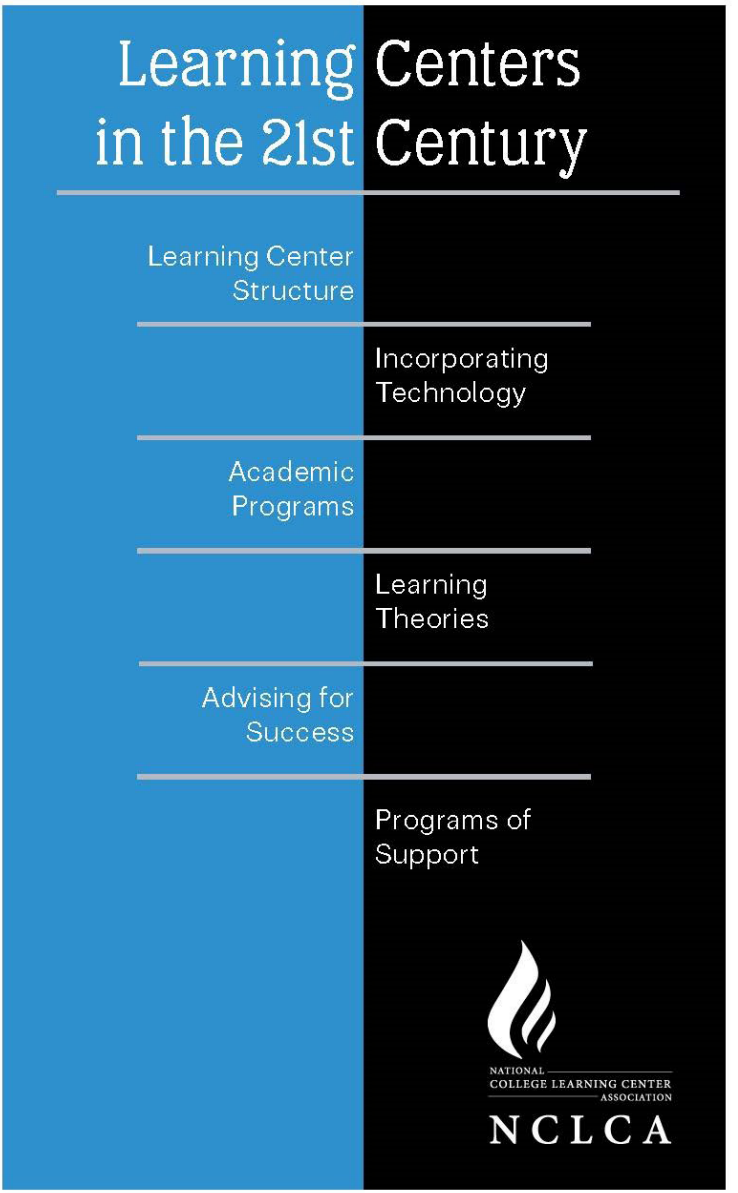
The Learning Assistance Review



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About *The Learning Assistance Review*

The Learning Assistance Review is an official publication of the National College Learning Center Association (NCLCA). NCLCA serves faculty, staff, and students in the field of learning assistance at two- and four-year colleges, vocational and technical schools, and universities.

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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

Contents

Letter from the Editor

Learning center professionals are adaptable.

We've had to be.

We've learned to innovate on the fly while seeking creative ways to support our students, often with little money while laboring under the expectation of big results.

As the bridge between teacher and student, academics and student engagement, and retention and frustration, learning centers have a chance to lead their universities through the precarious situation created by the novel coronavirus pandemic. As colleges struggle to understand how to keep student interest high and create meaningful learning experiences for them, we've been doing this all along. Working behind the scenes, we've helped a countless number of students who might've dropped a class or withdrawn from the institution believe they could achieve academic and personal success.

The writing consultants in the Bear CLAW (Center for Learning and Writing) always say, "We do a lot more than offer writing advice in the Writing Center." They're counselors, relationship experts, arbitrators, and passionate advocates. Learning centers reach underserved populations in ways other units on campus simply can't. We engage students who need assistance with enhancing their learning in the most challenging courses on campus. We partner with faculty and administrative units to offer our expertise and assistance. We're there when they need us and cheering them on when they think they don't.

And we do it every day.

Your university will need your ingenuity to ensure it can open its doors this fall. By providing engaging and personalized support now, students who may find themselves wary to return may be more inclined to do so because they made a meaningful connection with your tutors, consultants, leaders, prefects, and coaches.

Just as we always do.

It is for these reasons and more that I celebrate the work of the authors published in this milestone issue. You'll find some fantastic book reviews by Jennifer Rowe, Donna L. Fenton, and articles by Tara E. Diehl, Karen J. Hamman, Serina L. Rivera, Rebecca Cofer, Lauren C. Hensley, Tracy Hallstead, Erin Nash, Renee Just, and Daryl Bruner.

I finished the layout and design in the late-night hours while shifting my learning center to online and struggling to find toilet paper and other necessitites during a global pandemic. This issue, Volume 25, number 1, is not only a milestone in numbering, but in format, too. Thanks to a vote from our membership, this issue is all-digital (although printed versions will be available for purchase on-demand through Amazon in a few weeks). By Volume 26, I plan to engage our readers in new ways on the NCLCA website. It's an exciting time for our profession.

Thanks for reading.

Sincerely,
Michael Frizell, Editor
April 23, 2020

Group Study as a Form of Support for Developmental Mathematics Students

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Abstract

Students taking developmental mathematics often struggle with dedicating adequate time to engage with material outside of class. The institution in this study requires participation in out-of-class support and has utilized a variety of models of support. The goal of these support programs is to increase the pass rates for students and aid in the development of study skills that can be transferred to other coursework. The purpose of this study was to compare the academic attainment and study skill development for developmental mathematics students participating in a structured peer study group compared to students who did not participate.

Introduction

Students who begin college with deficits in basic skills, like mathematics, are most at risk of dropping the course and of dropping out of college altogether (Copus & McKinney, 2016). Therefore, connecting students with support can be of "life-changing importance for our students" (Adams, Gearhart, Miller, & Roberts, 2009, p. 67). This study highlights a program that focused on collaborative group study as a form of support for students enrolled in developmental mathematics.

Providing appropriate and effective out-of-class support for students in developmental mathematics has been an ongoing challenge at a public four-year institution in the northeast. Previous forms of developmental mathematics support included a pilot

program of Structured Learning Assistance (SLA) in one section of Intermediate Algebra. The SLA program helped students to achieve higher grades within the class and was then implemented in all sections of Intermediate Algebra following the pilot. Due to the increasing number of students SLA was serving and the strain on resources (space, time, number of SLA leaders, etc.), the SLA program was transitioned into a Math Lab. The Math Lab remains the primary mode of support and serves all sections of developmental mathematics courses offered at the institution. Students enrolled in developmental mathematics are required to attend Math Lab for two hours a week in addition to class attendance. Math Lab leaders are employed to offer assistance, support, and tutoring to the students taking the developmental math classes.

The Math Lab offered a solution to the logistical issues and was a more sustainable form of support for students taking developmental mathematics courses. After a few years of utilizing the Math Lab as the primary form of support, some of the math faculty wanted to create more structure and find ways to increase the collaboration among the students.

