asked to complete an online form to indicate their availability, and a group interview was scheduled accordingly. At least one faculty member represented each of the three schools. All five participants who volunteered attended a group interview via GoToMeeting, online meeting sofware. Once the interviews with the administrators and faculty members were completed, all students who were currently working with those five faculty members in the first three courses were invited via email to participate in a group interview. Only these students were recruited to allow for an examination of the degree of agreement between them and both the faculty member with whom they worked and the administrator(s) in their school. Of those students, six volunteered to participate and were asked to complete a form to indicate their availability. A group interview was scheduled accordingly. However, only one student attended, so an individual interview was conducted via GoToMeeting. Student recruitment procedures were repeated

a month later in an attempt to hear from more students. Of those students, seven agreed to participate and were asked to complete a form to indicate their availability. Again, a group interview was scheduled accordingly; however, no students attended the scheduled interview. The students who contacted the researchers after expressing interest but not attending the interview indicated that family and work responsibilities hindered their participation. The decision was made to move forward with responses from the one student, as it seemed that the targeted students were unwilling and/or unable to participate under the study conditions.

Instrument

Both the primary investigator (PI; leads the learning center) and the co-primary investigator (Co-PI; supports the leader of the learning center) developed the semi-structured interview protocol that was used to guide the interviews following a review of relevant scholarly literature. This strategy not only allowed for consistency in the questions but also provided the opportunity for follow-up questions so that each participant's experience shaped the narrative, resulting in thick, rich descriptions in the responses (Kvale & Brinkman, 2009). The questions were the same for all participants, regardless of role (i.e., administrator, faculty member, student) to allow for an examination of convergence and divergence within and across both schools and roles. The instrument was sent to all prospective participants prior to their interview to maximize transparency as well as give them time to reflect on the questions and prepare robust responses (Stacey & Vincent, 2011). Questions focused on the following areas of learning center services and resources: need for support in written communication and quantitative reasoning; learning outcome development; skills that hinder academic progress; conditions under which students seek assistance; current knowledge of learning center services and resources; and gaps in knowledge of learing center services and resources.

Data Collection and Analysis

Once the interviews were scheduled, participants were sent a GoToMeeting link that allowed them to connect with the researchers via teleconference during the scheduled date and time. Both the PI

and the Co-PI had their webcams on so that all participants could see them during the interviews. Participants were invited, but not required to do the same, and two participants shared their cameras. In addition, participants could enter any name that they preferred. No demographic data were collected from participants to limit any risk associated with their participation. The PI facilitated each interview, whereas the Co-PI took notes and maintained an audit trail. They both asked probing questions if additional information could be helpful and answered participants' questions as appropriate. Participants were informed that all interviews would be audiotaped and transcribed verbatim for subsequent analysis. All participants indicated their informed consent. The interviews were transcribed by a professional with expertise in learning assistance who signed a nondisclosure agreement.

The transcripts were analyzed using thematic analysis with the goal of identifying, analyzing, and reporting patterns (themes) in the data (Braun & Clarke, 2006). The data were organized and described as concisely and richly as possible (Braun & Clarke, 2006). When interpreting the data, the researchers were not guided by any one existing theoretical framework. Instead, they took into account their broader knowledge of the scholarly literature on learning assistance in higher education and their professional expertise. Nevertheless, to avoid any biased interpretations or selective focus on particular fragments of the transcripts, the researchers closely followed Braun and Clarke's (2006) six-phase approach (familiarization with the data, generating codes, searching for themes, reviewing themes, defining and naming themes, producing a report) as well as included a third researcher unaffiliated with the learning center. Both descriptive and in-vivo codes were used as appropriate (Kvale & Brinkman, 2009).

In the first phase of data analysis, the researchers read and re-read the transcribed interviews to familiarize themselves with the data. To aid in data-driven coding, MAXQDA (VERBI Software, 2016) was utilized. The PI and Co-PI independently coded the first administrator interview before coming together for discussion. Given the level of agreement in developing key phrases and the overarching narrative, they then coded the remaining interviews based on their shared understanding of the patterns in the data. Once they

completed all the coding, they came together again for discussion to ensure alignment of codes and categories. A third researcher, an assessment expert with no direct role in the learning center, confirmed that their level of agreement was adequate after discussing any differences in the wording of codes with the PI and Co-PI. Following the recommendation of Campbell, Quincy, Osserman, and Pederson (2013), the coding scheme was refined until all researchers were satisfied with the level of agreement. Then, all three researchers generated themes from the codes and categories. Finally, they decided upon the final themes, and the PI and Co-PI reanalyzed the data accordingly.

All participants were given an opportunity to select their own pseudonym. If they had no preference, a pseudonym was selected using a random name generator. In addition, member checking was completed by sharing findings with participants and having them confirm whether the findings were an accurate reflection of their experience.

Findings

Through thematic analysis, the researchers identified and examined patterns in the responses from administrators, faculty members, and one student. Three overlapping themes were developed: (1) Garden through instead of weed out: The need to empower every student to succeed by addressing their unique needs through personalized support, rather than pushing out those who are perceived as underprepared. (2) Caught like a deer in headlights: The need to prevent struggling students from feeling overwhelmed if they wait to engage with the learning center until the situation is dire. (3) Take a horse to water: The need to direct students to specific services and resources based on their unique needs and motivate them to use the services.

Garden Through Instead of Weed Out

This theme relates to the reported need for awareness of and responsiveness to common challenges and growth areas of each individual student as well as the student population as a whole. Several administrators and faculty members mentioned that some faculty members try to weed out underprepared students instead of

helping them to grow by suggesting that they use learning center services and resources. According to administrators and faculty members, one challenge involved in working with students is that many of them lack adequate foundational writing and statistics skills. For this reason, administrators and faculty members agreed that it is ideal if students engage with LCPs early and often, as some skill development requires guided practice, which can be time-consuming.

Two administrators spoke to the importance of recognizing that every student has unique needs, as evidenced by statements such as "some learners have such varied needs" (Jane) and "some students come to the table with different levels of proficiency" (Blake). Descriptions of varying levels of student competence, especially in writing, were generally presented as a challenging part of their role by faculty members as well as one administrator. Jane discussed the importance of faculty members' helping students to bloom into scholars. According to Jane, some faculty members "feel like the student should already know [about services and resources]. It is sort of the idea [that the faculty member] graduated from this top-of-the-line doctoral program and, therefore, they want to teach like it's that type of program." Jane added:

> Sometimes they [faculty members] do not want to work with the learners we have; they want to work with the learners they want. So, they are hesitant to include those things [links to learning center services and resources in feedback to students] because they think, 'Well, they are graduate students. They need to figure it out for themselves.' They do not see learner support as necessary or [as] valuable as it should be….The whole idea of **gardening through instead of weeding out**. Some faculty still have this weeding out mentality.

Although it is unclear on what evidence such evaluations were based, faculty members provided indirect support for the notion that they hold expectations regarding what skills graduate students should possess when they enter their program. Sydney stated, "There are a good proportion of our students who are not where they should

be, considering they are in a graduate program." Nevertheless, this faculty member also spoke about the appropriateness of working with students who need support to develop foundational skills in the first few courses. Whereas both administrators and faculty members expressed that they care about students and want them to do well, they provided few details regarding what they do once it is determined that a student might lack adequate skills to succeed. Liliana, an administrator, described the response of some faculty members when they were encouraged to provide a different and/or higher level of support to struggling students: "Sometimes, there is pushback. Like, [they say] you don't need to put that [a link to a resource] in there [assignment feedback]; students just need to figure it out."

To help students to grow, numerous administrators and faculty members noted the importance of understanding common challenges that many students who enroll in their particular institution face. For example, several of them highlighted the significant length of time that has passed since some students were enrolled in a university, which can create additional obstacles in an already challenging experience. In addition, they mentioned that students at their university often work full-time, leaving limited time for their studies. Sydney stated:

> I also think for some students, they are thinking as [engaging with the learning center] is 'one more thing that I have to do. I already probably do not have time to even do my assignments, and I am working.'

Therefore, Blake argued that instructional and learning center efforts should be aligned with how and when students learn:

> I don't think we can ignore that [many students work full-time and, consequently, have limited time]. That is not to give them a pass; it is that we need to be extremely effective in how we provide tools for them so that they can get the help that they need. So, I think that they are just really having problems.

Furthermore, Jane indicated that personal factors might be potential obstacles for some students: "I think recognizing the impact of poverty on many students who attend open-access universities…. Some students can actually be sabotaged by friends and family members who think, you know, why are you trying to be better?"

All administrators and faculty members also cited specific skills with which their institution's student population generally needs the greatest amount of assistance in developing. The majority of their responses related to writing and statistical competence. While describing the uniqueness of each student, differences were specifically noted in the level of writing competence. According to Liliana:

> I think that there is a variability of students that come into the program with diverse basic skills. Like the skills that they enter into the program with. Some students come as very good writers, but other students lack those skills.

Blake focused on the varying level of writing competence within the individual student, depending upon the context: "Some [students] can write well in [their field], but they don't write well when it comes to scholarly writing." This administrator also noted:

> I think it is the way we write our curriculum. We are trying to give them applied experiential learning so that they can apply it. The reality is, especially if you are a Ph.D. student, you still need to learn how to write like a scholar.

To a lesser extent than writing, administrators and faculty members also focused on statistics. Two commonalities were found across the participants' responses. First, they shared their belief that statistics are scary or intimidating to many people. Second, they reportedly know much more about students' specific struggles with writing than statistics. According to Blake, "I think everybody

knows that just the word 'statistics' scares most students." Similarly, Jane reported, "Statistics are scary. Knowing how to choose [the correct test] is scary." Jane offered her perception of why students can struggle: "I think that part of it is past experience with statistics. So, that fear is already there whether they have taken a course here or not." Beyond these statements, administrators and faculty members had difficulty explicating what exactly was so scary about statistics or with what specific skills students had difficulty. Jesse, an administrator, stated, "Students can get kind of hung up in stats classes, but I can't really break that down for you."

Both administrators and faculty members agreed that students who need to develop writing and statistic skills would benefit from early and ongoing support from LCPs. Blake explained:

> I find most of the challenges are that students don't start early enough utilizing your resources….If we could catch them early on in the enrollment process, they can go ahead and explore these resources before they begin their course. When I get them, a lot of them have not really taken the time to look at resources.

Blake also argued that some skill development "simply takes practice. It just takes deliberate practice. There is no way to pour that in anybody's head." Blake also emphasized that many students may not understand the process or approach behind a certain skill (e.g., synthesis) to practice on their own; therefore, they need someone who is knowledgeable to break it down into manageable steps and direct them on how to practice. According to several administrators and faculty members, given the varying strengths, growth areas, and needs of students, early efforts toward skill development can help students to grow as scholars.

Caught like a Deer in Headlights

This theme relates to reports by administrators, faculty members, and the student regarding why students might wait too long to seek services or not seek services at all at the university learning center. These reasons included misinformation, limited to no information, a lack of communication with faculty members as

well as a lack of visibility and accessibility of the learning center. According to administrators and faculty members, when students encounter a threat to their academic survival, they might feel overwhelmed and unsure of what to do or where to go. However, under such conditions, they may not take any action at all.

Administrators and faculty members described strategies that they use to encourage students to seek support early. Blake argued that students should not "wait until you get to your dissertation, and you're **like a deer in headlights** and all of the sudden you are now discovering the [center]." Similarly, Jane stated that the goal is "not to overwhelm them [students], right? …If you have a student who is struggling on more than one competency, and they get a lot of negative feedback too early, it is demotivating, and they are going to quit. We do not want that." For this reason, many of the participants emphasized the importance of being knowledgeable about what services and resources are available through the learning center as well as how these services work.

One potential explanation for students' waiting until later in their program to seek assistance is the common belief among both administrators and faculty members that students see the learning center as providing an emergency service; therefore, they might not think about engaging with LCPs until they are in danger of failing or being dismissed. Blake explained:

> What happens is they are really not spending time in the [learning center], unless they are in an emergency situation. 'I do not know who else to talk to. I can't talk to my professor. I gotta get some help. I need to turn this paper in.'

Consistent with this assertion, when asked if he had visited the learning center, Berat, a student, responded:

> I just completed my first class.… I did really well in the first course, but the second course hit me a bit hard, so it [exploring learning center services and resources] is something I am going to do in the future. I just have not

had the need to do it.

Despite the aforementioned belief among administrators and faculty members that students should engage with LCPs early and often, according to faculty members, students reportedly wait until their situation is dire, then feel stuck and do not know how to overcome the challenges they are facing. Sydney explained, "I find that the majority of students that I feel really need it [academic coaching] wait for not just the recommendation of faculty but often almost some kind of consequence." Mikato, a faculty member, supported this idea:

> When students see a B, nobody calls me but when I give them a 72, which shows up as an F, then I am not even off the computer, and they are calling me, 'Why did I get an F?' There is something triggering it [their seeking additional learning assistance], and it has to be something severe.

Misinformation seems to be another factor keeping students from accessing learning center services in a timely manner. Prevalent in the responses by administrators, faculty members, and the student were two forms of misinformation: (1) their own sharing of information that they thought they knew about the learning center that was not accurate and (2) others' sharing of information that the participants recognized was inaccurate. For example, when the student was asked if he was aware of the learning center, Berat stated, "I know an academic assistance center helps out if you have disabilities, if you are military, if they are deployed, or on active duty." It apparently was not clear to him that all students have access to the learning center or the specific services offered. When asked if he had used learning center resources, Berat applauded the library's resources. Whereas the student was enthusiastic about an available learning resource at the university, he seemingly did not have a clear understanding of the distinction between the learning center and other departments, such as academic advising and the library.

Similarly, faculty members discussed their experiences with

students' misunderstandings of the learning center and its scope of service. Reportedly, many students mistakenly believe that the learning center offers line editing or tutoring services as opposed to academic coaching toward skill development. Sydney described similar misunderstandings among school leaders, possibly due to outdated information:

> I'll hear the administrators talk about how a student said someone in the [learning center] cannot look at their papers, but they actually can. There is a lot of misinformation I think on a lot of different levels… I think it is really hard to get accurate information to everybody always. There is old information.

Two administrators wondered if misinformation based on previous experiences might continue to influence perceptions and usage of the learning center. Jesse recalled, "At one point, accessibility was an issue." Likewise, Blake stated that there was "so much information on the webpage that a student could get overwhelmed… I looked recently, and it is better now."

Three administrators admitted that they did not possess sufficient knowledge about the learning center and its services and resources, which might also contribute to students' not knowing what to do and where to go when they face academic obstacles. Blake said, "I am glad that you have statistics coaches, but I don't know how that works. I don't know if they [students] set up an appointment..." Liliana discussed limited knowledge about the learning center among the faculty as a whole:

> I think they know about the service in general. I don't personally think they know many details about how it actually works… Again, I might not know something they know. That is the impression that I am getting. That they know about the service and that they try to use it for the students that they perceive at risk or having some kind of difficulty with their skills, most likely writing and statistics.

Jane shared a similar perspective: "I think faculty [members] understand that the [learning center] is dedicated to helping students improve basic skills. I think they miss the more advanced services for folks who are further along. It is just not all lower-level or more basic skills."

Two faculty members and the student shared that communication between faculty and students about the center was also lacking: "I cannot really remember having a discussion with a student about the [learning center]" (Sydney), "I don't hear much about that [the learning center] from my students" (Mikato). Similarly, Berat replied that "before today, no one has really asked [if I have used the learning center]. They have just mentioned it." Potentially due to their not learning much about these services and resources from faculty members, students might not know what to expect prior to engaging with an LCP, which can be a barrier to their accessing learning assistance.