Literature Review

Supporting Developmental Mathematics Students

During the planning stage of this initiative, a variety of support models were considered in an attempt to match student needs with appropriate support. While group study seemed like a natural fit, a review of current literature revealed few studies documenting the use of group study for developmental mathematics students. Various other methods used with developmental math students were examined, such as a traditional peer tutoring model, Supplemental Instruction, Structured Learning Assistance, and a peer mentor model.

In a typical peer tutoring support model, where at-risk students were identified and connected early with this resource, Copus and McKinney (2016) were able to generate a 65.6% pass rate for student participants when compared to 56.6% pass rates for all students enrolled. In addition to improving their pass rates, 95.3% of student participants continued to utilize tutoring services

throughout the semester (Copus & McKinney, 2016), which is critical since Arendale (1994) notes that students most in need of assistance are often the ones that do not participate in support services when offered the choice.

Supplemental Instruction typically has not been recommended for developmental mathematics students because the model was developed for high-risk college courses, not high-risk students (Hurley et al. 2006). However, Wright, Wright, and Lamb (2002) reported that Supplemental Instruction in developmental math courses had a slight positive change in course retention and performance. This same study also recommended more instructor involvement in the supplemental instruction process, increased involvement of the Supplemental Instructor in class, and increasing Supplemental Instructor/Class Instructor meetings.

More recently, the City University of New York (CUNY) reported success utilizing Supplemental Instruction (SI) for developmental mathematics over a 2-years (Dias, Cunningham, & Porte, 2016). In this quasi-experimental design, their results included a statistically significant improvement in pass rates for students in sections supported by the SI model when compared to the sections not supported by the program. Specifically, 59% of students in SI sections passed compared to 52% in non-SI sections (Dias, Cunningham, & Porte, 2016). While the pass rates were certainly encouraging, Dias, Cunningham, and Porte (2016) were unable to identify any impact on the retention of this vulnerable population of students. Additionally, the traditional SI model involves voluntary attendance; however, as previously stated, at-risk students are less likely to utilize voluntary support services (Arendale, 1994).

The Structured Learning Assistance (SLA) program addressed this challenge in that it was specifically designed for developmental students and is a required component for students enrolled. Diehl's (2017) pilot results using SLA in some sections of developmental mathematics courses were promising, showing 45% of students in SLA supported sections with a C or higher course grade compared to 24% of students in sections not supported with SLA. This group of researchers hoped for a support model that would yield even more improved academic results while also helping

students develop skills transferable to other coursework.

Finally, the peer mentor model is yet another approach to assist students in developing the skills necessary for success in developmental mathematics courses. Morales, Amrose-Roman, and Perez-Maldonado (2016) noted positive academic and social benefits of having at-risk students work in a mentor-mentee format in support of their developmental mathematics course. They cited significant differences in pass rates of students participating in the mentor program compared to non-participants. Of equal importance, they were able to attribute increased self-efficacy and social integration to students' participation in the program, setting up students for a higher likelihood of long-term success in college (Morales, Amrose-Roman & Perez-Maldonado, 2016).

In a more current study, Deshler, Fuller, and Darrah (2019) developed a similar peer mentor model to support students in developmental mathematics with the hopes of supporting students both academically and socially. They too were able to see some positive impact on students' success, as well as their persistence. Student participants self-reported other benefits including a greater connection to the university and increased enjoyment of their time at the university (Deshler, Fuller & Darrah, 2019).

The review of these models suggests that any support program that involves some type of peer interaction yields positive results, both academically as well as in other domains. These findings encourage continued exploration of other models that rely upon peers assisting one another. The focus was to encourage students to work together in a cooperative learning approach.

Group Study

After a review of various models, group study appeared to be a viable option to support developmental mathematics students, although its use among this population was not well documented. However, cooperative learning models typically yield positive results. For example, Daneshamooz and Alamolhodaei (2012) compared 263 students from three universities on cooperative versus traditional learning. Regardless of their math anxiety levels, cooperative learners performed better in mathematics than traditional

learners. Additionally, Baker and Campbell (2005) conducted a study that focused on the needs of a successful group. They specifically examined undergraduate students in mathematics task groups and suggested that a successful group should be taught problem-solving skills, receive immediate feedback, have monitored progress, receive rewards for performance, be assigned to specific groups, and possess self-efficacy.

In one example of self-initiated study groups formed by students enrolled in STEM courses, Sandoval-Lucero, Blasius, Klingsmith, and Waite (2012) documented that students benefitted from group study by learning different perspectives on class material, as well as new study techniques. Additionally, the students reported an enhanced classroom and social experience and an increased sense of accountability that they attributed to the study groups (Sandoval-Lucero et al., 2012).

Another collaborative-style learning program, the Peer-Led Team Learning (PLTL), measured whether it could expand access to STEM majors for "at-risk learners." (Street, Koff, Fields, Kuehne, Handlin, Getty, et al., 2012). The results of this study showed that PLTL had positive trends in STEM persistence and students' use of effective learning strategies. The GPA outcomes for students participating in the program were also more positive compared to non-participants (Street et al., 2012).

While positive learning experiences and increased learning skills are exceptionally important, it is critical to remain focused on grade attainment and persistence. Quitadamo, Brahler, and Crouch, (2009) found that using Peer-Led Team Learning in STEM courses improved grade performance and retention in both math and science classes and increased critical thinking performance in science classes. In a study with a similar population, peer-led collaborative learning groups were integrated into developmental math classes in a tribal community college (Hooker, 2011). The study reported increased completion rates (the number of students earning a C doubled), increased perseverance rates (fewer students dropped the course), increased student satisfaction with the course, and self-reported growth by students in the areas of social skills and academic skills (Hooker, 2011).

The Learning and Study Strategies Inventory (LASSI)

To address building academic skills as well as improving performance in mathematics, it was important to identify an appropriate assessment tool. The LASSI is a widely used assessment tool that determines students' strengths and areas for growth in ten different key components of learning. The LASSI is a 10 scale, 80-item assessment of students' awareness of and use of learning and study strategies. According to Weinstein and Palmer (2002), the LASSI can be used in a variety of ways to screen, diagnose, and assist students in their development of study skills including as a "pre-post achievement measure for students participating in programs or courses focusing on learning strategies and study skills" (p. 4). The ten LASSI scales are Anxiety, Attitude, Concentration, Information Processing, Motivation, Selecting Main Ideas, Self-Testing, Study Aids, Test Strategies, and Time Management.

Weinstein and Palmer (2002) note that "each of these scales is primarily related to one of three of the components of strategic learning: skill, will, and self-regulation" (p.4). The "skill" components are Information Processing, Selecting Main Ideas, and Test Strategies. Information Processing refers to students' ability to summarize reading and relate new information to prior knowledge while Selecting Main Ideas assesses the ability to identify key points in both lectures and textbooks. The final skill category is Test Strategies, or the ability to study for various types of tests. The "will" components of strategic learning are Anxiety, or the level of worry and distress over grades, Attitude, or students' disposition toward their educational goals, and Motivation, or diligence and self-discipline. Finally, the "self-regulation" components are Concentration, or distraction level, and Self-Testing, or review behaviors. Also included within "self-regulation," are Study Aids, the ability to use practice exercises or create study materials, and Time Management, or organization and scheduling (Weinstein & Palmer, 2002). A study by Mireles, Offer, Ward, and Dochen (2011) found that incorporating study strategies into developmental mathematics courses increased Learning and Study Strategies Inventory (LASSI) scores.

Background Information

This study was developed to find a method to support students in developmental mathematics as an alternative to the math lab format, which had been the current support at that time. Students in the Math Lab tended to sit in isolation and rarely sought assistance from the Math Lab leaders or each other. The goal of group study was to create more meaningful interactions since the faculty teaching math saw collaboration as an essential component to the support program and an important part of students' mathematical development. Anecdotal observations from the math faculty led to the conclusion that many students were not using Math Lab to its full potential. One faculty member noticed that the students were struggling with the same ideas. Rather than re-teach the concept individually, the professor provided the students with an area to work collaboratively to understand the concept. Students were encouraged to ask the professor for assistance if everyone in the group struggled with a concept. As the professor observed these informal groups of students working together, she noticed that the students were learning as much or more from each other as they were from individually meeting with her about their questions. Wanting to encourage this type of collaboration, the researchers wanted to determine if a group study component could be integrated into the current structure and potentially replace it altogether.

One of the researchers in the study teaches developmental math courses in a centralized department of developmental instruction and was the instructor for the courses. Another researcher is the Director of Academic Support Services within the same department, who oversees Supplemental Instruction, peer tutoring, and the Math Lab. The third researcher was a Graduate Assistant in Academic Support Services and the facilitator for the group study program and had completed tutor training aligned with the College Reading and Learning Association (CRLA) practices. The Graduate Assistant met regularly with both the course instructor and the Director of Academic Support Services to review the group study program.

Purpose of the Study

The purpose of this study was to compare grade outcomes and study skill development for developmental mathematics students participating in a structured peer study group compared to students who did not participate in group study. The research questions guiding this study are:

1. Do developmental mathematics students who participate in a structured peer study group achieve higher quiz, exam, and course grades when compared to those who do not participate?
2. Do developmental mathematics students who participate in a structured peer study group develop better study strategies during the semester when compared to those who do not participate?

The first research question involved a quantitative analysis of the following assessments: homework, quiz, exams, final exam, exam averages, and the overall course grades. Independent sample t-tests were performed to analyze the significance of the data. The second research question focused on a quantitative analysis of the results of the LASSI. There was both a pre-test and a post-test measure of the LASSI administered to the student participants.

Structure of the Group Study Program

At that time, Math Lab was the required form of developmental mathematics support offered to students enrolled in developmental math courses. During the study, group study was offered as an alternative developmental mathematics support program. Study participants were given the choice during the first week of class to choose from Math Lab or group study as their support option (Appendix A). Rather than randomly assigning students to either Math Lab and/or group study, the researchers felt that it was important for the students to choose the support option that was the best fit for their learning style, work ethic, and schedule. If students utilizing group study felt that they needed additional support, they were able to also utilize the Math Lab in addition to their assigned study groups. Students who selected Math Lab were not given the option to use group study as additional support

unless those students wanted to permanently change their support option. Both group study and Math Lab were intended to aid in course understanding, homework completion, test preparedness, and academic success.

Math Lab

The Math Lab is a self-starter environment where Math Lab leaders monitor learning activities. Students work independently during Math Lab with the option of obtaining assistance from Math Lab leaders on an as-needed basis. Math Lab requires two hours of attendance per week that can be completed at the students' convenience in half-hour increments. Math Lab attendance is monitored by Math Lab Leaders who check students' identification cards and have students sign in and out to document attendance. Math Lab students who maintain perfect attendance throughout the semester are rewarded with a 110% Math Lab grade, which is a portion of their overall course grade. The bonus grade for perfect attendance was excluded during data analysis.

Group Study

Group Study support consisted of a collaborative group that included between three and five students. Group study required two hours of attendance per week. Students completed these hours in one block of time, which was pre-scheduled and remained consistent throughout the semester. Students who selected group study as their support option self-selected their groups and study time. Group study students met in the same building as the Math Lab students but were assigned to designated group areas within the lab space. Group study participants monitored and self-reported their attendance to their professor using a Group Attendance and Accountability Log (Appendix C). The groups were assigned a Graduate Assistant Academic Coach who helped the group begin their work, assisted in maintaining the group atmosphere, and acted as a mentor throughout the semester. If the group required assistance in mathematics, the Math Lab leaders were available for support.

Students participating in group study were rewarded according to their group averages on exams. If a group's exam

average was an A, then three bonus points were added to each group member's exam grade. If the group's average was a B, then each member of the group was awarded two points to their exam grade, and if the group's average was a C, each group member was awarded one point to their exam grade. No points were awarded for a D and below. Any bonus points awarded for this purpose were omitted during data analysis.

This method of rewarding group study students based on the average exam grade earned by their group was selected as both a motivational tool and an accountability tool. The researchers wanted students to invest in each of their group members and use their knowledge to help each other develop their mathematical knowledge. The researchers were hopeful that students would collaborate and engage with the course material through communication and discussion, thereby developing their own and each other's understanding.

Group Study Facilitation

Each group participating in a group study was assigned a Graduate Assistant Academic Coach. The graduate assistant was responsible for managing each group and disseminating information relevant to their studies, such as upcoming quizzes or exams. During the first group meeting, the graduate assistant conducted an icebreaker activity to help group members become comfortable working together. The graduate assistant also reviewed the group study policies in detail (Appendix B) and explained how to use the Group Attendance and Accountability Log (Appendix C). The graduate assistant was also responsible for giving each group member the Study Strategies handout and explaining each strategy (Appendix D). Finally, the graduate assistant facilitated the group in creating their own group rules during the first meeting.

For the second through fourth group study meetings, the graduate assistant simply checked in at the beginning of the meeting to facilitate group activity and followed up later in the meeting to assess the group's progress. During the fifth group meeting, all groups were given the Group Participation Rubric (Alfred State College of Technology, 2003), which was designed to assess their

work as well as the work of every group member (Appendix E). After the fifth week, the graduate assistant only facilitated the group on an as-needed basis.

All groups participating in group study completed the Group Attendance and Accountability Log for each study session. The Group Attendance and Accountability Logs were reviewed by the course instructor. As one underlying objective was to develop independent collaborative learners, each group's use of the recommended Study Strategies (Appendix D) was not monitored beyond what the groups reported on their log. In addition to documenting homework completion, the logs allowed groups to identify which of the following strategies were used during their study sessions: brain dumps, "types" of problems, homework review, and practice quizzes/exams (see Appendix D for a detailed explanation of these strategies). No formal work was collected or assessed beyond the group's log.

Method

Setting of the Study

This study occurred at a public four-year institution in the northeastern United States. The institution serves approximately 8,000 undergraduate students. Introductory Algebra and Intermediate Algebra are developmental mathematics courses housed in a centralized department of developmental instruction. At the time of the study, the centralized department of developmental instruction coordinated and administered two levels of developmental mathematics, reading, and writing, as well as tutoring and academic advising. Enrollments in the higher-level developmental courses are capped at 25 students per section while the lower-level courses are capped at 20 students per section. The courses are taught for either three days per week for 50 minutes or two days per week for 75 minutes.