Take a Horse to Water (But You Can't Make It Drink)

This theme relates to reports by administrators, faculty members, and the student that many students do not utilize learning center services and resources, even though faculty members use various strategies to increase the likelihood that they will seek additional learning assistance. According to both administrators and faculty members, directing students to specific services and resources based on their needs is critical. Administrators and faculty members discussed the importance of closing the loop and stakeholders' (both inside and outside the learning center) sharing accountability for encouraging students to take advantage of center services and resources.

Given their previously mentioned belief that some students lack adequate skills to succeed, administrators emphasized the importance of helping them to understand what specific services and resources are available through the learning center. According to Jane, simply encouraging struggling students to visit the center, in general, might not be sufficient:

> You literally have to **take a horse to water**. You can't say, 'Go [to the center] and brush up on your grammar.

> You have to give them a specific link. And I was thinking, if we can start early in the program to reach students with some adaptive learning opportunities, then they will realize early on their strengths and weaknesses. Maybe that will drive them to take advantage of resources early on in their program.

There was agreement among both administrators and faculty members that many students who might benefit the most from learning assistance above and beyond what is offered in the classroom are often the least willing to seek it on their own. Jesse explained, "In my experience, they don't go [to the learning center] until I encourage them or refer them, and, even then, a lot of them won't go."

Faculty members frequently described pushing students to seek additional learning assistance but recognized that they cannot force them to do so. According to Stacy, a faculty member, "I don't see many students who initiate seeking any help.…Those who do are already pretty good. The students who need serious help, they do not initiate the connection until they are told to do so." Likewise, Sydney stated, "I think it is really a matter of…you cannot force somebody to do something they do not want to do." Similarly, Renata, a faculty member, reported that "students don't always follow through. Sometimes it feels as if it is me pushing them to get the help that they need, but they just don't follow through."

To guide students effectively, administrators and the student reported that stakeholders must see the value in learning assistance; however, it is unclear whether there is a shared understanding of the value. The administrators seemingly assigned significant value to learning center services and resources. According to Jesse:

> I think if students start to realize, 'Well, my writing skills are not going to cut it here. I could go pay for a community college course, or, look at this, they want to assign me a coach who is going to work with me at no extra cost and help me catch up.' That is valuable.

However, these administrators did not appear to believe that students and professionals in other roles at the university necessarily shared their perspective. Blake stated, "Both the library and [the learning center] are critical to the success of our students," but added that "I think students don't necessarily know all the value that [the learning center] provides." Similarly, Jane replied, "I think that [the learning center] is viewed very positively and as a very important resource for the university to offer students." Nevertheless, this administrator subsequently said:

> I do think some faculty don't understand the value… Some people have not taken the time to identify the resources…and to use them. The gaps of knowledge are really about the value that the center can offer students that make faculty's jobs easier…it is sort of the idea of sometimes delegating is harder than just doing it yourself.

None of the five faculty members spoke directly about their perception of the value of the learning center. However, Berat, the student, stated, "I know a lot of students, they came [to the learning center] and they come back positive." Berat continued, "I mean it is all there for me. I have glanced at it [the learning center]. I have used it in previous schools. It has helped out."

To aid stakeholders in seeing the inherent value of the center's services and resources, there was a common notion among faculty members that there could be greater transparency in interactions with LCPs. According to them, when they encourage or direct a student to visit the learning center, they do not know the outcome, unless they ask the student or reach out to an LCP. Additionally, one administrator, Jesse, offered a suggestion:

> If there was ever an opportunity to collaborate with a coach or hear some follow up from a coach, that would be ideal. Like, so-and-so and I met for 30 minutes, and we talked about multiple regression.…It could be a phone call, a Skype, or a team meeting.… Closing the loop is good.

There was a consensus among the faculty members that automated notifications might be a way to increase transparency and initiate collaboration with LCPs. Stacy agreed:

> I would like to have a notification once I recommend someone to get help from the [center]. I assume that many of them do not go, and if I do not know, I have to ask them again. It would be very helpful to have just a one-sentence notification.

As another potential method for motivating students to utilize learning assistance, administrators discussed the importance of sharing accountability for student learning. Blake stated, "[Role playing talking to a student] You are developing your skills, which means you should be attentive and active in this process. I am the facilitator of this knowledge, not the sole giver, which means we must work together and are jointly responsible for your success." Blake described shared accountability in action:

> We are not trying to trick you; it's gonna be a lot of hard work. But we are going to give you all the tools that you need. And we are going to show you how to use them. And the rest is left up to them. I don't believe in spoon feeding; we are all accountable for their success.

Moreover, an administrator shared that faculty members often want to assist struggling students in their learning, but do not know where to start. Liliana discussed one experience with a student:

> I had a student submit a paper, and I was like…'Maybe I do not understand something.' But then, I figured out she was not constructing sentences in a way that they are supposed to be constructed grammatically. So, even though she had some good ideas to contribute, I just could not understand what she was writing. Where do you go with this kind of student?

Faculty members reported similar uncertainty:

> As faculty, sometimes, I'm just trying to figure out where do I even start to address some of the problems that students are having? Perhaps me being able to say from my evaluation of the student's work thus far, 'This student falls about here on the scale of being a proficient writer, and skills are needed in the next area, or they are really struggling in this area.' Just some sort of resource to kind of, at least, to kind of help guide and maybe to help students to see that they are making progress or that they have to put a lot of work to be the scholarly writer that they need to be for their respective program. (Renata)

> I do have a hard time when the student does not have the appropriate level of academic skills….And, in that case, I say go to the [learning center] to improve your writing. I offer to have weekly meetings with the student, but only some of them respond. In that case, in other words, if there are students who do not have the necessary skills in their academic study, I don't know where to start and how to help them. Other than recommending some resources and having frequent meetings and providing some intense feedback. It is very hard, and there is not an answer. (Stacy)

To ensure that all stakeholders share a consistent message with students, the administrators and one faculty member focused on the importance of the learning center's having a clear identity within the university that is highlighted through outreach efforts to provide an overview of services and resources:

> There's never enough help or enough resources. I think it is always a good thing if we collaborate so that we have a consistent message across the university for our students. I think that is very important. (Blake)

Several administrators and faculty members suggested that developing a clear identity can help to ensure that updated and accurate information about the learning center is disseminated university-wide. Additionally, according to these participants, it can promote the center's visibility among students who might not know about available services and resources. Sydney stated:

> I think students do not know where to go and…we say, 'Well, go to the [learning center]', and I know that is wrong…I know we have to be specific. But it is more helpful if we could have some [common language]. I think what I am saying is that I need more specifics to tell the students where to go.

Similarly, Jesse explained:

> Sometimes, I feel like I could use some help with my sales pitch for the [learning center]. I think more knowledge would help because sometimes it is a hard sell. That could be because I am not giving students an accurate picture of what their experience could be like.

Discussion

In response to Payne et al.'s (2017) call to employ a needs assessment to understand and meet students' needs relating to their academic success, this work examined gaps between the current state of learning center services and resources and the intended outcomes of personalized support, clarity of services, and shared accountability for student success. Three overlapping themes were developed: (1) Garden through instead of weed out: The need to empower every student to succeed by addressing their unique needs through personalized support, rather than pushing out those who are perceived as underprepared. (2) Caught like a deer in headlights: The need to prevent struggling students from feeling overwhelmed if they wait to engage with the learning center until the situation is dire. (3) Take a horse to water: The need to direct students to specific services

and resources based on their unique needs and motivate them to use the services.

The Need to Empower Every Student to Succeed

When examining gaps between the current state of learning center services and resources and the intended outcomes, participants emphasized the importance of addressing students' unique needs. The idea that every student is unique and brings with them myriad preferences, experiences, and levels of expertise that must be considered by faculty and LCPs when working with students, especially adult students in online education, is also prevalent in the literature (Britt, 2015; Cercone, 2008). As enrollment at open-access institutions continues to grow (Aud et al., 2010), it is prudent for an institution's stakeholders to remember that "access without support is not opportunity" (Engstrom & Tinto, 2008, p. 46). To provide both access and support, educators and leaders have a responsibility to be aware of common challenges and growth areas of the student population as a whole and develop the appropriate types of assistance for them to develop as scholars (Engstrom & Tinto, 2008; Kuh et al., 2010). This notion is consistent with this needs assessment's findings. Both administrators and faculty members highlighted the importance of acknowledging challenges, such as students' professional and familial obligations. Therefore, when attempting to empower students to succeed, it is vital to be aware of the student population as a whole as well as individual student's needs to provide personalized support.

When investigating specific skills that students need individualized support to develop, writing and statistics were the two areas of focus for participants. Both administrators and faculty members agreed that working with students to develop foundational skills was crucial to increase their likelihood of success in their program. Research on graduate students' preparation in and struggles with scholarly writing is abundant (Hurst, Cleveland-Innes, Hawranik, 2013; Robinson & Bishop, 2017; Thomas, Williams, & Case, 2014). Consistent with the results of previous research (e.g., Hurst et al., 2013; Robinson & Bishop, 2017; Thomas et al., 2014), the findings of this needs assessment challenge the assumption that graduate students tend to enter their professional degree programs with

adequate scholarly writing skills. Whereas both the needs assessment findings and literature suggest that students who enroll in graduate programs may need additional support in scholarly writing, faculty members, who are content area experts, may not always know how to provide writing support (Belcher 1994; Thomas et al., 2014). Specifically, in this needs assessment, both administrators and a faculty member described not knowing how to proceed with a student who struggled with sentence structure to such an extent that it hindered their ability to comprehend the meaning. Likewise, several administrators indicated that students often struggle with mastering the writing skills needed to "speak the language of scholars." Because students enter their program with insufficient writing skills, faculty members face additional challenges in trying to assess learning and determine how to provide support most effectively.

Relative to the literature on writing preparation, research on graduate students' preparation in statistics is less extensive. However, an increasing amount of research has been done on statistics anxiety in the past two decades, as researchers have realized the effect of anxiety on academic achievement (Onwuegbuzie & Wilson, 2003). In this needs assessment, administrators described students who felt fearful of or intimidated by statistics. According to Onwuegbuzie (2004), statistics anxiety is common among graduate students, with as many as 80% of them experiencing it. Chew and Dillon (2014) reported that students in nonmathematical disciplines often consider statistics courses to be more anxiety-inducing than any others in their program. This heightened emotional state can have significant consequences. Bell (2003) contended that statistics anxiety likely is partially responsible for many students' delaying enrollment in statistics and research methodology courses and procrastinating when completing their assignments. Therefore, it might also be true that it could be a barrier to students' seeking timely assistance outside the classroom at the learning center. Whereas their awareness of students' statistics anxiety is important, the administrators in this needs assessment were unable to identify with what specific concepts and skills students struggled or why they might be experiencing difficulties in statistics beyond their own emotional experience. This lack of clarity might make it difficult to assist students in overcoming

statistics anxiety both in and beyond the classroom. Nevertheless, it also presents an opportunity for collaboration, as the LCPs at the university can share with their colleagues in the schools with which concepts and skills students are seeking support.

The finding that many graduate students lack the foundational writing and statistics skills needed to succeed is consistent with the literature (Hurst et al., 2013; Robinson & Bishop, 2017; Thomas et al., 2014). Several administrators reportedly perceived that some faculty members operated under the assumption that students need to find solutions for themselves. Some faculty members may view students who lack basic skills as antithetical to graduate education (Thomas et al., 2014). However, if students do not know what they need to "figure out," then they may become frustrated or overwhelmed, as both faculty and administrators discussed in this needs assessment.

Administrators and faculty members also discussed the need for students to practice these basic skills, as skill development often requires guidance and repetition. Participants focused on the need to motivate students to go early and often to the learning center, which may allow them to develop the skills needed to be successful when they otherwise might not be (Hurst et al., 2013; Thomas et al., 2014). Research on learning centers supports the assertion that skill development takes practice (Thomas et. al., 2014) and that LCPs can assist with skill development (Griffiths, 2015; Griffiths & Campbell, 2009). Both administrators and faculty members highlighted that students often need someone in front of them breaking down the steps of a skill into manageable steps and directing them how to practice. Previous research supports the use of a student-centered coaching model that focuses on skill building and learning the process of those skills (Griffiths, 2015; Griffiths & Campbell, 2009). Therefore, LCPs should bridge the gap between the struggling student who needs support and the faculty member who is aware that the student needs additional support but is unsure of what that would look like (Arendale, 2010; Masiello & Hayward, 1991). Even when faculty members possess expertise in teaching course content and the conventions of the discipline as well as course competencies, they can still benefit from collaborating with LCPs to identify students who need additional support and assist them most

effectively (Robinson & Bishop, 2017). Likewise, LCPs' work should be informed by faculty members, especially to learn what strategies have been used with a student so far and the extent to which they have been effective, to increase students' competence in the areas in which they struggle. This collaboration between faculty and LCPs should be seen as a step toward personalizing education to meet students' unique needs.

The Need to Prevent Struggling Students from Feeling Overwhelmed

Even when a learning center has highly credentialed professionals who employ a student-centered model, the students who would benefit from learning assistance the most may not necessarily seek help on their own (Casazza & Bauer, 2006; Hao, Wright, Barnes, & Branch, 2016; Masiello & Hayward, 1991). A common perception both in the literature and in these findings is that students often see learning assistance as being associated with struggling in courses and, therefore, are hesitant to seek support (Hurst et al., 2013; Thomas et al., 2014). However, learning assistance is not just for remedial students (Arendale, 2010). It is critical that stakeholders view learning assistance as a normative experience. Even though many graduate students struggle with developing the skills needed to succeed in their program (Britt 2015; Cercone 2008), they often are encouraged to be self-directed, autonomous learners (Hurst et al., 2013). Therefore, students, especially graduate students, might feel reluctant to admit that they need assistance.

In this needs assessment, participants could not provide specific data to support their belief that students are hesitant to seek support. However, both faculty and administrators provided anecdotal evidence that students often wait until they face a threat to their academic survival, such as failing a course. Then, because they do not fully understand the services and resources offered or the protocol for using them, they become overwhelmed and may decide against seeking assistance. Additionally, the student participant described not visiting the learning center yet because there was not a need due to doing well in the first course and just beginning to struggle in the second course. One way to begin to address the hesitance of students to utilize learning center services and resources

(Arendale, 2010; Hurst et al., 2013) is to create a culture of inclusive support for all students so that they feel welcome to seek learning assistance. Under such a condition, students could be more likely to take advantage of the services and resources available before they encounter a serious threat to their success. Also, they may be more likely to follow the recommendation of a faculty member to seek academic support above and beyond what the faculty member can provide as the needs assessment findings indicated that even when students are encouraged to seek learning assistance, they do not.