This study was conducted over a spring and fall semester in the same calendar year. Data was collected in three sections of Intermediate Algebra during the spring semester. During fall, data was collected in one section of Introductory Algebra and two sections of Intermediate Algebra. The same professor, who is

one of the researchers, taught all courses. Student demographic information was not collected during the study. Additional attributes such as high school GPA, placement exam scores, and SAT scores were not available to the researchers.

Participants

Enrollment in both Introductory Algebra and Intermediate Algebra is determined by placement scores (see Table 1). Students who place out of these classes can self-select the course(s) if they feel it necessary.

Table 1

Placement Scores

Course Placement	SAT	ACT	Accuplacer
Introductory Algebra	$x \leq 450$	$x \leq 16$	$x < 60$
Intermediate Algebra	$460 \leq x \leq 500$	$17 \leq x \leq 19$	$60 \leq x < 74$

At the time of the study, all incoming students were administered the Accuplacer test to determine the most appropriate developmental mathematics course; course placement was determined by the highest placement score. For instance, if a students' SAT/ACT score placed them into Intermediate Algebra while the Accuplacer score placed the student into Introductory Algebra, the student was required to complete Intermediate Algebra. Students that placed into Introductory Algebra were required to successfully complete both Introductory Algebra and Intermediate Algebra before they were able to enroll in their credit-bearing course(s) required for their major and/or general education requirements.

This study utilized a purposeful sample of students enrolled in one of the researcher's courses for spring and fall semesters. All students enrolled in either Introductory Algebra or Intermediate Algebra are required to complete two hours of out-of-class support in the Math Lab. During this study, students were given the option of attending Math Lab or participating in group study. All students self-selected their support option based upon personal preferences

and were informed that they could change their support option if they decided that it was not the best fit for them. Students were discouraged from jumping back and forth between Math Lab and group study. There were also students who, for whatever reason, did not attend either Math Lab or group study.

Within this study, all students were classified into either Math Lab, group study, or no support based upon their attendance in each of the support options for the semester. Since all students were required to attend two hours of out-of-class support each week, each student's attendance was calculated based upon the two required hours each week and the number of weeks of support available in the semester. For example, during the fall semester, there were thirteen weeks of support that students were required to attend (no support is available the first week of the semester or finals week). Since there were thirteen weeks of support and each student was required to attend two hours each week, there were twenty-six total hours of support.

For students to be classified into one of the three support options (group study, Math Lab or No Support), they needed to attend more than 50% of that support option for the semester. As an example, one student attended 17 hours of support (group study) out of the 26 required throughout the semester. That student had a 65% attendance rate for group study and was classified into the group study support option. Another student attended 16 hours of group study (62% attendance rate), 4 hours of Math Lab (15% attendance rate), and 6 hours of no attendance (23% attendance rate) in either support option. As a result that student was determined to have primarily utilized group study as his support option.
All students were required to attend a minimum of two hours of out-of-class support each week, but students were welcome to attend more hours if they wanted. Although some students chose to attend more than two hours for the week, those hours were ignored for support calculations since they exceeded the two required hours. Five students did not have more than 50% attendance in any one of the three support options (Math Lab, group study, or no support) and they were not included in the data set. There were 114 students included in the study; 73 students utilized Math Lab, 31 utilized

group study, and 10 students did not utilize any support option. For students to earn the group study bonus points based upon their group's average exam grade, they had to attend their group study sessions for two weeks before the exam.

Instrument

The LASSI was used to determine whether students participating in Math Lab and group study were able to develop improved study behaviors over a semester. Students were asked to take the LASSI during the first two weeks of the semester and again at the end of the 14-week semester. The pre-test and post-test results were compared to determine if there were significant gains in any of the ten areas assessed by the LASSI instrument.

Findings

The findings of this study are framed around the research questions:

1. Do developmental mathematics students who participate in a structured peer study group achieve higher quiz, exam, and course grades when compared to those who do not participate?
2. Do developmental mathematics students who participate in a structured peer study group develop better general study strategies over a semester when compared to those who do not participate?

Research Question 1 (Achieve Higher Grades)

Students were categorized into one of three support group options based upon their attendance throughout the semester: group study (n = 31), Math Lab (n = 73), and no support (n = 10). Average grades were calculated for each participant in each of the following categories: homework, quizzes, each unit exam, final exam, all exams combined, and the overall course grade. A simple comparison of the averages illustrated that the average grade for the group study participants was higher across all categories except exam two and exam four when compared to the students who participated in Math Lab (see Table 2). A comparison of the averages of the students who participated in group study versus those students who did not

utilize any support showed higher averages across all categories except exam four.

Table 2

Average grades across all measures and support options (bonus points not included)

Measure	group study (N=31)	Math Lab (N=73)	No Support (N=10)
HW Average	84.61	84.30	67.00
Quiz Average	78.13	73.63	66.10
Exam 1 Average	78.84	78.45	70.70
Exam 2 Average	72.90	73.59	68.00
Exam 3 Average	73.00	70.85	71.90
Exam 4 Average	70.80	71.86	78.00
Final Exam Average	68.19	63.55	63.70
Average of All Exams	73.19	71.55	68.50
Course Grade Average	75.39	73.27	64.40

Although the averages were higher in seven of nine categories, further investigation using an independent samples t-test did not show significance between students utilizing group study when compared to those students using Math Lab for support in any measure. Significance was found in the average homework grade for students participating in group study ($M = 84.61$) when compared to homework grades of students not using any support ($M = 67.00$), $p = .02$. Independent samples t-test also showed significance on homework grades when students participating in Math Lab ($M = 84.30$) were compared to students not using support ($M = 67.00$), $p = .001$.

Research Question 2 (Development of Study Strategies)

Of the 31 students who participated in study groups, 21 students took both a pre-test and post-test of the LASSI. Of the 73 students who participated in Math Lab, 50 students took both LASSI tests. The students utilizing group study and the students in Math Lab were analyzed separately to determine if there were differences among the groups. The scores were analyzed by comparing the pre-test and post-test scores in an analysis of variance with repeated measures.

Upon analyzing the students who participated in group study,

there were significant differences in the pre-test and post-test raw scores for Information Processing (INP), $p = .003$, and Study Aids (STA) with $p = .014$. However, when analyzing the students who participated in Math Lab, there were no significant differences in any of the ten scales assessed by the LASSI instrument.

Discussion

This study's goal was to determine whether students who participated in a structured group study would achieve higher grades in several categories (homework, quiz, exams, and course grades). Although the averages were higher in seven of nine categories, there were no significant differences between the group study and Math Lab populations in any measure. Group study only significantly affected homework grades when compared to the population utilizing no support. The significantly higher homework grades may have resulted from the students working collaboratively on their homework during their group study session. The collaborative environment likely created an environment of accountability that assisted in homework completion. Significance was also found between Math Lab participants and participants utilizing no support on the homework average. This finding may imply that students are using the mandatory support options as a study hall to complete their work. Since the group with no support had a significantly lower homework average, the data suggests that out of class support (regardless of type) helps developmental mathematics students complete their homework.

While the data shows that group study participants had higher averages in almost all of the categories, the students that did not participate in any type of support for the semester had the highest average on exam four. At this point in the semester, the students earning a B or above in the course were no longer mandated to attend their support option. The researchers question if their achievement decreased on exam 4 because some of them were no longer receiving support.

According to the pre-test and post-test results for the LASSI, there were no significant differences between the results for those students who participated in Math Lab. This suggests that,

although Math Lab may support students in their success in their developmental mathematics course, this form of peer support does not necessarily promote the development of skills transferable to other courses, at least not over one semester.

In the pre-test and post-test comparison of students participating in group study, significant differences were found in both Information Processing and Study Aids. According to the LASSI manual, "the Information Processing Scale assesses how well students can use imagery, verbal elaboration, organization strategies, and reasoning skills as learning strategies to help build bridges between what they already know and what they are trying to learn and remember" (Weinstein & Palmer, 2002). This suggests that students participating in group study were able to further their ability to relate new information to previously learned material, a critical study skill.

The other scale that yielded significant change was the Study Aids Scale. Also, per the LASSI manual, "the Study Aids Scale assesses students' use of supports or resources to help them learn or retain information" (Weinstein & Palmer, 2002). This suggests that students participating in group study were able to further develop their effective use of resources to assist in academic success. Development in both areas over one semester is encouraging since it demonstrates growth in areas that will benefit students in future coursework. The significant movement in these areas among the study group participants is likely the result of more structured interactions with other students allowing them to learn from one another.

Anecdotal Observations

One researcher noted some anecdotal observations she made during classes concerning the students who participated in group study. She observed that these students chose to sit next to each other in class. Not only did group study students sit together, but they also seemed very comfortable asking each other questions during class and seemed to use each other for support. Only when all students were stumped would they seek the instructor out for assistance. Students that chose to utilize Math Lab were more

dependent upon the course instructor. Math Lab students were not as comfortable collaborating with their classmates and using them for assistance.

Limitations

A limitation of this study was the small sample size of students participating in this study. A greater sample size may yield different results in terms of significance and should be explored in further research. There were also some issues with group communication and students not showing up for their group meeting times, which can affect group dynamics and functioning. Snow days were also an issue for the students participating in group study because groups were scheduled to meet for two hours, at a specific time, on a specific day of the week and missing a meeting because of a snow day meant the students missed their scheduled math support for the week. A suggestion for replicated research is to include a make-up policy for students utilizing group study as a method of support.

Another limitation of this study was the departmental policy for developmental mathematics support. At the mid-term point in the semester, students whose grade is a B or above are no longer mandated to attend and utilize support options (they can elect to participate). As long as the student maintains an overall course grade at or above the B level, they are excused from group study or Math Lab from mid-term through the end of the semester. Due to this policy, some students participating in group study were excused at mid-term, which resulted in some groups losing members. Since the groups ranged in size from three to five members, some groups lost a significant number of members. The resulting group had to establish a new culture with the remaining members, which impacted the functionality of the group. For those groups that became too small to operate, students were paired up with other students who lost group members and new groups were formed with remaining members from other groups. The loss at mid-term of the highest academically achieving group members may have affected the results of the study.

Finally, the setting for the study was a public four-year institution located in the northeastern United States. The department where the courses and support options were coordinated are housed in a centralized department of developmental instruction. The conditions, policies, and resources of support at this institution may not necessarily apply or be transferable to other institutions. The results of this study are not generalizable.

Implications for Research and Practice

The results of this study were examined in the context of two semesters, and researchers looked at both academic success in the supported courses and study skill development over a 15-week term. The researchers assumed that students would develop study skills that would contribute to their future academic success; however, a longitudinal analysis would be required to verify that this is indeed a reasonable conclusion.

Additionally, this study focused solely on study groups and their effect on achievement in developmental math. A parallel study in other developmental courses, such as reading and writing, would inform us of the effectiveness of this strategy on developmental students in general. Finally, a comparison of the outcomes of group study for students in college-level courses, either in math or other disciplines, would provide some insight into group study's effects on students performing college-level work.

This study has highlighted the need to further examine the out-of-class support options for developmental mathematics since students utilizing support are not earning significantly higher grades across the selected categories.

Conclusion

In a comparison of a structured group study program and an independent math lab model, the data indicated that students participating in group study had higher averages than students who used Math Lab (although this was not statistically significant), across the following measurements: homework, quizzes, exam 1, exam 3, all exams combined, the final exam, and overall course grades. Additionally, there was statistical significance in the homework grade

of students using group study versus the students who did not receive support and among students who used the Math Lab versus no support. This indicates, as one might expect, that participation in any type of support program yields better academic results than not participating.

In addition to favorable academic results, according to LASSI pre-test / post-test results, group study students scored significantly higher on Information Processing (INP) and Study Aids (STA). This suggests that students in group study were developing the ability to relate new information to old at a significantly higher rate than students in Math Lab or no support. Also, group study students gained the ability to utilize resources to assist in successful course completion. Group study is a valuable support option because it is inexpensive, nonintrusive, and adaptable. Group study also empowers developmental students by strengthening their mathematical study skills, self-directed learning, and accountability by immersing them in a cooperative and collaborative environment.

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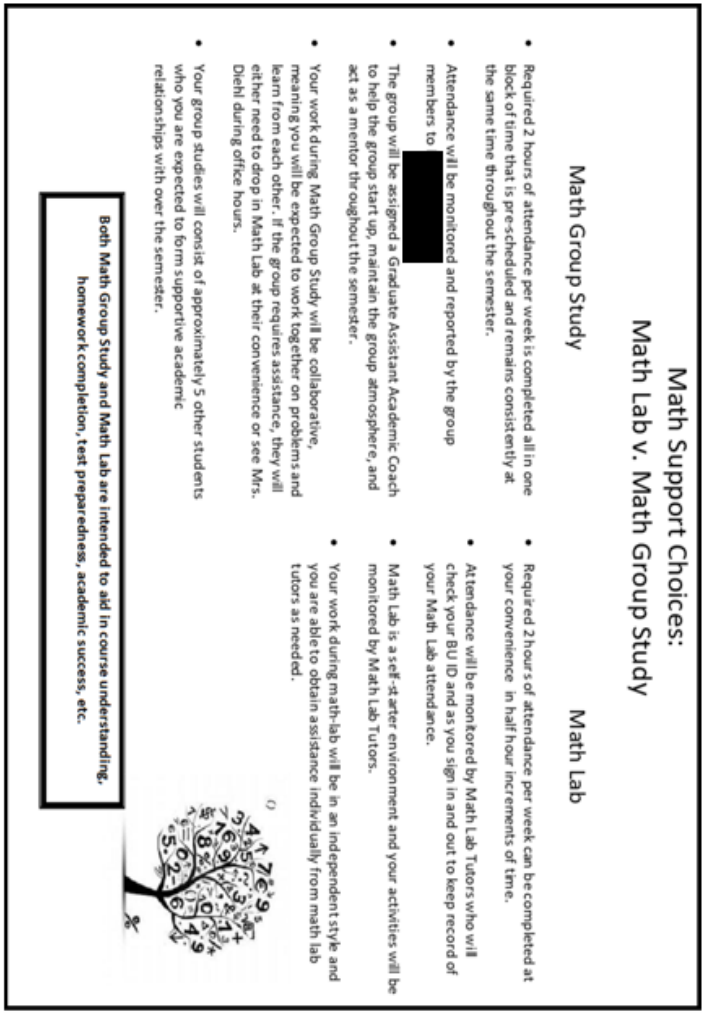
Appendix A



Appendix B
Math Group Study Policy

Group Study is designed to assist all students in successfully completing their coursework. The collaborative, group atmosphere will offer students the study strategies, background information and practice time vital to academic success. Group Study sessions are an important part of the academic course and, to be beneficial, must be attended with regularity. To that end, the following policies will be in effect for Group Study.