The findings of this needs assessment showed that misinformation, limited or no information, and limited or no communication among stakeholders about the services and resources available in the learning center may contribute to students waiting until later in their degree program to obtain help or until an "emergency" (e.g., potential failure or dismissal) occurs. Learning centers traditionally have operated in the margins of universities, with both faculty members and LCPs struggling to reach the students who need support the most (Arendale, 2010; Boquet, 1999). Due to this marginalization, in this needs assessment, faculty members, administrators, and the student all reportedly struggled with articulating the learning center's scope of service. Faculty members spoke about the importance of having someone other than a faculty member who is knowledgeable about writing and statistics assist students with skill development. However, they also admitted that they rarely talked to students or other administrators and faculty members about the center. Furthermore, they were unsure about how to start a conversation with students about seeking learning assistance, which is consistent with previous research findings (Arendale, 2010; Boquet, 1999, McGuire & McGuire, 2015). If LCPs want students to make the connection between their educational needs and the support available to them, two conditions must exist: (1) the resources need to be visible and (2) the services must be accessible (Paiz, 2018). Therefore, moving learning centers out of the margins to increase visibility and collaboration is paramount to achieve the intended outcome of stakeholders clearly understanding the center's services and resources.

The Need to Direct Students to Specific Services and Resources

To reach the struggling student who is hesitant to seek support, faculty members often need to be purposeful in (1) communicating with students that assistance is a normative part of the learning experience (Arendale, 2010); (2) showing students how utilizing services and resources can meet their unique educational needs (Hurst et al., 2013); and (3) directing students to specific services and resources to support them in skill development (Paiz, 2018; Thomas et al., 2014). At the university studied, a faculty member and two administrators grappled with being deliberate and clearly articulating why students would benefit from utilizing the learning center's services and resources. Given that the university is completely online, they cannot walk them to the center as they could at a brick-and-mortar institution. They reportedly encouraged students to take advantage of the learning center but noted that they could not force them to take advantage of the services and resources. One administrator discussed the need to be purposeful when sending links to resources and providing directives for students to follow, which speaks to Paiz's (2018) assertion that students need to connect the resource to filling a specific knowledge gap to see the inherent value. For administrators and faculty members to construct purposeful and convincing language that may entice the struggling student to utilize learning assistance, LCPs should initiate collaboration with everyone who shares accountability for student success. Such collaboration can ensure that stakeholders are speaking the same language regarding the center's role at the institution to provide targeted support to students (Arendale, 2010).

Researchers focusing on online learners often have cited collaboration as an important factor in engaging students (Britt, 2015; Hurst et al., 2013; Robinson & Bishop, 2017). Nevertheless, there is a lack of research on what successful collaboration looks like. Manning et al. (2006) stated that LCPs should be knowledgeable of each faculty member's willingness to collaborate and potential barriers to success before proposing a collaboration. In this needs assessment, one administrator welcomed collaboration, with an emphasis on closing the communication loop. Relatedly, two faculty members focused on the importance of increasing transparency between

faculty members and LCPs.

Instead of operating in silos (Manning et al., 2006), they can develop purposeful partnerships (Arendale, 2010, Boquet, 1999; Masiello & Hayward, 1991). A step toward developing faculty-learning center partnerships involves ensuring faculty members know how students are progressing when they utilize learning center services. Therefore, when they guide students to learning assistance, they can speak genuinely to them about how its services and resources can be beneficial to their success.

Limitations

The findings of this needs assessment should be considered in light of its limitations. The purpose of this work was to develop a shared understanding of the desired future state of learning center services and resources at one completely online university. Whereas the use of a single-case study design was appropriate, given the unique nature of the completely online learning center and university that were the foci of this study, the findings might not be generalizable to other contexts. Moreover, only faculty members who were teaching the first three courses of a program were invited to participate, as students are most likely to drop out of online programs during this phase (Willging & Johnson, 2009). However, their experiences with students and learning centers might not mirror those of faculty who teach courses later in students' programs. Although attempts were made to recruit all students with whom the faculty members in the sample were working at the time, only one student of the several who expressed interest participated. The challenge of recruiting student participants might reflect the unique student population's (e.g., adult, working students with familial obligations) limited time for additional activities. However, it is possible that if faculty members and students at other points in the program had participated, different findings would have been generated. Furthermore, including the perceptions of LCPs (e.g., academic coaches) as well as having additional students participate could have led to even more robust and/or different findings, including more of a focus on the unique needs of students attending a completely online university.

It should also be noted that the instrument was self-developed based on a review of the scholarly literature on learning center needs assessment as well as the researchers' professional expertise in learning assistance. Whereas several strategies (e.g., maintaining an audit trail, member checking, presenting rich and thick descriptions of participants' responses to support findings, identifying similarities and differences across participants' responses to ensure that divergent perspectives are represented) were employed to increase the likelihood that the findings are trustworthy, the interview protocol was not pilot tested. It is possible that one or more questions were unclear or that important questions were not included. Relatedly, the data were self-reported to individuals in leadership roles associated with the learning center. It is possible that some participants did not feel comfortable sharing negative perceptions and/or accounts of the center's services and resources with them. To contribute to the knowledge on this topic, future researchers can address one or more of the limitations above.

Conclusion

If learning centers are at the crossroads between faculty and student support services, then LCPs can lead the charge forward for collaboration and shared accountability for student learning with faculty members and other support services providers (Arendale, 2010). To answer Payne et al.'s (2017) call to employ a needs assessment to understand and meet students' needs relating to their academic success, this research sought to examine gaps between the current state of learning center services and resources and the intended outcomes of personalized support, clarity of services, and shared accountability for student success. Based on the findings and literature supporting the findings, three next steps for LCPs are recommended. (1) Work with faculty, staff, and administrators to ensure they understand the learning center's inherent value in promoting student success. (2) Develop a clear identity for the learning center that is jointly developed with the above stakeholders. (3) Collaborate with other professionals in departments who have similar student-driven missions (e.g., the library) to create a seamless experience for students. Alvarez and Risko (2000) contended that

education not only involves classroom interventions but is also an institution-wide responsibility. To that end, it is the responsibility of LCPs at this institution to use this needs assessment as a catalyst to engage institution stakeholders and develop a culture in which accessing the learning center is seen by all as a normative and expected part of the student experience.

References

Alvarez, M.C., & Risko, V.J. (2000). Motivation and study strategies. In R.F. Flippo & D.C. Caverly (Eds.), *Handbook of college reading and study strategy research* (2nd ed., pp. 199-219). New York, NY: Routledge.

Arendale, D.R. (2010). Access at the crossroads: Learning assistance in higher education. *ASHE Higher Education Report, 35*(6). San Francisco, CA: Jossey-Bass.

Artino, A. R., Jr., & Stephens, J. M. (2009). Academic motivation and self-regulation: A comparative analysis of undergraduate and graduate students learning online. *Internet and Higher Education, 12*(3-4), 146-151. doi:10.1016/j.iheduc.2009.02.001

Aud, S. Hussar, W.J., Kena, G., Bianco, K., Frohlich, L., Kemp, J., & Tahan, K. (2011). *The condition of education 2011* (NCES 2011-033). U.S. Department of Education, National Center for Educational Statistics. Washington, DC: U.S. Government Printing Office.

Belcher, D. (1994). The apprenticeship approach to advanced academic literary: Graduate students and their mentors. *English for Specific Purposes, 13*(1), 23-34.

Bell, J. A. (2003). Statistics anxiety: The nontraditional student. *Education, 124*(1), 157-162.

Bettinger, E. P., & Baker, R. B. (2014). The effects of student coaching: An evaluation of a randomized experiment in student advising. *Educational Evaluation and Policy Analysis*, *36*(1), 3-19. doi: 10.3102/0162373713500523

Boquet, E. (1999). "Our little secret": A history of writing centers, pre- to post-open admissions. *College Composition and communication, 50*, 463-482.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*, 77–101. doi: 10.1191/1478088706qp063oa

Britt, M. (2015). How to better engage online students with online strategies. *College Student Journal*, *49*, 399-404.

Campbell, J. L. Quincy, C., Osserman, J. & Pederson, O.K. (2013). Coding in-depth semistructured interviews: Problems of unitization and intercoder reliability and agreement. *Sociological Methods & Research, 42*, 294-320. doi: 10.1177/0049124113500475.

Casazza, M. E., & Bauer, L. (2006). *Access, opportunity, and success: Keeping the promise of higher education.* Westport, CT: Praeger.

Cercone, K. (2008). Characteristics of adult learners with implications for online learning design, *AACE Journal, 16*, 137-159.

Chew, P. K., & Dillon, D. B. (2014). Statistics anxiety update: Refining the construct and recommendations for a new research agenda. *Perspectives on Psychological Science, 9*, 196-208.

Engstrom, C., & Tinto, V. (2008). Access without support is not opportunity. *Change: The Magazine of Higher Learning*, *40*(1), 46-50.

Gayton, J. (2015). Comparing faculty and student perceptions regarding factors that affect student retention in online education. *The American Journal of Distance Education, 29*, 56-66. doi: 10.1080/08923647.2015.994365

Grant, J. (2002). Learning needs assessment: Assessing the need. *British Medical Journal, 324*(7330), 156-159. doi: 10.1136/bmj.324.7330.156.

Griffiths, K. E. (2015). Personal coaching: Reflection on a model for effective learning. *Journal of Learning Design*, *8*(3), 14-28.

Griffiths, K. E., & Campbell, M. A. (2009). Discovering, applying and integrating: The process of learning in coaching. *International Journal of Evidence-Based Coaching and Mentoring*, *7*(2), 16-30.

Hao, Q., Wright, E., Barnes, B., & Branch, R. M. (2016). What are the most important predictors of computer science students' online help-seeking behaviors? *Computers in Human Behavior*, *62*, 467-474. doi: 10.1016/j.chb.2016.04.016 0747-5632

Hurst, D., Cleveland-Innes, M., & Hawranik, P. (2013). Online graduate student identity and professional skills development. *Canadian Journal of Higher Education, 43*(3) 36-55.

Kuh, G.D., Kinzie, J., Schuh, J.H., Whitt, E.J., & Associates (2010). *Student success in college: Creating conditions that matter.* San Francisco, CA: Jossey-Bass.

Kvale, S., & Brinkman, S. (2009). *Learning the craft of qualitative research interviewing.* Los Angeles, CA: Sage.

LaPadula, M. (2003). A comprehensive look at online student support services for distance learners. *American Journal of Distance Education, 17*, 119-128.

Lee, Y. F., Altschuld, J. W., & White, J. L. (2007). Effects of multiple stakeholders in identifying and interpreting perceived needs. *Evaluation and Program Planning, 30*(1), 1-9.

Lehan, T. J., Hussey, H. D., & Shriner, M. (2018). The influence of academic coaching on persistence in online graduate students. *Mentoring & Tutoring: Partnership in Learning*, *26*, 289-304. doi: 10.1080/13611267.2018.1511848

Manning, K., Kinzie, J., & Schuh, J. H. (2006). One size does not fit all: Traditional and innovative models of student affairs practice. New York, NY: Routledge.

Masiello, L., & Hayward, M. (1991). The faculty survey: Identifying bridges between the classroom and the writing center. *The Writing Center Journal*, *11*(2), 73-79.

McGuire, S. Y., & McGuire, S. (2015). *Teach students how to learn.* Sterling, VA: Stylus.

Milman, N. B., Posey, L., Pintz, C., Wright, K., & Zhou, P. (2015). Online master's students' perceptions of institutional supports and resources: Initial survey results. *Online Learning*, *19*(4).

Onwuegbuzie, A. J. (2004). Academic procrastination and statistics anxiety. *Assessment & Evaluation in Higher Education, 29*(1), 3-19.

Onwuegbuzie, A. J., & Wilson, V. A. (2003). Statistics anxiety: Nature, etiology, antecedents, effects, and treatments--a comprehensive review of the literature. *Teaching in Higher Education*, *8*, 195-209. doi: 10.1080/1356251032000052447

Paiz, J. M. (2018). Expanding the writing center: A theoretical and practical toolkit for starting an online writing lab. *The Electronic Journal for English as a Second Language, 21*(4), 1-18.

Payne, E.M., Hodges, R., & Hernandez, E.P. (2017). Changing demographics and needs assessment for learning centers in the 21st century. *The Learning Assistance Review, 22*(1) 21-36.

Robinson, L. B. & Bishop, M. (2017). Creating a writing course to improve the writing self-efficacy of graduate nursing students. *Clinical Nursing Studies, 5*(4), 88-95.

Stacey, K., & Vincent, J. (2011). Evaluation of an electronic interview with multimedia stimulus materials for gaining in-depth responses from professionals. *Qualitative Research*, *11*, 605–624. doi: 10.1177/1468794111413237

Stake, R.E. (1994). Case studies. In N. K Denzien, & Y.S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 236-247). Thousand Oaks, CA: Sage Publications.

Tinto, V. (2012). *Completing college: Rethinking institutional action.* Chicago, IL: University of Chicago Press.

Thomas, M., Williams, A., & Case, J. (2014). The graduate writing institute: Overcoming risk, embracing strategies, and appreciating skills. *The Learning Assistance Review, 19*(1), 69-98.

VERBI Software. (2016). MAXQDA Analytics Pro [Computer Program]. Berlin, Germany:VERBI.

Willging, P. A., & Johnson, S. D. (2009). Factors that influence students' decision to drop out of online courses. *Journal of Asynchronous Learning Networks, 13*(3), 115-127.

Book Review: *Learning Centers in the 21st Century: A Modern Guide for Learning Assistance Professionals in Higher Education*

Sanders, L., Reedy, D. & Frizell, M. (Eds.). (2018). *Learning centers in the 21st century: A modern guide for learning assistance professionals in higher education.* Bentonville, AR: Iona Press.

Reviewed by James Otwell

Learning Centers in the 21st Century: A Modern Guide for Learning Assistance Professionals in Higher Education offers a collection of over 30 essays that discuss a wide scope of topics relevant to learning assistance professionals and related university stakeholders. It is the first book published by the NCLCA, and the editors of the book and authors of the essays represent a broad and diverse group of institutions and roles including: current and past learning center administrators, deans and associate deans, faculty members, researchers, and other roles/combinations of roles that demonstrate the myriad of professional pathways into becoming a stakeholder in the field of Student Success. The book is intended for learning center professionals as well as administrators at institutions tasked with or considering creating/expanding learning support services at their institutions. The editors of the book use their collective experience to organize and present the topics of the book in a foundational manner beginning with chapters on different steps and factors to consider when establishing a learning center as well as ways to grow a learning center in its infancy. These are followed by groups of chapters organized by themes intended to augment existing learning centers such as technological resources, learning center programs (such as academic coaching) that learning centers can adopt, and learning philosophies that align with both the goals of modern learning centers as well as the needs of 21st century college students. Additionally, the book seeks to, in some chapters, consolidate and review relevant literature to learning centers and, in other cases, expand the base of knowledge in an under-researched field.

The editors of *Learning Centers in the 21st Century* organize the chapters (each read as a stand-alone article) into 7 distinct sections, plus appendices with additional case studies. The editors more or less organize the book on a continuum that begins with chapters concerning macro-level issues that learning centers face such as their place in the institutional setting, and continues narrowing in the scope of focus before the final chapters discuss the micro-level scale of interactions between students and tutors that learning centers are built on. The Introduction and Section 1 focus on taking the steps necessary to establishing a learning center including chapters discussing aligning the center with the strategic plan of the institution, conducting needs assessments for establishing a center (as well as follow-up assessment and different considerations for how to model the center based on the assessments/campus type), and different ways to train the tutors (most often students) who are responsible for direct learning assistance. Section 2 focuses on growing a learning center through chapters on expanding partnerships and stakeholders at an institution, leveraging resources, marketing, and certifications/professional associations (such as NCLCA) that support learning center professionals.

After discussing issues relevant to establishing a learning center, the book pivots to covering specific topics within learning center administration. Section 3 deals with technological resources for learning centers such as virtual and blended learning centers as well as individual virtual and blended learning support programs. Sections 4 and 5 discuss common programs offered at institutions that are either offered through the learning center, or supplement/interact with learning center programs in some way. Examples of the former include peer mentoring and academic coaching programs, learning strategies courses, structured study environments, and supplemental instruction (or similar) programs. Topics related to the latter include academic warning systems, academic recovery, and the intersection between disability resources (and the students that use them) and the learning center. Section 6 consists of two chapters addressing how academic advising programs and learning centers both mirror each other and can learn from each other in terms of their learning objectives and approaches to working with students.

The final section applies established educational psychology theories that directly address (or describe) metacognition to learning center pedagogy and strategies that tutors can utilize that are conducive to student development in areas shown to increase their likelihood of persistence through college.

The editors of *Learning Centers in the 21st Century* have collected a large assortment of publications that together help the book reach its goal of being a valuable resource for learning assistance professionals. However, the chapters each work toward this goal in different ways. Some chapters read more as narratives with anecdotes and wisdom that the authors glean from their own experiences as learning center directors. Most chapters incorporate some degree of literature review to supplement the author's summary of the topic at hand. In some cases, these literature reviews offer a thorough synthesis of recent relevant research that a reader can incorporate into their own research and/or evidence-based practice. One salient example is chapter 20 by Reedy (2018), which discusses working with students with disabilities in a learning center and utilizes current research to provide specific strategies that tutors can incorporate when working with students with specific disabilities (such as tutoring students with ADHD in 8-10 minute "bursts" with short breaks to limit cognitive overload) (p.304). Another is chapter 15 by Arendale (2018), which incorporates current articles to differentiate between different cooperative learning models (such as Supplemental Instruction) and how each model is beneficial/limited.

Unfortunately, there are also times where the chapters are limited by the dearth of contemporary research into certain areas, and authors are occasionally forced to supplement their research with their own experiences in order to avoid describing current trends in higher education with more dated literature. Consequently, while the book is primarily designed to identify and address challenges facing learning center professionals, it also implicitly reveals another challenge facing the profession in the lack of recent large-scale research into a certain facets of learning center management. However, there are also instances where authors fill some of these gaps by contributing scholarly case-studies as chapters. Chapter 14 by Salmon (2018), for example, conducts a case- study that interviews

students utilizing structured study environments while also providing current research on structured studied environments. Nevertheless, the lack of more recent scholarly research in the field of many areas of learning center programming is made readily apparent over the course of reading the entire collection of articles.

The many authors that contributed to the chapters of the book provide a diversity of experiences that are appropriate given the diverse topics that the book discusses. Some authors draw on their own experience as learning center and administrative professionals, others as researchers, and many as both. Furthermore, the editors Laura Sanders, David Reedy, and Michael Frizell each have decades of experience both in learning center administration and as senior members of the NCLCA's leadership and editorial board. This experience gives each of them extensive familiarity with national trends in learning centers as well as the existing research surrounding learning centers, and qualifies them to review and curate the different chapters that comprise the book. It is this collective experience that readers will likely notice and appreciate regardless of their own level of familiarity with the topics presented in the chapters. Particular areas covered in great detail that were pertinent to my learning center include fostering external stakeholders and advocates for the learning center (Simmerman, 2018, p. 93-100), academic skills-based interventions (including academic coaching) (Ochola & Price, 2018, p.197-204; Keller, 2018, p.249-260; Blair, 2018, p.261-280), and specific tutoring strategies that tutors can utilize in different settings to increase student metacognition and self-regulatory capacity (Reed, 2018, p.295-309; Breslin, 2018, p. 381-392; Brocato, Rocke, & Mcguire, 2018, p.393-416).

Learning Centers in the 21st Century's greatest contributions are providing a primer for higher education professionals that delves into the multitude of layers that are involved in learning center administration, and thematically demonstrating how a learning center functions and works with other units of an institution to build the self-regulatory capacity in students that is paramount to student success. It offers multiple detailed perspectives on the factors surrounding learning center development and success, and explores more recent learning center programs in depth such as academic

coaching and technology-based supports. One area of learning center operations that is not explored in depth that could be covered in follow-up publications is a close examination of the tutors in learning centers. While there is ample discussion of the role tutors play in learning centers and best practices that they can use to help the learning center achieve its goals, there is little exploration about who the tutors are and how a learning center professional might select, manage, develop, and nurture the individuals responsible for delivering learning center programming (who are also most often students at the institution).

In summary, this book is an excellent read written by learning center professionals for learning center professionals. It deeply examines many topics and themes surrounding learning center management, and the articles are effectively weaved together in such a way that the book meets its objective of being useful both for those new to learning centers (or establishing one) who would read it cover-to-cover, and for more seasoned learning center professionals looking for more research in select topics related to program expansion and improvement. I recommend it as an essential text for those responsible for student support who wish to borrow from the collective experience provided by the authors to both build and grow their learning center.

Radically Rethink & Reshape: Creating a Cohesive Commons Community

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Abstract

Learning centers and academic support programs are often idealized entities campuses look to for student success, retention, and engagement. By untethering our thinking about program boundaries, identities, and alliances and radically reforming, we can generate interest, passion, and opportunities across campus. The force of redistributing identity, authority, and alliances for student workers reshaped thinking about student success, high impact practices, and active learning at the highest levels. This paper explores best practices utilized by Texas A&M University at Galveston to create The Commons: Learning, Research, & Teaching communities with a focus on learning commons and how to develop considerations for other campuses.

The evolution of learning centers (LC) has generated successful models including information commons, learning commons, learning assistance centers, and others. The formative history and definition of information commons as studied by Beagle has and continues to help "scholars . . . view the model as a continuum of change that ranges from adjustment to transformation, with the learning commons on the transformation end of the spectrum" (Accardi, 2010, p.312). While allowing for variations in the design, organization, and mission, the pulse of learning commons programs remains linked to student success, lifelong learning, good citizenship, and self-sufficient learning; "whether they call themselves an information commons, learning commons, knowledge commons, or simply library, they are envisioning new spaces and new partnerships to create environments that can support the integrated service needs" (McMullen, 2007, p.2).

Our forms and boundaries are defined by campus environments including physical, political, and cultural geographies. Beagle's classic model of a commons includes a harmonious combination of a physical, virtual, and cultural commons which provide designated spaces with computers (physical), access to digital library and learning collections (virtual), and the collaborative, co-curricular teaching created as a result of the environment of the commons (cultural) (Heitsch, 2011, p.66). This paradigm extends the boundaries of our campus' information ecologies and calls for a restructuring of services in both physical and virtual spaces focused on the learning needs of our user community (McMullen, 2007, p.2).

Teams often discover hidden challenges when balancing the formation, adaptation, and migration of these geographies. As our programs grow and mature, we retain fundamental identities and pedagogies but must slough benign relationships and inactive initiatives in order to engage new partnerships, expand our high impact activities, and improve student success.

However, the path of forming or reforming a program can be wrought with obstacles toward well-intended initiatives such as modernizing services, staying relevant to student learning abilities, building productive relationships with faculty and staff, or achieving positive assessment outcomes. According to Accardi (2010), indicators of a successful LC environment include cross-campus partnerships to enhance learning, strong leadership to establish the best model for holistic learning, a unifying vision integrating disparate campus stakeholders, and a flexible perspective that plans for the inevitable changes the creation of an LC brings to a campus (p.327).

What if we could untether our thinking about program boundaries, identities, and alliances and radically reform? What if we could be a nucleus for generating interest, passion, and opportunities for student success across campus? The opportunity to redistribute identity, authority, and alliances among academic support programs and learning centers specifically reshape post-secondary educational thinking about student success, high impact practices, and active learning. This paper explores best practices utilized by Texas A&M University at Galveston (TAMUG) to create the commons with emphasis on the learning commons peer community.

Approaching and resolving challenges along the continuum of change led us to review leading change management philosophies to learn how organizations thrive by managing change and allocate time and energy distilling the change process into essential steps aiming for predictable outcomes and guaranteed success. Conventional thinking would invite an organization to follow a linear selection process choosing one methodology through which to manage and contain change. We recognize that the role of change in learning centers is nonlinear, constant, and natural. Therefore new, scalable, and malleable models for managing the change-continuum are needed. According to Graetz (2010), "the multi-philosophy approach reinforces the need to discard assumptions about opposing values, instead replacing them with an appreciation of complementary concepts" (p.151). The systems philosophy of change management proposed an understanding that imposed change has "multiplied effects across an organization, and consequently, in order. . . to be successful, it must be introduced across the range of organizational units and sub-systems (p.146). This approach aligns with our values of focusing on the holistic learning environment for students and prioritizes the sums of the organization over the individual units. Integrating this approach allows reflection, continuous improvement, and feedback to stakeholders with future hopes that when effectively linked together, our programs and the formation of the LC can lead to high team performance.

Initiating new programs involves acknowledging the political nature of higher education environments which is necessary for navigating the stages of change and creating realistic and sustainable change. The political philosophy of change management empowered us to set our agenda and review competing agendas while acknowledging that each organization seeks to acquire more power, conflict lies at the heart of change, and without power change is futile (Graetz, 2010, p.145). In forming or reforming an organization, leadership must review the political space and cost to others for re-allocating resources. Working toward understanding and using the political approach to change management allowed us to gain power by arguing effectively for the value of our program toward achieving university goals and gain coalition support along with the

allocation of staff, program funding, and meaningful representation in leadership.

Intertwined with the philosophies of change management is the theory of group management. Of the many group development theories, Tuckerman's conceptual model for stages of group development informed our strategy for "helping group members understand what was happening in the development process, and. . . a way to predict the stages of growth in groups and provided common language" (Bonebright, 2009, p.111). The basic tenets of this model include five progressive stages. The first stage is forming and includes team members focused on testing boundaries and dependence with all activities focused on orientation to a task. The second stage is storming which allows team members to explore intragroup conflict with activity focused on emotional response to task demands. The third stage is norming which focuses on development of group cohesion with activity focused on the open exchange of relevant interpretations. The fourth stage is performing which explores team relatedness to functional roles with activity focused on the emergence of solutions. The fifth stage is adjourning which involves completing the task and breaking up the team. This process often takes many iterations and often becomes cyclical between the storming and norming stages. The combination of the change continuum and innovation often cause groups to vacillate which requires teams to be malleable.

Flexibility is essential in a turbulent environment in order to find new paths to innovation, but order is also necessary to ensure that innovation is focused and relevant (Graetz, 2010, p.151). Educational institution environments, climates, and cultures are inherently provocative, but soundly and bureaucratically structured, which makes change a precarious endeavor. Four years, 10 programs, four mergers, and a workforce of 100 students later, we have Frankensteined the commons by radically rethinking and reforming partnerships among academic support programs.

Quiet Riot

The culmination of factors that set our task force in motion is convoluted and seemingly random, but after continued analysis,

connected in ways that only a centralized model would assuage. It started with the snowball of new staff hires to operate peer service programs and evolved into an avalanche of collaboration to disrupt the campus for good. Suffice it to say that if administration hears similar problems from varied departments enough and those parties combine forces to propose a solution as a unified voice, they are more likely to entertain proposed changes.

After a passionate joint proposal and presentation to the executive leadership team, the TAMUG Executive Associate Vice President for Academic Affairs and Chief Academic Officer charged the Learning Commons Task Force "to evaluate the feasibility and operations of a learning commons" (Louchouarn, 2016). The task force set a deadline of three months and a team of representatives from academic advising, applied math lab, library, instructional technology, media studio, supplemental instruction, tutoring, and writing lab agreed to meet weekly.

The first step of quietly rioting is to create a safe space or neutral environment where everyone has an equal voice outside academic departmental ownership. These conversations should expand program visions and allow team members to be vulnerable about our own programs while trying new things together. The task force did extensive research into existing learning commons activities and services in the State of Texas and across the nation. Using Austin Community College, Oregon State University, and Louisiana State University as models, the task force was able to delineate typical program models to consider for integration. Many successful programs on our campus have shared visions and missions prompting regular collaboration. Each program's mission and value to the campus was carefully considered.

We began by cataloging the function and activities of academic support programs or departments that contribute directly to the success of our students. We compared our catalog to holistic factors attributed to student success (Achieving the Dream, 2019) and sorted program activities into categories of "prescriptive" and "developmental." Prescriptive or directive services support student learning through specific and logical process-driven directions including editing, solving math problems, or registering for courses.

Services identified as developmental or non-directive student learning involve guiding students to develop solutions and skills including information literacy, academic coaching, paper revision, and goal formation. This sorting allowed the task force to objectively assess the balance of prescriptive and developmental services and identify redundancies in the formation of an LC.

As at most campuses, these services are distributed across diverse divisions and departments as well as separated by political, personal, and spatial barriers. One of the most influential decisions the task force made was to remove the limitations of politics, ownership, and personnel concerns in favor of imagining the purest intention and function of a program and service. It became crucial to set rules for the conversations that we were going to have moving forward, so we approached this as if we had all signed non-disclosure agreements and agreed to abide by the rules of a safe space to voice our thoughts and ideas. We met in a secluded conference space where we could not be overheard and no ideas were off the table; we did not discuss the people or the politics orbiting the involved entities, and we did not share any of the radical ideas outside of our meetings so as not to inadvertently threaten anyone's perception of their future position or livelihood. As with radical planning projects, it was imperative that we keep everything under wraps until we could have the opportunity to explain the logical thoughts behind our creative new campus model.

Table 1: Selection Criteria for Inclusion or Exclusion into learning commons

Program	Factors for Inclusion				Factors for Exclusion	
	Reduce Redundancy	Operational Support Needs	Outgrown Current Space	Shared Database	Referral Partner	Future Partner
Academic Advising				☑	☑	☑
Academic Coaching				☑	☑	☑
Applied Math Lab	☑	☑	☑	☑		
Career Services					☑	
Counseling					☑	
Honors Program		☑	☑	☑		
Library	☑			☑		
Learning Communities					☑	
Media Studio	☑		☑	☑		
Supplemental Instruction	☑			☑		
Tutoring	☑		☑	☑		
Undergraduate Research		☑				
Writing Lab	☑			☑		

NOTE: The Task Force determined to include or exclude programs based on the factors listed in the table above. Leading factors for inclusion were a shared data collection repository and opportunity to reduce redundancy. Supportive factors for inclusion were program growth and the need for operational support.

Table 1 is divided into two major areas, factors for inclusion and factors for exclusion, to show how the task force delineated proximal partnerships across campus. In addition to the shared database for quantitative data collection and reporting, the leading factor for inclusion was the opportunity to reduce program redundancy by coordinating student worker hiring, training, and evaluation; departmental and LC support in Chemistry, Math, Physics, and Writing; and streamline workloads, time management, and budgets for administrative staff and faculty. The programs we decided are not part of the main body of the LC are academic advising and coaching. These services are highly prescriptive (directive) and do not develop or teach academic content to students in the same way the other peer-led services offer tutoring, teaching, and learning.

Once we determined which programs comprised the TAMUG Learning Commons (Table 1), it was crucial to distinguish a centralized space and department to house this collection of services.