General Attendance and Lab Policies:

1. All students are required to attend their 2-hour session of Group Study each week until mid-term. Students may also choose to attend Math Lab in addition to their Group Study session.

2. Students must attend the entire Group Study session.

3. Students will need to sign in at each study session.

4. At mid-term, students who have earned a grade of 'B' or better in the course are no longer mandated to attend Group Study, however, it is certainly encouraged.

5. Students are required to attend Group Study at any time during the semester in which their grade falls below the established cut-off and until their grade improves up to the minimum score. It is the student's responsibility to learn if he or she is required to continue attending throughout the semester. Students should ask the professor if they are uncertain. Do not make any assumptions about your attendance status.

6. No more than two (2) unexcused absences from the required Group Study sessions will be permitted during the

semester. Absences may not be consecutive Group Study sessions.

7. All students will earn a 100% Group Study grade unless they exceed two absences. Students exceeding two absences from Group Study sessions will be removed from Group Study and are mandated to attend Math Lab immediately. Math Lab grades will be determined based upon the Math Lab Attendance Policy.

8. All Group Study members have the potential to earn extra credit on their exams. If the exam average for all Group Study members is an "A", each Group Study member will receive an additional three points (+3) on each of their exams. A Group Study "B" average will result in an additional two points (+2) and a Group Study "C" average will result in an additional (+1) point.

9. The Group Study policy is separate from the professor's attendance policy. Students are required to understand and follow both policies.

10. Students who are requested to refocus their behavior on the learning task more than two (2) times during a Group Study session may be dismissed and marked absent.

11. A student must have all required materials and actively participate to be counted as having attended a Group Study session. This includes bringing lecture notes and textbooks. A student who comes to the Group Study session unprepared and is not participating will be asked to leave the Group Study session and no credit for attendance will be earned.

12. Students may be dismissed from the Group Study program if they are disruptive, uncooperative, disrespectful to other members, do not participate and/or contribute to the function of the group.

Expectations for Student Participation in Group Study:
• Have all textbooks and learning materials.
• Participate fully and actively in Group Study session activities.
• Have a positive attitude about learning.
• Work collaboratively with other students and respect all views and opinions.
• Appropriately address all group members.
• Work only on material/homework pertaining to Math Group Study.
• Inappropriate language (profanity) and personal misconduct will not be tolerated and will result in dismissal from Group S tudy. Any dismissals will be counted as unexcused absences.

Adapted from:

University College, Ferris State University. (2008). *Facilitator manual training guide, structured learning assistance*. Big Rapids, MI.

Appendix C
Math Group Attendance and Accountability Log

Date and time of study group:

Group Member Attendance:

Print Name	Sign Name
1.	
2.	
3.	
4.	
5.	
6.	

What did your study group accomplish today?

What is your plan for the next study group meeting?

Are there any group questions or concerns for the course instructor?

Appendix D

Math Study Strategies

Strategy	Description
HW Review	Review the previous week's homework as well as the current homework assignment. Focus on all problems that were incorrect, incomplete, or that you struggled with. Re-do those homework problems as necessary. Choose even-numbered problems that look similar to the problems you experienced difficulty with. There are instructor edition textbooks in Math Lab that you can borrow to check your answers to even-numbered problems. Successful and prepared math students do more homework than is assigned and can complete every homework problem without using their notes and the answers in the back of the book. If there are problems that you cannot figure out, seek out assistance (math lab, other students, course instructor) on those problems immediately. The longer you wait the more difficult it will become.
Notes Review	Compare your class notes to other students. Fill in any gaps that you find. Request clarification on anything you did not understand from the notes (math lab, other students, course instructor). Pay careful attention to the "notes" in your notes. They are important and color-coded to attract your attention. Be sure to include the concept maps in this review.
Practice Quizzes/Exams	Create a practice quiz/exam. Since you know the format for quizzes and exams, try to model your practice quiz/exam after the real one. Be thorough as you are creating your practice quiz/exam. Copy the page and problem number down for each problem you use on your practice quiz/exam so you can check your work. Allow some time to pass and then take your practice quiz/exam. Grade yourself and review any

"Types" of Problems	Examine each section of homework and identify "types" of math problems in each section. Review each "type" taking care to determine the qualities, properties, and characteristics of each "type."
For the exam, I must be able to. . .	Write down each section and idea/objective you need to know for your exam. Under each objective write an example of each "type" of problem. Rate yourself (E = excellent, S = satisfactory, N = needs improvement) on each objective. Direct your studying to those objectives that are rated N and S first. If time permits, review any marked E. Think of this strategy as an outline for your exam. Keep this outline. You will find it useful when preparing for your final exam.
Brain Dump	The brain dump paper is created by you before the exam and is one side of an 8 ½ x 11 piece of paper. You can use your brain dump paper during the exam as a sort of "cheat sheet." Feel free to write down anything that you might need to be successful on the exam. You may want to include just examples on your brain dump or a combination of examples and notes to help guide you through the work. Don't forget about all those special "notes" in your class notes. Since you know how the exam is organized, I encourage you to organize your brain dump to correspond with the exam. If you create a practice exam, take it using only your brain dump paper. This will tell you whether your brain dump paper is thorough.

Appendix E
Group Participation Rubric: Math Group Study

Skills	3 Advanced	2 Competent/meets expectations	1 Progressing/does not fully meet expectations	0 Beginning/does not meet minimum expectations
Contributions/participation Attitude	Always willing to help and do more, routinely offered useful ideas. Always displays positive attitude.	Cooperative, usually offered useful ideas. Generally displays positive attitude.	Sometimes cooperative, sometimes offered useful ideas. Rarely displays positive attitude.	Seldom cooperative, rarely offers useful ideas. Is disruptive.
Working with others/cooperation	Did more than others – highly productive Works extremely well with others, never argues	Did their part of the work – cooperative. Works well with others, rarely argues.	Could have done more of the work – has difficulty, requires structure, directions and leadership, sometimes argues.	Did not do any work – does not contribute, does not work well with others, usually argues with teammates.
Focus on task/commitment	Tries to keep people working together. Almost always focused on the task and what needs to be done. Is very self-directed.	Does not cause problems in the group. Focuses on the task and what needs to be done most of the time. Can count on this person.	Sometimes not a good team member. Sometimes focuses on the task and what needs to be done. Must be prodded and reminded to keep on task.	Often is not a good team member. Does not focus on the task and what needs to be done. Lets others do the work.
Preparedness	Brings needed materials to class and is always ready to work.	Almost always brings needed materials to class and is ready to work.	Almost always brings needed materials but sometimes needs to settle down and get to work	Often forgets needed materials or is rarely ready to get to work.