Throughout the course of our discussions, library representation disclosed their fears of becoming insignificant as a campus resource based on the rapid paradigm shift from paper to technology. At the TAMUG Library, books circulation is reduced to 3%, but students heavily utilize study spaces, computer stations, free printing, check out electronic devices, and explore university purchased journal articles. Academic libraries are challenged to create venues that engage "learning in a social context, not solely a place to socialize; otherwise, the commons would just become a glorified student union or dorm common room facility" (Lippincott, 2012, p.543-544). Determined to stay relevant to student needs, the director offered up the Library as a centralized location for the peer support programs—a one-stop-shop for student success. These programs aligned under the chief academic officer in the division of academic affairs; this made it an easier decision to align the budgets. The best-selling point of centralizing physically in the library was the 2015/2016 gate count that showed foot traffic of 294,668 visits on a campus with about 2,000 students. The hope was that by being in a location students regularly frequented, services could positively benefit from the symbiotic relationship.

Expand

The task force compiled all thoughts and results into a proposal and then shared it one-on-one with key administrative individuals to get their endorsement before sharing it with the entire administrative team. The proposed framework of our learning commons (LC) was not universally welcomed by library and campus faculty and staff. As with Schmidt's (2005) formation of an LC, there was concern that LC activities were not in keeping with traditional library roles, rebuke for relinquishing space for non-library services, and fear "that the notion of the Learning Commons was supplanting the identity of the library" (p.252). However, the very space we aimed to create naturally fostered a collaborative space "both literal and metaphorical, to seek out opportunities both to fortify current programs and to develop new services (Schmidt, 2005, p.246). By proactively explaining what we were thinking and why it gave others a chance to consider our progressive movement more calmly and rationally without feeling

threatened in a public setting. Our approach tempered opposition and allowed the initial conversations the safe, exploratory space needed to thrive; stakeholders became allies that empowered our plan and promoted it to their peers.

Once we had administrative buy-in, we needed to get the students to see our vision for what it was: a chance to enhance their educational experience. So we, once again, decided to start with our allies: the student workers. We began by inviting just the student leaders, who up until this point had never worked together, to a private meeting where they introduced themselves to one another and discussed what they did in their jobs. Then we proposed the idea of an LC model and asked what it could look like on our campus and what it would entail. Then we just sat back and listened. The student leaders made suggestions, debated, and compromised with one another about what an LC could be like and how it could work and, to our relief, came to similar conclusions we had. Once they had exhausted the topic, we shared our concept and held our breath. The heads around the room nodded and we finally started to think that this dream could actually come to fruition.

We took it a step further by holding a summit for all student workers, 100 in total, associated with the programs that would comprise our future LC. We held the summit in a room with large round tables and assigned seating with student workers from each program at each table so that they had to interact with students they likely did not know. We explained why they were there and introduced the general idea of an LC and what it could look like on our campus. Then we had them debrief on their year of work in their small groups by introducing themselves, what they do, and how they do it. We provided a series of questions for them to reflect on and discuss as a group in order to get them to see that even though they were from different programs run in different ways, they all had the common goal of helping students succeed (Appendix A). By the end of this summit, we had a noisy room full of students who were excited to make new friends with whom they could collaborate and were open to the idea of working more closely together as a unified organization.

We then proceeded to win over the rest of the student

body starting with the incoming cohort of freshmen. Changing the minds of students who have traditional processes and roles is difficult at best, but critical to the holistic and campus-wide cultural development of an LC. We partnered with other programs to design an academic success session for our new student conferences that showed the typical issues students go through each semester and how they could use the combination of our services to improve their academic performance. Incoming students and their families left knowing that despite the strenuous academic regime that was coming their way, they would have a unified team of support with various options to help them reach their goals.

Develop

While deciding to label our new unit of peer support services the TAMUG Learning Commons (LC) felt like an easy decision, determining what to call the collection of other programs and our student employees was more difficult. The LC formation precipitated the development of two additional commons: research commons and teaching commons. The research commons includes the library, collection services, interlibrary loan, honors, and undergraduate research programs in order to emphasize their primary research functions. The teaching commons aims to fill the gap in teaching support for our campus. The initial goal is to build future services, resources, and training to support and development instructional faculty and graduate students. Together these three pieces would comprise the commons: learning, research, and teaching. This unique arrangement is creating excitement from all areas of campus with ongoing development and growing support; future goals include sharing findings from those areas in future presentations and publications.

We focused the majority of our energy establishing centralized peer support services; to unify our student workers, we replaced job title designations such as tutor, coach, or supplemental instructor with the general term of learning consultant. We restructured future hires under wages that mapped to their mode of work such as 1-on-1, small group, or large group modes scaffolding pay from the lowest pay for 1-on-1 work up to the highest pay for large group work with

additional raises for annual merit or leadership roles. We then created a common student employment application form and process in conjunction with our human resources department to streamline the intake and interviewing procedures as well as recruitment to our programs.

We prioritized similar values based on training agendas and learning outcomes to design a common, conference-style training which includes scaffolded content and subject-specific breakout sessions. Weekly meetings, presided over by designated student leaders, are pivotal to continuing training conversations, group bonding, and professional development. To facilitate these trainings, digitize, centralize, and coordinate resources, we utilized a shared Google team drive setup with folders for guidelines, schedules, data, evaluations, and more. The biggest challenge was to merge our separate handbooks/manuals into one format by combining materials to eliminate redundancies and create a more cohesive unit. After two versions, we converted it to a Google site to offer a dynamic and interactive format with which our students could better engage. It continues to evolve and improve each semester with regular feedback and edits by student leadership.

Rebranding efforts are critical for university communities to find and understand the mission of this newly formed collaborative group. First, we worked with our webmaster to create new landing pages for each program that follows a similar layout with the same university branded colors, fonts, and styles. Each program page links back to its corresponding unit landing site and each unit can be navigated from our new home page at www.tamug.edu/commons. Then, the university communications manager designed branded university logos to use for all marketing materials and promotional giveaways. The use of logos, promotional giveaways, and unified web formatting has helped us to entice our students, faculty, and staff to accept the transition to the commons.

Bonding is one of the most pivotal factors of the buy-in process and provides opportunities for our student workers, staff, and faculty to connect, grow, and learn with one another. We started with the requisite training icebreakers and luncheons, crossover recruiting events, and leadership meetings and then progressed to

optional social events such as potlucks, gift exchanges, and an annual banquet to celebrate their achievements. Over time, we've observed consultants talking to other consultants they had previously been ambivalent towards, diverse groups of student workers hanging out during their downtime in the staff lounge and around campus, and, most importantly, the "them" language morphed into "us".

Evidence for our hopes that the creation of this centralized service would have a positive effect on our student workers, tie them to the community of learning, and develop skills toward their academic careers came one year after forming the LC as a graduating senior and former tutor cited the LC as a source for their success during a commencement speech. They thanked our "student leadership for the tutoring opportunities they made available. . . and the selfless service… repeatedly demonstrated by the many tutors and staff of the LC… I was really thankful I was able to participate in that program" (Schein, 2018).

Evolve

To show success to our stakeholders, we often transform into data analytic experts, accountants, and even graphic designers. Diverse strategies are cobbled together and archival data sources are mined to share our innovations, strategic partnerships, frugal resourcefulness, relevancy, and direct impact on student success. We attempt it all: write the reports; gather the surveys; manage the data; present at orientations; and visit department meetings, classes, and communities all to gain the student's attention, appreciation, and understanding.

Using TutorTrac Software to collect data across terms, we are able to interpret and craft success reports to diverse administrative teams such as departmental faculty, department heads, academic councils, deans, and provosts. The narrative and data for each report are crafted specifically for the type of audience such as annual provost report, division of academic affairs strategic plan, or departmental academic success update. Additionally, the system automatically sends weekly instructor reports of student participation in learning commons (LC) programs. Reporting methods have transitioned from individual program data collection and reporting to

collaborative data reporting using narrative coupled with infographics to show relevant developments, the success of program initiatives, and student participation and interaction with programs. Figure 1 is a comprehensive compilation of the involved programs delineated by time; 2015/2016 shows data from all programs prior to the formation and physical relocation of the LC while 2016/2017 and 2017/2018 show data after the initial formation.

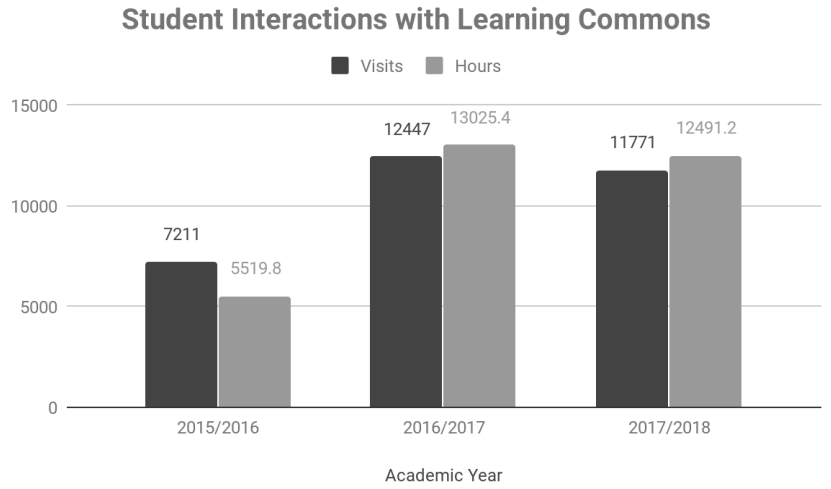

Figure 1: Student Interactions with Learning Commons from 2015- to 2018. This figure illustrates the total student visits among learning assistance programs and total hours consultants assisted students each academic year.

One value of success we track and report is the steady increase of unique student visits each year; the other value is the total number of contact hours students spent engaging our services. Figure 1 shows the student interactions from 2015/2016 to 2016/2017 representing the 72% increase in visits and 135.9% increase in contact hours; These increases are presumably due to the informal formation of the LC including relocating physically separated programs into a common space and unified messaging to the student body, staff, and faculty. One impactful event during summer 2015 was that four programs across two divisions–including tutoring, writing lab, academic coaching, and advising–teamed up to design and present a unified academic success orientation at each new

student conference. The data demonstrates the initial success of our comprehensive program design and encouraged our administrative team to believe that the LC model could greatly benefit our campus.

During the 2016/2017 to 2017/2018 academic years, the LC publicly launched to the faculty and staff and show similar data ranges. The 2017/2018 academic year showed a slight, but insignificant, decrease in the total number of visits and hours compared to the 2016/2017 year. This decrease is most likely a result of the impacts of two severe weather events to our campus and surrounding areas. In fall 2017, the Greater Houston Area was hit by Hurricane Harvey and again spring 2018 by Winter Storm Inga, which both delayed the start of the semesters and resulted in student, staff, and faculty attrition as well as playing catch-up for the remainder of the terms.

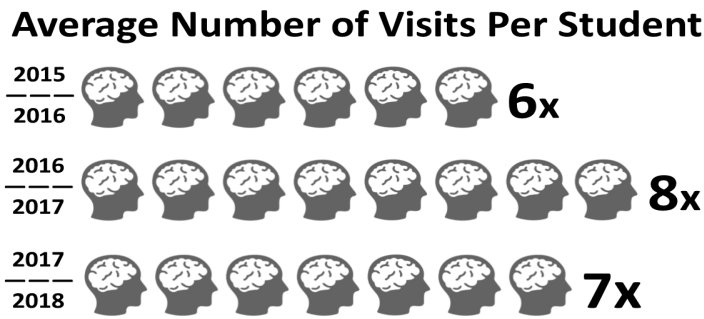

Figure 2: The average number of visits per student. This figure illustrates the return rate of students participating in learning assistance programs for multiple academic years.

The return rate measure of visits per student as shown in Figure 2 is a quantitative value of consultant interactions with students which we use in conjunction with anecdotal data collected from end-of-term student feedback surveys to inform the efficacy of rapport. As separate programs, our return rate per program was lower before the merger; however, since combining our data for visits per individual student, we show an increase of students returning to not only one program but multiple as they discover the benefits of one-

stop-shopping for academic support. LC administration transparently shared return rate data with consultants at orientations, leadership meetings, and annual banquets. This encouraged consultants to compare longevity data, set goals for improving student relationships and interactions, and support our vision of increasing the equity of return rates across programs. A resulting byproduct was a positive effect on faculty and staff interactions as the students aligned program services and processes with the curriculum.

Figure 2 shows a 33% increase in the average number of visits per student for the 2016/2017 academic year from the 2015/2016 academic year. We anticipated some increase based on the crossover of services but were pleasantly surprised by the increase above two visits per student average that preceded merging data sets. It also shows a 17% decrease from 2016/2017 to 2017/2018 due to the impacts of severe weather events. We will continue to monitor to establish long term trends proving that we can persist.

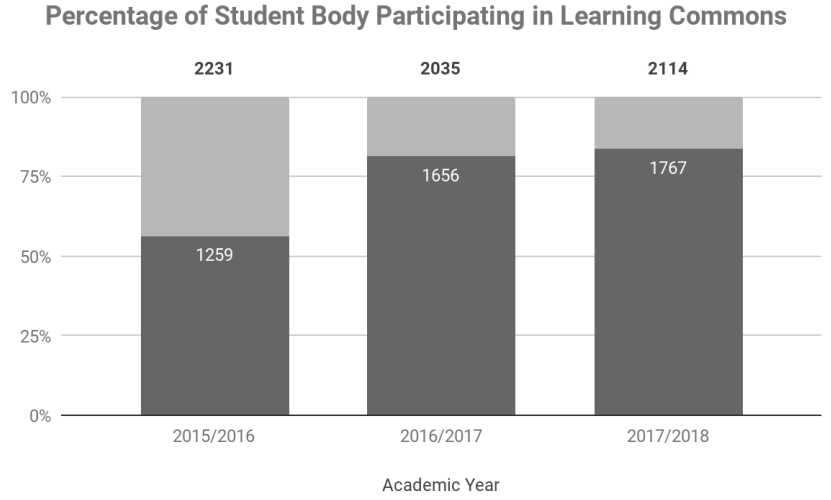

Figure 3: Percentage of students engaging with LC programs by academic year. This figure shows the total unique students based on campus enrollment who participated in learning assistance programs over three academic years.

Another value of success we track and report is the number of unique students that visit each year compared to the total number of students enrolled at the institution. Figure 3 shows the

percentage of voluntary student participation in LC programs had the largest increase, 32%, from the 2015/2016 academic year to the 2016/2017 year due to the initial and informal formation of the LC programs. As a unified group of learning assistance programs on a small campus, we are able to build better rapport with our students, staff, and faculty which directly influences the referral and recommendation processes.

We were able to increase our overall student participation from 56% to an average of more than 82% of the total student population. Despite the slight decrease in total student visits and hours in our programs for the 2017/2018 academic year (Figure 1) due to Hurricane Harvey and Winter Storm Inga, we still saw an increase in the total number of students that visited and the percentage of the total student population that utilized our services.

Most academic support program data fluctuates with enrollment; however, our data shows a steady increase in total student participation despite a decrease in enrollment after 2015/2016. These significant increases infer that our programs are robust and able to support the majority of all undergraduate and graduate students better unified than when we were independent.

Conclusion and Discussion

Successful change involves curating the many definitions, voices, barriers, and plans of learning assistance programs. Institutions large or small should have strong facilitated coordination among academic, operational, and student affairs programs in order to untether our thinking and radically reform. The evolution and varied iterations of the commons in academic libraries over the recent two decades show "clear promise for an enlightening era of vibrancy and intelligence . . . and great hopes for those of us who strive to collaboratively produce and share the vision of the dynamic library Commons" (Somerville, 2008, p. 2-3). Discovering the best-fit change management philosophies and designing group management plans for implementing innovative, student-centered program design can establish Learning Assistance Organizations as leaders in shaping student success (Figure 4 and Appendix B).

By breaking the silos and streamlining our processes as the LC,

we increased our efficacy and reduced redundant student success efforts like recruiting, hiring, training, marketing, data collection, and assessment. Faculty and staff now have a centralized partner on campus with which to collaborate, communicate, and refer students in need of academic support outside the classroom. Initial participation data indicates that this campus culture shift has been productive and worth the storming and forming stages we have undergone since 2016.

Next steps include identifying, analyzing, and sharing data from the research & teaching commons programs so that we can point to a more holistic student impact. We need to continue evaluating our effectiveness based on other quantitative success measures such as correlations to the impact services have on student course and assignment grades, cumulative grade point averages (GPA) or grade point ratio (GPR), retention, and time to graduation. Further research into blending these 'hard' outcomes with 'soft' outcomes which include learners' perceptions of progress toward their learning goals is needed to discover the holistic picture of student learning experiences derived from learning commons (Zepke, 2010, p.661-662). Reviewing these data will inform the baseline over a five year period. With more data and time we hope to establish a trend and present a model of success to the campus, administration, and peer institutions as verification and justification for this complex but invaluable process.

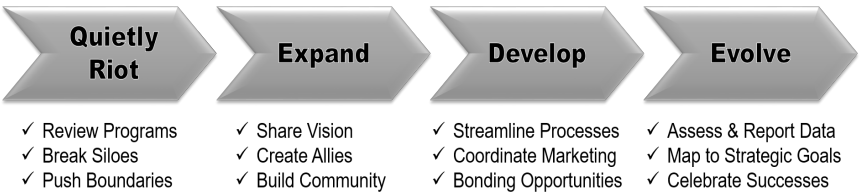

Figure 4: The four steps in creation of an LC. This figure shows Texas A&M University at Galveston's process to create a centralized learning commons.

We share our experience to map one possible pathway and model toward forming or reforming a learning commons while encouraging other institutions to review, creatively think about, and

take steps toward forming new partnerships. Outlined in Figure 4 are the essential steps we took during this process and the objectives met to complete them. Each part comes with its own challenges and rewards, but will ultimately reshape the way one thinks about creating a cohesive commons community and supporting the success of students.

References

Accardi, M. T., Cordova, M., & Leeder, K. (2010). Reviewing the library learning commons: history, models, and perspectives. *College & Undergraduate Libraries, 17*(2-3), 310-329. doi:10.1080/10691316.2010.481595

Achieving the Dream. (2019). Holistic Student Supports. Retrieved from https://www.achievingthedream.org/resources/initiatives/holistic-student-supports

Bonebright, D. (2010). 40 years of storming: a historical review of Tuckerman's model of small group development. *Human Resource Development International*, *13*(1), 111-120, doi: 10.1080/13678861003589099

Graetz, F. & Smith, A. (2010). Managing organizational change: A philosophies of change approach. *Journal of Change Management*, *10*(2), 135-154, doi: 10.1080/14697011003795602

Heitsch, E. K., & Holley, R. P. (2011). The information and learning commons: some reflections. *New Review of Academic Librarianship, 17*(1), 64-77. doi:10.1080/13614533.2011.547416

Lippincott, J. K. (2012). Information commons: Meeting millennials' needs. *Journal of Library Administration, 52*(6-7), 538-548. doi:10.1080/01930826.2012.707950

McMullen, S. (2007). The learning commons model: determining best practices for design, implementation, and service. (Sabbatical Report). Retrieved from http://faculty.rwu.edu/smcmullen/McMullen%20Final%20Sabbatical%20Report.pdf

Schein, B. [Brad S]. (Producer). (2018, August 11). *Thank You Speech Summer 2018 TAMUG* [Video file]. Available from https://www.youtube.com/watch?reload=9&v=X74HsShQrrY&feature=youtu.be

Schmidt, N., & Kaufman, J. (2005). Learning commons: Bridging the academic and student affairs divide to enhance learning across campus. *Research Strategies, 20*(4), 242-256. doi: http://dx.doi.org/10.1016/j.resstr.2006.12.002

Somerville, M. M., Harlan, S., & Schader, B. (2008). From information commons to learning commons and learning spaces: an evolutionary context. In Schader, B. (Ed.), *Learning Commons: Evolution and Collaborative Essentials* (pp. 1-36). Cambridge, UK: Chandos Publishing.

Tuckerman, B. W., & Jensen, M. A. (1977). Stages of small-group development revisited. *Group & Organization Studies*, *2*(4), 419-427. doi: 10.1177/105960117700200404

Zepke, N., & Leach, L. (2010). Beyond hard outcomes: 'soft' outcomes and engagement as student success. *Teaching in Higher Education, 15*(6), 66-673. doi: 10.1080/13562517.2010.522084

Appendices: Appendix A
Tutor Summit Spring 2016

Circle your center:
Tutoring / Applied Math Lab / Media Studio / Writing Lab / Library

Supplemental Instruction

Introduction
Describe your idea of a learning commons on this campus:

Annual Debrief
Describe one moment or point of pride from your work this year:

List three challenges you experienced in your work this year:

Future Directions
What do you generally need in order to perform your job responsibilities?

What unique or specific tools, resources, or training would help you in your work?

How do you see future communication among centers and subject specialties?

These worksheets will serve to BEGIN the conversation on your project. Basically there aren't any right or wrong answers to these questions, rather, completing the form is designed to get YOU thinking about the leadership aspects of your project.

<table>
<tr><td colspan="3">Title</td><td colspan="3">Keywords</td></tr>
<tr><td colspan="3">Summative/Overview</td><td colspan="3">Scope/Timeline</td></tr>
<tr><td colspan="2">Leadership Issues/Challenges/Gap Analysis</td><td>Project Manager(s)/Leader(s)</td><td colspan="3">Environmental Scan – Leadership</td></tr>
<tr><td colspan="2">Goals/Expectations</td><td>Products</td><td colspan="3">Risk Assessment; Impact</td></tr>
<tr><td rowspan="2">Participants</td><td>Participants I</td><td rowspan="3">Strategies</td><td rowspan="3">Measurement</td><td rowspan="3">Assessment</td></tr>
<tr><td>Participants II</td></tr>
<tr><td colspan="2">Comments</td></tr>
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Supporting Students Through Peer Mentoring in Developmental Mathematics

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Abstract

Students taking developmental mathematics often need academic support to succeed in their courses, but also benefit from support in adapting to university life. In this paper we describe our experience in developing, implementing, and evaluating a peer mentoring program for developmental mathematics students at a large research university that focused on both academic and psychosocial support. We give a summary of the success and persistence rates of students in the program, compare them to non-mentored students, and discuss the results of an assessment of the project that includes student feedback and lessons learned.

Introduction

Nationally, approximately 42% of students enter college needing a developmental mathematics course (Radford, Pearson, Ho, Chambers & Ferlazzo, 2012) and lacking the necessary mathematical background to begin the mathematics courses required for their chosen majors. More than a third of students in the U.S. planning majors in science, technology, engineering, and mathematics (STEM) enroll in mathematics remediation (Radford et al., 2012), and, despite rapid growth of enrollment in STEM disciplines in recent years, the number of students graduating with a STEM degree remains relatively stagnant due to diminishing student retention rates (Hurtado, Eagan & Chang, 2010; Thompson & Bolin, 2011).

Also, as the number of developmental mathematics courses taken increases, rates of successful completion of the sequence needed to enter a mainstream mathematics track (such as calculus) decrease dramatically (Bailey & Cho, 2010). Consequently, the chances of persisting in a STEM major for this population decrease as well.

More than 5000 students enter our University each year and place into mathematics classes through national standardized exam scores or the departmentally administered placement exam. Roughly 30% of our first year students are not ready for college level mathematics (Fuller, Deshler, Kuhn & Squire, 2014). Since the early 1980s, the department has offered a developmental mathematics course focusing on basic arithmetic, pre-algebra skills, and critical thinking that serves approximately 1000 students per year. The current format of the course is a self-paced, mastery online model with in-class facilitators and its efficacy has been evaluated as it has changed formats over the past decade (Deshler & Fuller, 2016).

Despite the increase in success rates for students both in this course and in subsequent courses (Deshler & Fuller, 2016) after various revisions of the course delivery method and content, we recognized an additional opportunity to support students in this course academically as well as through enculturation into the university system. In this paper we describe the process of designing, implementing, and evaluating a peer mentoring program in a developmental mathematics course at a large university, with the goal of ultimately supporting STEM majors and STEM persistence. One of the goals with the peer mentoring program was to provide additional support to increase overall STEM persistence for students starting in developmental mathematics. Support programs meant to retain STEM-intending students in their majors often overlook those who begin their academic journey at this lowest level of mathematics and focus on those in calculus and higher level courses. The program was implemented in developmental mathematics in an attempt to retain more students in STEM majors by reaching them earlier in their careers, before they switch to majors that do not require calculus.

Literature Review

The recruitment and retention of majors in STEM disciplines has received a great deal of attention from researchers over the last few decades. As the U.S. economy has transitioned to more technically demanding industries the need for workers with skills that are affiliated with those disciplines has outstripped the supply (PCAST, 2012). These students in turn must enroll in a number of mathematics courses in order to develop the mathematical skills needed for these majors. The result is that the population of students taking mathematics courses has broadened substantially (McFarland et al., 2017) as larger cross sections of the population enter these courses.

Historically, mathematics courses have presented significant obstacles to students in general and as the population of students has increased, the need to adapt instructional methods and support structures to a more diverse population has grown. In particular, in order to foster access and success for larger, more diverse, groups of students in STEM, support structures in mathematics must provide a more diverse collection of processes to meet the needs of students (Watkins & Mazur, 2013). Meeting the needs of underrepresented groups and first-generation students, for example, requires efforts that go beyond the traditional supports provided for students in a calculus class since many of those were designed for populations with very specific backgrounds (Hernandez, Schultz, Estrada, Woodcock & Chance, 2013; Hurtado, Newman, Tran & Chang, 2010) and they may not resonate with the actual students in a given classroom. Content-focused support in the form of tutoring or help sessions can be limited in its impact (Topping, 1996; Crouch & Mazur, 2001) since tutoring is typically defined as interaction with students that is intended to focus on the acquisition of knowledge in a given subject. Mentoring, on the other hand, focuses more holistically on a number of aspects of student experience (Colvin & Ashman, 2010) including student engagement that are not strictly related to instruction. Peer mentoring, in particular, provides this support through individuals, such as other students who have taken a given course, with the intent of creating culturally and individually relevant interactions that increase the positive impact on students who are currently active in

a course. Indeed, recent work has shown that peer mentoring creates a support environment that allows students to engage in learning while connecting with role models with whom they can identify more readily (Dennehy & Dasgupta, 2017; Fox & Stevenson, 2006; Morales, Ambrose-Roman & Perez-Maldonado, 2016; Rios-Ellis, Rascón, Galvez, Inzunza-Franco, Bellamy & Torres, 2015). In many cases, the peer mentoring structure is also less threatening and can provide supports that extend outside the classroom into the day-to-day lives of students where departure events may be more likely to occur.

Recent work in various STEM areas including chemistry (Wamser, 2006) and long-term studies in physics (Crouch & Mazur, 2001; Watkins & Mazur, 2013) have demonstrated the impact that peer mentoring can have in courses with mathematical content that challenges students. Consistent evidence (Watkins & Mazur, 2013) indicates that peer mentoring supports higher levels of STEM retention and that this can have an impact at the developmental level (Weissman et al., 2011).

Many researchers have outlined best practices for peer mentoring of college students (Anderson & Boud, 1996: Crisp & Cruz, 2009; Jacobi, 1991; Topping, 1996). In a meta-analysis of articles from 1990-2007, Crisp and Cruz (2009) found that peer mentors had been shown to provide psychological or emotional support, assistance in goal setting and career paths, subject-specific expertise, and served as role models. Cramer and Prentice-Dunn (2007) posited that the impact of peer mentoring cannot easily be separated into neat categories and that psychosocial support is closely linked to identity formation and belonging, but these functions do not act in isolation (e.g., academic support can promote self-efficacy and thus belonging). Zaniewski and Reinholz (2016) describe a mentoring program where peer mentors provide both academic and psychosocial support. In that study, mentors were recruited from a pool of students who had the same set of majors as the mentees and the experience level of the mentors ranged from second-year to graduate students. Mentoring supported students to deal with a wide variety of topics, ranging from academic to personal, according to the needs of individual mentees. The impact of their program was both

academic and psychosocial and helped mentees develop a sense of belonging and positive science identities. Kram and Isabella (1985) define a model of peer mentoring that supports both academic and psychosocial development and we based our program on this model to support students' development as mathematics students, college students and STEM majors.

Program Development and Implementation

We define peer mentoring based on Kram (1983) and as used by Terrion and Leonard (2007) as a relationship in which two individuals of similar age and experience come together (formally, in our case) to fulfill a set of functions that are career-related (e.g. information sharing, academic tutoring) and psychosocial (e.g. emotional support, personal feedback). Two mathematics faculty members and a graduate student assistant worked together to establish the following goals for the program grounded in the literature: (1) provide a support system for students in developmental mathematics, (2) increase developmental mathematics students' feelings of campus connection, (3) help developmental mathematics students navigate curriculum and locate university resources, (4) increase developmental mathematics students' confidence, involvement in learning, and retention, (5) cultivate relationships between students who have successfully completed developmental and subsequent mathematics courses and current students in the course, (6) develop current developmental mathematics students into potential future mentors, and (7) help developmental mathematics students address adjustment issues and improve decision making.

In order to build a program that would combine academic support with general university acclimation support, the first focus was on recruiting appropriate peer mentors. Many mentoring or tutoring programs that are strictly focused on supporting the academic activities of students tend to recruit their tutors from a pool of talented, upper classmen who have done well consistently in the relevant courses. Academic achievement, as expected, is one of the ten common characteristics identified in student peer mentors (Terrion & Leonard, 2007). However, upper classmen, specifically mathematics majors, are often less likely to relate to the struggles of a student in developmental mathematics than a student who started

college in a similar course. Therefore, in our program we consciously chose peer mentors to be students who had started their mathematics coursework at our university in the same developmental course and who had been successful both in the developmental course and in at least one subsequent mathematics course. For consideration to be a peer mentor in our program, a student needed to have passed the developmental mathematics course with an A the previous year and have received an A or B in their next mathematics class, College Algebra. They did not necessarily have to be a STEM major or have persisted beyond College Algebra, though some were taking a subsequent College Trigonometry class when recruited to be a potential peer mentor.

The mentor recruiting materials were created, and the peer mentor training was then established based on the goals and on existing literature on best practices. The graduate assistant was tasked with the day-to-day operation of the peer mentoring program, including the recruitment and training of the mentors, with the faculty members overseeing all activities. The graduate student assistant emailed all qualified potential peer mentors to recruit them to the program, sent them an application, screened and interviewed all applicants, and chose eight mentors for the first semester of the program. Seven of the eight were retained as peer mentors in the second semester. Selection criteria included not just the academic requirements, but also considered the student's desire and potential to help others. The mentors met with small groups of mentees (average six) twice weekly in one-hour sessions. Mentors were paid the standard undergraduate hourly rate for jobs on campus, including those who tutor in our Mathematics Learning Center.