Group Member Names	Contributions (Participation & Attitude)	Working with Others (Cooperation)	Focus on task (Commitment)	Preparedness	POINTS EARNED
1.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	
2.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	
3.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	
4.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	
5.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	

The Peer Tutor Experience: Tutor Perceptions of Academic Performance and Skillset Gains

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Abstract

Although the research on the effects of peer tutoring is not in short supply, there is limited research on the effects of this experience for the peer tutor. Using a researcher-created survey based on themes in the literature, this study explored the perceived gains of peer tutors through their tutoring experience. Participants were recruited from tutors who worked for the past seven years at a small state college in Georgia. All subcategories showed a significant difference in the perceived skillset gains. Overall, these findings support the thesis that peer tutoring is an impactful experience not only for the tutee but also for the tutor.

The Peer Tutor Experience: Tutor Perceptions of Academic and Skillset Gains

Higher education institutions are increasingly data-driven, as initiatives like Complete College America (CCA) and Gateway to Completion (G2C) are directly connected to campus funding. Additionally, higher education institutions are expected to supply the future workforce of America as global competition pushes for more employees who are better prepared. When discussing persistence in higher education, retention remains a focus of the discussion. Roberts and Styron (2010) discussed four main types of retention and the factors that contribute to the persistence of college students. One common factor consistently studied concerning retention is student engagement. Roberts and Styron also outlined seven factors that contribute to student engagement, two of those being social connectedness and involvement (2010). Nunez and Sansone (2016) learned in their collective case study that campus employment allowed the students to build a sense of community at

their institution. Pike, Kuh, and Massa-McKinley (2008) found that working part-time on campus had a positive relationship with grades. A later study related that student employment to resiliency and engagement in low-income, first-generation students and reported a significant relationship regarding student resiliency and the type of employment they had (Martinez, Bilges, Shabazz, Miller, & Morote, 2012). A later study found that student employment was related to resiliency and engagement among low-income, first generations students, and there was a relationship between resiliency and type of employment.

Peer tutoring in higher education is known by different nomenclatures. Institutions have reciprocal peer tutoring, peer tutoring programs, and peer-assisted learning. Regardless of their names, these tutoring programs provide benefits to the peer tutors, which until recently, has been overlooked in the literature. Gardner (2010) briefly discussed peer teaching/tutoring as one of the meaningful experiences for students, and peer tutoring has always been viewed as a high impact practice for campuses. As noted by Astin's analysis of factors (as cited in Nunez & Sansone, 2016), on-campus employment experiences, like that of peer tutoring, can provide student employees with increased time spent on campus, which could enhance their social connectedness and involvement in campus life. Although tutoring certainly provides academic support to aid in the persistence of the student being tutored (tutee), there is a gap in the literature on the way tutoring may influence peer tutor academic performance and skillset gains.

The purpose of this study was to investigate peer tutor perceptions of the tutoring experience as it related to academic performance and skillset gains. The research questions for this study were:

1) What are the perceptions of peer tutors regarding the influence of the tutoring experience on their academic performance, and their skillset gains (i.e., self-confidence and fulfillment and social and professional skills)?

2) Is there a statistically significant difference in these constructs with more experienced tutors?

Literature Review

Peer tutoring serves as one method used in higher education to assist students in the successful completion of course work through to graduation. However, tutoring can be viewed from multiple perspectives, such as being a student engagement tool, on-campus employment, and an impactful experience for the peer tutor. A review of the literature on peer tutoring and its impact on college campuses allows one to understand how to utilize this practice beyond that of its benefits for the tutee.

Academic Performance and Learning of Peer Tutors

In a review of research on the academic performance and learning of the peer tutor, there is a focus on the academic gains for tutors within the STEM and health sciences fields. Dioso-Henson (2012) looked at three relationships, one of which was between academic performance of tutors and non-tutors. The study was applied only to a Reciprocal Peer Tutoring (RPT) program in a college physics course (Dioso-Henson, 2012). As is the case in many of the previous studies, there was clear proof that tutoring required skills in simplification of content, communication, and organization. The aspect that makes this study unique is that academic performance was measured beyond those of skills gained through tutoring. The students tutoring in the RPT had marginally greater academic improvements in the course than those who did not use the program (Dioso-Henson, 2012). Brannagan et al., (2013) continued this trend with their study of the benefits of tutoring for the nursing peer tutor. There was a heavy focus on the skills gained through tutoring, but this mixed-methods study also discovered that tutors perceived an increase in their content knowledge.

As late as 2014, studies of peer tutoring began to center on the academic performance of the tutor. Iwata, Furmedge, Sturrock, and Gill (2014) studied students who served as Peer-Assisted Learning (PAL) tutors and non-PAL tutors. While the study noted that part of the statistical significance could be due to the high achieving background of the PAL tutors, the researchers also learned that those who served as peer tutors performed better on final examinations in medical school than those who did not (Iwata et al., 2014). The study

recognized that PAL tutors may not be the experts in the subject area, but the social congruence required of the work is what connects to the tutees. In a similar study, Unger, Keiller, Inglis-Jassiem, and Hanekom (2014) focused on tutor gains for physiotherapy peer tutors. Utilizing both pre- and post-tests and focus groups, the study discovered that the peer tutoring experience had a positive influence on the tutors' perceptions of their learning. In conclusion, research in the area of tutor gains is focusing more on tutor persistence, but this research is currently only in the STEM fields of tutoring.

The literature of tutoring uses various lenses to examine the relationship of tutoring with persistence in higher education. Peer tutoring has been viewed for its use with tutee academic support, for its involvement in the campus employment arena, and finally in its relationship with tutor academic performance and skillset gains. These gains include academic performance in a course, communication skills, time management skills, and listening skills, to name a few. Much of the literature examines the soft skills associated with being a tutor, but more recent literature is hypothesizing about the peer tutor experience as it relates to STEM tutors' persistence and graduation. Studies in the field have divided the tutor group into subsets according to specific demographics like socio-economic status and student major. The literature, though, lacks a more thorough investigation of how the peer tutor experience relates to the skillset and learning gains.

Method

The current study used a quantitative methodology to understand the experience of peer tutoring, as perceived by the tutors at one college in Georgia. This survey sought participants who were employed as tutors since 2012, which included those that had since graduated and those currently employed in the center. Since the fall semester of 2012, the approximate tutor population for the center was about 150 peer tutors, all of whom were trained and certified through the College Reading and Learning Association (CRLA). This study used the implementation of certification as the time frame for the study's participant pool. Each tutor served as such for at least one semester, but more often were peer tutors for multiple consecutive

years.