The training materials for the mentors included activities for each week that would help them learn to work with students and understand what topics to emphasize during their weekly small-group meetings. The mentors met with the graduate student assistant weekly and, as the semester went on, the meetings also helped address issues that arose during the meetings they had with their mentees. The mentor training meetings covered such topics as what it means to be a peer mentor, guidelines for mentor/mentee meetings, how to get a group to interact (such ice breakers), an introduction

to university resources, how to set and achieve short term goals, and other such topics. The training materials did not include mathematics topics, since the mentors had all recently passed the course the mentees were taking, but they did include ideas about how to help students understand mathematics in general. Also, instead of preparing all materials for the mentors, the graduate student assistant would occasionally assign different topics to each mentor to research and report back information to share with the group. This allowed the mentors to build communication skills within their small group that could be translated to their mentor/mentee meetings.

Research Methods

During the first semester we offered the peer mentoring on a strictly voluntary basis. We did this so that any issues that arose throughout the pilot semester for a smaller group of students could be addressed before a larger implementation. All students in the developmental mathematics course were emailed and offered the opportunity to meet with mentors outside of class for two hours per week to work on mathematics and also to learn about resources available to them on campus for any issues they may have while adjusting to their first year in college. In the first semester of the mentoring program, there were 696 students enrolled in the course and only 24 asked to be part of the peer mentoring groups. For the pilot and followup implementations described in this paper, we considered a mentee to have participated actively if they missed at most four peer mentoring sessions (two weeks of the semester). Only eight of the 24 students in the pilot project attended enough meetings to be considered to have fully engaged in the peer mentoring. Though this number was smaller than we had hoped, we were able to discern from this small pilot what some of the issues and obstacles to a full implementation may be and address them in the subsequent implementation.

Because the goal of the program was to support all students in the course, our ultimate plan was to implement the program for all students, requiring attendance. To move toward this model, in the second semester, we required participation in the peer mentoring process for students in two sections of the course, and used two sections offered at the same times and taught by the same instructors

as a control group. Each set of instructors taught back-to-back sections, one with peer mentoring and one without. For the two treatment sections, the peer mentoring was a required part of the coursework. Again, we considered a student to be fully engaged in the peer mentoring process if they missed no more than four peer mentoring sessions.

In that semester, there were 450 students enrolled in the course, and 87 students in the two treatment sections were required to participate in peer mentoring. Of the 87 who were required to attend, 54 actively participated the peer mentoring program (missed at most four peer mentoring sessions).

Program Evaluation & Participation

In order to more fully understand the impact of the peer mentoring program on the participants, an assessment plan was developed that included the administration of a follow-up survey and focus group interviews. The survey instruments and processes were developed by an independent evaluator for the project based on a peer mentoring evaluation toolkit (Clark & Andrews, 2009) and questions were all rated on a 5-point Likert scale from Strongly Agree to Strongly Disagree. Of the 87 students in the original mentee group of the second semester, 54 finished the program; 19 (35%) of those responded to the survey; and 12 (22%) participated in focus groups. Unfortunately, since the pilot treatment group population was initially only 87 students, the resulting population of followup survey respondents was quite low and the focus group population lower still. The survey and two follow-up reminders were sent to the mentee's email near the end of the semester; the low response rate could be explained by the fact that some of the students finished the course early.

Five focus groups were held for mentees; 12 mentees attended these sessions with one, two, or three in each session. The focus groups were held near the end of the semester during one of the regular peer mentoring sessions, without the peer mentors present. No additional meetings or plans had to be made as this was a regular meeting time. By the end of the semester there were only a few students still coming to the sessions, because many had finished. It may be the case that the respondents to the survey, like the mentees

attending the focus groups, were the students who took the longest time to finish the course. To begin the discussion, some questions were asked about why they decided to study at the university, what their main concerns were when coming to the university, and how they prepared for their transition to the university. The remaining questions came from the Peer Mentoring Evaluation Tool Kit (Andrews & Clark, 2011). Focus group meetings were facilitated by the program's external evaluator, who audio recorded the meetings for data collection and later analyzed the data.

The mentees who completed the survey were from various majors including three STEM majors (one Forensics and two Biology) with the rest from Business, Finance, Athletic Training, Occupational Therapy, Psychology, Elementary Education, Exercise Physiology, Wildlife Management, Health Professional, Information Systems, and Undecided. Of the survey respondents, six were male; 13 were female; one was black or African American; 18 were white; and all were U.S. citizens. None of the 19 identified as having a disability. They ranged in age from 18 to 20, with most (11 of the mentees) being 18 years old. Sixteen of the mentees were freshmen; two were sophomores; and one was a junior. Seventeen were full-time students and two were part-time. Twelve mentees lived on-campus and seven lived off-campus. We collected information about their perceptions of the peer mentoring program and of the benefits they received from being involved as a mentee.

Major persistence. For this study we were also interested in the persistence of students in STEM majors. Using the National Science Foundation (NSF) list of CIP codes for majors considered STEM, we coded student majors as either STEM or non-STEM while they were in the developmental mathematics course. We then coded the same students' majors as of the fall term of the following academic year in the same way and, following the analysis in Rasmussen & Ellis, (2013), we consider four different patterns for major choice among students (Table 1).

Table 1. Patterns of Major Choice Over Duration of the Study

Category	Description
Persister	A student who began the study in a STEM major and was still in a STEM major in the fall term of the following academic year
Switcher	A student who began the study in a STEM major and was not in a STEM major in the fall term of the following academic year
Culminator	A student who began the study in a non-STEM major and was still in a non-STEM major in the fall term of the following academic year
Converter	A student who began the study in a non-STEM major and changed to a STEM major in the fall term of the following academic year

Study limitations

Participants. As is often the case with educational studies, students were consented and enrolled in this study on a voluntary basis. Therefore, it is expected that there is some self-selection bias but that this is the norm in voluntary educational studies.

Departmental changes. During this study, changes beyond the control of the research team were implemented in the department and these affected some aspects of this work, including success rates. In the Fall of 2016, the same semester we implemented the peer mentoring program, the placement test that guided students into mathematics courses at our University was changed to a more rigorous, adaptive, mastery-based testing system. The stronger diagnostic resulted in more students being placed into the developmental course being studied (instead of College Algebra) than in previous semesters. Consequently, the success rate of students in this course changed from year one to year two of the research project. This affects the results presented later in this paper but is also representative of the continual need to assess and adjust placement policies and procedures within a large mathematics department offering many classes to a large number of students.

Incentivizing participation. One of the greatest difficulties with the design and implementation of the peer mentoring program was determining how to incentivize participation, both during the first semester when participation was voluntary and in the second

semester when some students were required to attend, but many other students (in other sections) were not. A decision was made to incentivize completion of the program the first semester with a gift card. The small number of students who completed the entire peer mentoring program that semester with no more than four absences were awarded a small gift card to the campus bookstore. The small number of students who earned gift cards (the eight who actively participated) that semester is indicative of the difficulty we had in getting students to show up to the meetings. We decided that required attendance would be the best way to get students to participate in the meetings.

Since providing a financial reward is not a sustainable method of incentivizing student participation, it was decided instead to establish an attendance policy with consequences for missing peer mentoring meetings. The mathematics class met four days per week and students were allowed to miss up to six class meetings before the absences would affect their grade. For each class absence after six, the final grade was reduced by a letter grade. Given that the course already had this mandatory attendance policy in place, the peer mentoring program adopted a similar policy to require students to attend the peer mentoring meetings in the second semester. For each meeting absence after four the final grade was reduced by a letter grade. This structure was further complicated by the self-paced nature of the course. A number of students who complete the course do so earlier than the end of the term. If they complete the mathematics material, they are no longer required to attend class and may miss class without penalty. For the peer mentoring program, if a student completed the course at some point prior to the end of the term and stopped attending the peer mentoring meetings, they were still considered to have actively participated in the peer mentoring program.

Communication with instructors

In order to ensure effective and consistent implementation of the various core components of the peer mentoring process, a great deal of communication was developed among instructors, the peer mentoring leader, the mentors, and the project leaders. Since the research team was leading the peer mentoring sessions outside

of the classroom, and none of the instructors were part of the research team, our goals for the program were communicated to instructors via regular emails, program documentation including the peer mentoring manual, and regular meetings of the mentors with the peer mentoring leader. The instructors were generally focused on helping students get through the course while the mentors were focused also on enculturating them into university life and helping them navigate the course successfully. One aspect of the intent of this program was to articulate concerns across this boundary so that each group (instructors or mentors) would be aware of the other group's progress and concerns.

As noted above, the self-paced nature of the course made the attendance tracking process more challenging since students who completed all the online modules prior to the end of the semester were able to stop attending both the class and the mentor meetings. Consequently, it was important for us to have continued communication with the course instructors about this issue as well. They would let us know when students finished the content and we would report back to them the number of absences from the peer mentoring meetings up to that point to use when determining student final grades. Instructors were ultimately responsible for assigning student grades based on the information we provided them about the total number of absences.

Results & Discussion

In the self-paced model of this developmental mathematics course, students may move on to College Algebra once they have completed six mastery exams (out of 8) in the sequence. Using this as the definition of success in the course, we have the success rates over a 2-year period as presented in Table 2. The 2015-2016 data was collected as a baseline before the peer mentoring program was implemented. However, there was another change that affected the data – the placement process for students was changed this year as described in the limitations section above. Therefore, we will focus on data from the second year for analysis. In total, over the two-year period of the study with 2421 students enrolled the pass rate was 70.8%.

Table 2. Success rates in Developmental Mathematics Fall 2015 – Spring 2017 by Percentage

Semester	Success	Fail
Fall 2015	45.6	54.4
Spring 2016	68.7	31.3
Fall 2016	81.8	18.2
Spring 2017	74.9	25.1

During the first implementation of the peer mentoring program, participants volunteered. Students were required to meet with mentors twice per week for approximately 14 meetings during the semester. Out of the total cohort of 696 students enrolled in the course, only 24 signed up for mentoring and of these only eight persisted to the end of the program by attending at least 10 weeks' worth (20 meetings) of the peer mentoring sessions, and only six passed the course.

Table 3. Success Rates for Fall 2016 Pilot by Peer Mentoring Status by Number and Percentage

	Success		Fail		Total
	N	%	N	%	N
Not Mentored	550	81.8	122	18.2	672
Began, Did Not Complete Mentoring	13	81.3	3	18.8	16
Completed Mentoring	6	75.0	2	25.0	8

Outcomes from the pilot implementation were mixed and are presented in Table 3. The success rate was higher for the mentored group than the general population from previous semesters, but lower than the general population for that semester. The small number of students suggested that we needed to recruit participants differently and could not draw conclusions based solely on this implementation.

For the treatment group of the second semester implementation, we assigned 87 students from two sections to mentors and ended the study with 54 of them completing the peer mentoring program. Table 4 shows the success rates for these students and the entire population, as well as for the control group.

Table 4. Success Rates for Spring 2017 by Peer Mentoring Status by Number and Percentage

	Success		Fail		Total
	N	%	N	%	
All Non-Mentored Sections	216	75.2	70	24.8	286
Paired Instructor Control Group	56	74.0	21	26.0	77
Mentoring Treatment Sections	45	83.3	9	16.7	54

During this semester, mentored students who completed the peer mentoring process with no more than four absences outperformed students both in the larger population that received no peer mentoring and in the matched sections of the control group. The measured effect on success is strong but was not found to be statistically significant using a chi-square analysis of the 3x2 table ($\chi^2(2)=2.081$, $p=0.353$).

Persistence. Students who participated in the peer mentoring process in either of the implementations were more likely to persist in a STEM major. In particular, for the Spring 2017 implementation, 5% more of the mentored STEM majors persisted than observed in the larger, non-mentored population over the course of the program. Moreover, students converted to STEM in the mentored group at almost twice the rate as in the larger population and switched out of STEM majors at a rate that was one third less than the non-mentored.

Table 5. STEM Persistence Tracking for All Students in the Study

	Switcher		Culminator		Converter		Persister		Total
	N	%	N	%	N	%	N	%	
Not Mentored	345	14.6	1611	68.3	50	2.1	353	15.0	2359
Fall 2016 Mentored	0	0.0	6	75.0	0	0.0	2	25.0	8
Spring 2017 Mentored	5	9.3	36	66.7	2	3.7	11	20.4	54
Total	350	14.5	1653	68.3	52	2.1	366	15.1	2421

Interestingly, students in the smaller pilot cohort persisted at a higher rate (25%) than any other, even though the peer mentoring process was not implemented as completely as it could have been. It is likely that the smaller number of students overall in this cohort (N=24) led to outcomes that are more variable than would be expected in a larger group, or that the more focused attention on the group (higher mentor to mentee ratio) that actually completed the program (N=8) tended to reinforce persistence even more. Similar to the success analysis, the impact on this outcome was not observed to be statistically significant ($\chi^2(2)=4.745$, $p=0.577$). Overall, these results indicate that mentoring had a slightly positive impact on persistence but given the small sample size our results cannot distinguish this impact from the variance determined by other underlying variables such as course structure, demographic factors or student personality.

Non-academic results for participants. In Table 6, we see that the mentees have a somewhat positive perception of the program and the benefits they gained from the program. The scale was from strongly agree (5) to strongly disagree (1). The highest agreement occurred with the statement "As a result of participating in the peer mentoring program, I am more committed to completing my course of study." Over half (58%, 11 students), agreed with the previous statement. This could be interpreted that as a result of participating in peer mentoring, the students are more dedicated to persisting in their chosen major. While the learning outcomes for the course focus primarily on knowledge acquisition within the college algebra spectrum, it has been observed that in many cases students abandon the course when they begin to perceive that the difficulty presented by either the course or the process of being a university student in general becomes unmanageable. In order to ascertain the impact of the mentoring program on student perceptions of their connection to the university and their mathematics program, we administered a survey with the items in Table 6 to measure a number of aspects of this sense of belonging, hypothesizing that strong agreement with these statements would in turn indicate that the mentoring program was providing supports that would enhance student engagement and academic progress in general.

Table 6. Mentee Perceptions of Benefits of Participating in Peer Mentoring Program by Response to "As a result of participating in the peer mentoring program..." Questions

Question	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	N	Average Value
...I feel part of the university	0	8	6	2	3	19	3.00
...I feel I am making more use of the opportunities available at university	0	8	7	2	2	19	3.11
...I am finding my time at university more enjoyable	1	7	6	3	1	18	3.22
...I feel my communication skills are more developed	0	9	4	4	2	19	3.05
...I am more committed to completing my course of study	0	11	4	2	2	19	3.26

In Table 7, we see perceptions of the mentees on other possible benefits of participating in the program. The scale for this set of statements was from significantly increased (5) to significantly decreased (1). The highest scoring statement in this set was "As a result of participating in the peer mentoring program, my subject knowledge has...." Over half (53%), reported that their subject knowledge had increased or significantly increased as a result of participating in the program. For all of the statements, only two or three of the mentees had negative responses; most responses to the statements were either positive or neutral.

Table 7. Mentee Perceptions of Benefits of Participating in Peer Mentoring Program by Response to "As a result of participating in the peer mentoring program..." Statements

Question	Signif-icantly Increased	Increased	Not Changed	Decreased	Signif-icantly Decreased	N	Average Value
...my confidence in succeeding in my studies has...	1	7	10	0	1	19	3.37
...my confidence about my academic skills has...	1	5	11	1	1	19	3.21
...my subject knowledge has...	2	8	8	0	1	19	3.53
...my confidence in using student services has...	1	8	8	1	1	19	3.37
...my ability to form new connections with other people has…	1	8	7	2	1	19	3.32
...my ability to make positive decisions has...	2	6	10	0	1	19	3.42

In Table 8, we see that the mentees have a somewhat neutral or even slightly negative perception of the program related to the learning experience in the program. The scale was from strongly agree (5) to strongly disagree (1). Slightly less than half (47%) agreed or strongly agreed that "Working with a peer has been a positive learning experience." Only 32% disagreed or strongly disagreed with this statement. Forty-two percent (42%) agreed or strongly agreed with "Peer mentoring has helped me learn independently," while only 32% disagreed or strongly disagreed with this statement. On the slightly negative side, 47% of mentees disagreed or strongly disagreed with the statement, "I feel my grades will improve as a result of peer mentoring."

Table 8. Mentee Perceptions of Their Learning Experiences

Question	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	N	Average Value
Peer mentoring has positively influenced the way I approach learning	2	4	9	2	2	19	3.11
Working with a peer has been a positive learning experience	1	8	4	3	3	19	3.05
Peer mentoring has increased my interest in my subject area	2	4	6	3	4	19	2.84
Peer mentoring has helped me learn independently	3	5	5	3	3	19	3.11
I feel my grades will improve as a result of peer mentoring	1	4	5	5	4	19	2.63
Peer mentoring has increased my involvement in my own learning	1	4	8	2	4	19	2.79
Peer mentoring has helped me understand how to self-pace my own studies	1	5	6	3	4	19	2.79
Peer mentoring has positively influenced the way I make decisions related to academic matters	1	4	7	4	3	19	2.79

In Table 9, we see that the mentees had a slightly positive perception of the value of the peer mentoring program. The scale was from strongly agree (5) to strongly disagree (1). More than half (58%) agreed or strongly agreed with the two statements "I can relate to my mentor" and "I feel comfortable working with my mentor." Also, just slightly less than half (47%) agreed or strongly agreed with

the two statements "I feel I can talk to my mentor if I am worried" and "I enjoyed working in a small group with other students." We find these results to be supportive of continuing the peer mentoring, though not overwhelmingly indicative of a highly effective program.

Table 9. Mentee Perceptions on the Value of Peer Mentoring

Question	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	N	Average Value
Peer mentoring is responsive to my individual needs	1	7	6	3	2	19	3.11
I can relate to my mentor / mentee	1	10	4	1	3	19	3.26
Working with another student has been useful	2	5	5	4	3	19	2.95
I enjoy working in a small group with other students	1	8	4	1	5	19	2.95
I feel I can talk to my mentor / mentee if I am worried	2	7	5	2	3	19	3.16
I feel comfortable working with my mentor / mentee	2	9	4	1	3	19	3.32
I can talk to my mentor / mentee about things I would not discuss with a member of faculty	2	6	6	2	3	19	3.11

The mentees were also asked "Did your mentor have adequate training for the peer mentoring role?" Sixty-nine percent (69%) said that the mentor had extremely adequate or moderately adequate training; only one mentee said that the mentors had moderately inadequate training and no mentees responded that mentors had extremely inadequate training (Table 10).

Table 10. Mentee Perceptions of Mentor Training

Answer	N	%
Extremely adequate	6	31.58
Moderately adequate	7	36.84
Neither adequate nor inadequate	5	26.32
Moderately inadequate	1	5.26
Extremely inadequate	0	0.00
Total	19	100.00

The mentees were asked "During your time at [the University] have you ever thought about leaving?" The responses were divided evenly between "Yes" (9 mentees) and "No" (9 mentees), with one student saying they were "Not Sure." Students who answered "Yes," were given a follow-up question "If you thought about leaving did peer mentoring influence your decision to stay?" Only one student of the nine said that peer mentoring had influenced his decision to stay: the others answered in the negative. This result may be due to the fact, that for this peer mentoring program, they were focused on student success in a particular course and not working with students as general mentors. Students indicated things like being homesick, not liking school in general and not liking [the University] in general. No students indicated wanting to leave because they were not passing their mathematics course. These statements support the conclusion that peer mentoring should span a larger portion of student life than content support. The distinction partially manifests in the follow-up survey responses indicating that some of the quantitative improvements in success may be attributable to these soft skill support areas but the number of participants is too small to provide sufficient data.

Ten mentees responded to the open-ended question, "How can the peer mentoring program be improved?" Several of the responses addressed two or more ideas. One mentee said, "It was an awesome program that helped me a lot." Two responses said that students should receive more credit for the course if they had to attend two extra hours a week for peer mentoring. Three responses commented that the program should not be mandatory, because

some students didn't need it. Four responses said that the program was a waste of their time. One commented that their mentor was not helpful nor attentive.

Mentee Focus Group Results. Students were then asked how they learned about the peer mentoring program. Most said they received an email from the graduate student assistant, then from the mentor. Some said their teacher told them about the program while others said that someone came to their class at the beginning of the semester and asked them to sign a consent form. The mentees said their first contact with their mentor was through email and the first meeting happened several weeks after the course started. When mentees were asked "How did you feel about meeting your mentor?" some answered that they were skeptical, nervous or felt strange about the first meeting. Some mentioned that they thought it might be a waste of their time or that it would conflict with other activities that they already had scheduled. The mentees were then asked, "What were your first thoughts about your mentor?" All mentees had a positive response to this question. The mentees described their mentors as "Friendly, nice, approachable, relatable" and said that they "Helped when they could", were "patient with slower students", "would give students extra time" and one said his/her mentor was "very young in the same shoes as me, understood what I was going through".

The mentees were then asked, "Was there anything that the mentor did to make the mathematics class a good one?" The responses included that the mentors helped explain topics that the teacher didn't go over, made the content understandable, gave extra help, and helped to keep unmotivated students accountable. The question was asked, "How did the mentor make sure you got what you wanted?" The mentees said that the mentors individualized the help by checking in with each student and asking about their understanding of the topic they were working on. Some of the mentors helped set schedules for pacing of the material to ensure students could finish on time. One mentee stated that the mentor would let him leave the sessions to go take tests for the course and another said the mentor would check with him about what he had missed on their tests, to help him get ready to re-test. One mentee

mentioned that he would email the mentor questions and the mentor would bring materials to help him at the next session.

Mentees were asked, "What was the most valuable thing you got out of the peer mentoring?" Most of the responses to this question pertained to the idea that it forced the mentee make time to study the mathematics and get the class-work completed. Since the mathematics course is self-paced, this was a very beneficial result of the peer mentoring. Several said it provided extra help and one-on-one instruction when they needed it. Some commented that it helped them finish the class on time.

The mentees were asked to name one key aspect of the program. The responses included that it was mandatory and they had to be there, it provided extra time to focus on mathematics, it provided extra help, and it kept them from procrastinating in the course. The mentees also mentioned that being part of the peer mentoring program helped with other classes. One mentee said the mentor had taught him how to take things step by step – read and try to understand. Several responded that it helped them with scheduling and developing a routine. Others responded that it made them more accountable or made them realize they needed more discipline to get things done. Again, these responses indicate a support effect that is broader than the course-specific content support that tutoring supplies. The fact that mentoring impacts student behavior in other courses and responses to events outside the course indicated a successful effort to enable this support. More data would be needed to understand the relationship with success and persistence.

Finally, the mentees were asked if there were any issues or negative aspects of the peer mentoring program. Several suggested putting the sessions as a lab for the course, so students would know at the start of the semester and arrange other courses and obligations around the sessions. One issue that was mentioned by many of the mentees was that they did not know about the peer mentoring sessions for several weeks into the semester, they also mentioned that their instructors could not tell them much about the program. One mentee mentioned that he thought there should be more available times to choose from.

Conclusions

Students seeking to complete a university major in a number of areas will have to, as a part of that program, complete a mathematics requirement. For many students, a part of that coursework will include a developmental component that intends to bridge them from the level at which they enter the university to more advanced topics. Students potentially encounter difficulties that span both the academic nature of their degree programs as well as the underlying process of living and being a student at a university.

Peer mentoring programs offer an opportunity to support these students in multiple ways as they progress through their time at a university. By combining an academic support model with a life-skills support model delivered by students with similar experiences at the same level of coursework, the program described here seeks to promote success at the university level and persistence in STEM majors in a novel way. The data from this study indicate that peer mentoring has a measurably positive effect on student success and an impact on persistence in major choice even though these effects could not be isolated as statistically significant. Both of these effects are more complex than a simple causal relationship, and this work is an attempt to present a more holistic picture of how such a program would be developed and how students responded to it, both in terms the levels of success observed as well as in terms of the qualitative responses of the students after having participated in the program.

The next step is to implement this program on a wider scale and to possibly implement a truly randomized trial of the intervention for a larger population. These preliminary results have shown that this type of program can benefit students and the cost of implementation is rather low. In particular, students demonstrated higher levels of success and this effect appears to be supported in part by the mentoring program in a way that is broader than content focused tutoring programs or help rooms. More data would be needed to identify the specifics of this and reach stronger conclusions. We will take the lessons learned and move forward to investigate how peer mentoring can continue to improve the success of students, while helping students persist in their majors and specifically the STEM pipeline. We will also follow these

mentored students to determine any long-term effects in subsequent mathematics courses from their early peer mentoring experiences.

References

Anderson, G., & Boud, D. (1996). Extending the role of peer learning in university courses. *Research and Development in Higher Education*, *19*, 15-19.

Andrews, J., & Clark, R. (2011). *Peer-mentoring works! How peer-mentoring enhances student success in higher education.* Birmingham: Aston University. Retrieved from http://eprints.aston.ac.uk/17968/1/Peer_mentoring_works.pdf

Bailey, T. R., & Cho, S. W. (2010). Issue brief: Developmental education in community colleges. *Community College Research Center White House Summit on Community College*, Columbia University Academic Commons.

Clark, R., & Andrews, J. (2009) Peer mentoring in higher education: A literature review (Working Paper 0109_LTR). Aston Centre for Learning Innovation & Professional Practice, (CLIPP), Aston University, Birmingham, UK. Retrieved fromhttp://publications.aston.ac.uk/17985/1/Peer_mentoring_in_higher_education.pdf

Cramer, R. J., & Prentice-Dunn, S. (2007). Caring for the whole person: Guidelines for advancing undergraduate mentorship. *College Student Journal*, *41*(4), 771–778.

Crisp, G., & Cruz, I. (2009). Mentoring college students: A critical review of the literature between 1990 and 2007. *Research in Higher Education, 50*, 525-545.

Crouch, C. H., & Mazur, E. (2001). Peer instruction: Ten years of experience and results. *American Journal of Physics*, *69*(9), 970-977.

Colvin, J. W., & Ashman, M. (2010). Roles, risks, and benefits of peer mentoring relationships in higher education. *Mentoring & Tutoring: Partnership in Learning*, *18*(2), 121-134.

Dennehy, T. C., & Dasgupta, N. (2017). Female peer mentors early in college increase women's positive academic experiences and retention in engineering. *Proceedings of the National Academy of Sciences*, *114*(23), 5964-5969.

Deshler, J., & Fuller, E. J. (2016). The effects of migration to a blended self-paced format for a remedial pre-college algebra mathematics course, *Journal of Computers in Mathematics and Science Teaching*, *35*(2), 113-129.

Fox, A., & Stevenson, L. (2006). Exploring the effectiveness of peer mentoring of accounting and finance students in higher education. *Accounting Education: An International Journal*, *15*(2), 189-202.

Fuller, E.J., Deshler, J.M., Kuhn, B., & Squire, D. (2014). Tracking success of pre-college algebra workshop students through subsequent college mathematics classes, *PRIMUS: Problems, Resources, Issues in Mathematics Undergraduate Studies*, *24*(1), 46-60.

Hernandez, P. R., Schultz, P., Estrada, M., Woodcock, A., & Chance, R. C. (2013). Sustaining optimal motivation: A longitudinal analysis of interventions to broaden participation of underrepresented students in STEM. *Journal of Educational Psychology*, *105*(1), 89.

Hurtado, S., Eagan, K., & Chang, M. (2010). Degrees of success: Bachelor's degree completion rates among initial STEM majors. Higher Education Research Institute at UCLA, Research Briefing, January 2010. Retrieved from https://heri.ucla.edu/nih/downloads/2010-Degrees-of-Success.pdf

Hurtado, S., Newman, C. B., Tran, M. C., & Chang, M. J. (2010). Improving the rate of success for underrepresented racial minorities in STEM fields: Insights from a national project. *New Directions for Institutional Research*, *148*, 5-15.

Jacobi, M. (1991). Mentoring and undergraduate academic success: A literature review. *Review of Educational Research*, *61*(4), 503-532.

Kram, K. (1983). Phases of the mentor relationship, *Academy of Management Journal, 26,* 608-625.

Kram, K., & Isabella, L. (1985). Mentoring alternatives: the role of peer relationships in career development, *Academy of Management Journal, 28*, 110-132.

McFarland, J., Hussar, B., de Brey, C., Snyder, T., Wang, X., Wilkinson-Flicker, S., & Hinz, S. (2017). The Condition of Education 2017 (No. NCES 2017-144). Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Morales, E. E., Ambrose-Roman, S., & Perez-Maldonado, R. (2016). Transmitting success: Comprehensive peer mentoring for at-risk students in developmental math. *Innovative Higher Education*, *41*(2), 121-135.

PCAST. (2012). Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and

Mathematics. Washington, DC: PCAST.

Radford, A.W., Pearson, J., Ho, P., Chambers, E., & Ferlazzo, D. (2012). *Remedial coursework in postsecondary education: The students, their outcomes, and strategies for improvement.* Jefferson City, MO: Missouri Department of Higher Education.

Rasmussen, C., & Ellis, J. (2013). Who is switching out of calculus and why. In *Proceedings of the 37th Conference of the International Group for the Psychology of Mathematics Education, 4*, 73-80.

Rios-Ellis, B., Rascón, M., Galvez, G., Inzunza-Franco, G., Bellamy, L., & Torres, A. (2015). Creating a model of Latino peer education: Weaving cultural capital into the fabric of academic services in an urban university setting. *Education and Urban Society*, *47*(1), 33-55.

Terrion, J. L., & Leonard, D. (2007). A taxonomy of the characteristics of student peer mentors in higher education: Findings from a literature review, *Mentoring & Tutoring, 15*(2), 149-164.

Thompson, R., & Bolin, G. (2011). Indicators of success in STEM majors: A cohort study. *Journal of College Admission*, *212*, 18-24.

Topping, K.J. (1996). The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *Higher Education*, *32*, 321- 345.

Wamser, C. C. (2006). Peer-Led team learning in organic chemistry: effects on student performance, success, and persistence in the course. *Journal of Chemical Education*, *83*, 1562.

Watkins, J., & Mazur, E. (2013). Retaining students in science, technology, engineering, and mathematics (STEM) majors. *Journal of College Science Teaching*, *42*(5), 36-41.

Weissman, E., Butcher, K.F., Schneider, E., Teres, J., Collado, H., Greenberg, D., & Welbeck, R. (2011). *Learning communities for students in developmental math: Impact studies at Queensborough and Houston community Colleges.* New York: National Center for Postsecondary Research.

Zaniewski, A. M., & Reinholz, D. (2016). Increasing STEM success: A near-peer mentoring program in the physical sciences. *International Journal of STEM Education*, *3*(14).

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