Abraham Baldwin Agricultural College's (ABAC) tutoring center, known as the Academic Achievement Center (AAC), serves the entire student population, which in the Fall of 2018 was 57% female and 43% male. The majority of students enrolled are White (79%) with Black or African American being the next largest group at 11% of the population. Students are typically traditionally aged, 89% of the enrolled students were 24 years old and under in the Fall of 2018 (National Center for Education Statistics, 2018). Tutors provide services for all students throughout their academic career, starting with remedial courses up through upper-level in-major courses. However, the courses tutored vary by the semester due to tutors' classifications and academic background. Although students are encouraged to log in for all tutoring through Tutor Trac, some tutees prefer to not log in, so the enrollment statistics here are the best indicator of tutees served.

Regarding the support provided for the peer tutors at the AAC, the center is certified through the CRLA Tutor Training Program and training agenda reflects this certification. Tutors are evaluated once every semester, get trained in a large group setting before the semesters begin and then continue training elements throughout the year. Additionally, each larger content area (Math, English, Science, Agriculture, etc.) work closely with faculty in their respective area to receive biweekly content training on relevant topics and upcoming assignments. When students are not busy working with tutees, they are expected to review content for their areas or work on certification elements. If tutees are caught up in both areas, they are permitted to work on their homework, thus providing a job that supports their priorities as students.

Participants

When selecting a sampling approach for the study, the researcher considered the availability of potential participants and communication methods used for former tutors. In the end, the study utilized a convenience sample, with participants being those who were or are enrolled at ABAC from 2012 until the present. Tutoring is optional for all enrolled students, as the Center's staff

believes that voluntary participation in the tutoring center is the best approach for student success. Around 800 are students served annually by the AAC, varying by year and semester. In the Fall of 2018 through Spring 2019, 628 students logged in for tutoring, as opposed to the 796 students who logged in for the 2015-2016 academic year (Trac Systems, 2020).

Participants of this study were both current and former tutors who have been employed by the AAC as a peer tutor. ABAC is a state college in Georgia, with a strong agriculture history. To remain consistent with the sample groups selected, tutors in the sample groups were those who had been employed since certification requirements were implemented in the AAC at ABAC. The AAC, ABAC's peer tutoring center, began using certification requirements in 2012, so tutors invited to participate in the study were those employed since 2012. To provide as large a sample as possible, former tutors were recruited for the study as well. The potential participant pool was around 100 current and former tutors.

Instrument

Using a researcher-created survey (see Appendix A), this study assessed the opinions and attitudes of current and former tutors regarding academic and skillset gains while serving as a peer tutor. After exploring the literature about tutoring benefits, a survey was created to assess the key gains of those tutors. Basing the survey items on the literature review enhanced the content validity of the instrument. To enhance the validity, the researcher sought feedback about survey content items from experts in the tutoring field, such as elected officers in the College Reading and Learning Association (CRLA) and the National College Learning Center Association (NCLCA). Any revisions noted by the experts were made before administering the survey. The Survey Item Grid (see Appendix B) was included to show the source of each item of the instrument.

The first part of the survey allowed participants to respond to statements regarding their work as a tutor and how that relates to skills gained. The skills gained included three main areas of focus: 1) academic performance and learning (item numbers 2, 8, 9); 2) self-confidence and fulfillment (item numbers 1, 5, 11); and 3) social

and professional skills (item numbers 3, 4, 6, 7, 10, 12). The third subcategory had double the number of items than the previous two subcategories. Having reviewed themes of gains in the literature, this skillset area had more research devoted to it, which is reflected in the number of items on the instrument. Part I of the instrument had a total of 12 items to which the tutors responded. For each statement, the participant assessed the extent to which they agreed or disagreed using a 5-point Likert scale. In this scale, 1= Strongly Disagree, 2= Disagree, 3=Neither Agree nor Disagree, 4= Agree and 5=Strongly Agree. Part II of the instrument was the collected demographic information of the tutors including gender, race, academic level, primary tutoring area, and length of experience as a tutor.

The instrument was tested through a pilot group of tutoring center staff members, 10 participants in total. Any areas of feedback from the pilot group were noted and changes made to the survey if multiple pilot participants noted the same feedback. As is discussed in the limitations section of this study, there is potential bias in the use of this instrument because respondents may have enjoyed their tutoring experience more than others and many of the respondents happened to be former tutors, so recall bias may exist in that capacity.

Procedures

This study utilized a quantitative research approach intending to explore peer tutors' perceptions of their skillset gains through the experience of tutoring. Recruitment of participants occurred through a group email sent to all current and former peer tutors, but the survey utilized the "anonymous link" tool from Qualtrics (XM, 2019) to ensure anonymity among participants. Contact information for former tutors had been collected over the years, so the researcher was able to send the survey link to approximately 90% of the former tutors hired since 2012. As the researcher is the supervisor of any current tutors that may participate, permission to distribute the survey was sought through the Director of Academic Support at the institution, who oversees the coordinator of the tutoring center. Before recruiting tutors for the study, the researcher submitted appropriate Institutional Review Board (IRB) paperwork to the Institutional Research department contact at ABAC and to Georgia

Southern University, where the researcher is a doctoral student. The researcher created and distributed via email a passive consent letter to all tutors. At the bottom of this letter was a link to the survey. A link to the survey was provided at the bottom of this email letter. The survey was open for two weeks, with a follow-up reminder email sent midway through this period of availability.

Results

This study sought to understand the way peer tutors view their academic performance and skillset gains through the tutoring experience, so descriptive statistics were calculated to better understand the sample and responses. Data analyses were completed using a combination of SPSS (IBM Corp., 2016) and Microsoft Excel software. Percentages for each variable in the demographic section of the instrument were included for both the sample as a whole and as they related to the category of lower and senior tutors, according to experience level tutoring. Those labeled "less experienced tutors" self-reported one year or below of tutoring experience, while the "more experiences tutors" reported two or more years' experience. Table 1 offers a demographic view of the respondents in the study using percentages, broken down by such variables as gender, academic level, and race.

Percentages of demographic information

Characteristic	Percentage
Gender	
Male	32.0
Female	66.6
Prefer not to answer	1.3
Academic Level	
Sophomore	10.6
Junior	10.6
Senior	12.0
Former Tutor	66.6
Primary Tutoring Area	
Writing/Humanities	29.3
Social Sciences	1.3
Math	40.0
Science	17.3
Business	9.3
Ag/Natural Resource Management	2.6
Race	
White/Caucasian	84.0
Black/African American	5.3
Hispanic/Latino	9.3
Multiracial	1.3
Years as a Tutor	
1 Year and Less	46.6
2+ Years	53.3

n = 75

Over half of the respondents were female and the largest percentage of respondents were former tutors. Additionally, well over half of the respondents identified as White or Caucasian (84%), which is in agreement with the majority of the students at the college not only being White but also the largest percentage of tutors identifying as White. The next two largest groups in race were Hispanic/Latino (9.33%) and then Black/African American (5.33%). Tutors can assist in multiple classes, as their grades allow, but almost half of the tutors identified Math as their primary tutoring area. Writing/Humanities was the next largest group and Social Science tutors were the smallest group. The percentages of years of experience had less range between them. Outside of the class rank demographic, all areas in the demographic chart are indicative of the center's employees at large.

Table 2 shows the percentages for items one to twelve on the survey; these percentages are based on the total number of completed responses for that item, which is seen in the far-right column labeled n.

Table 2

Percentage of Responses for Peer Tutor Experience Survey

Survey Item	D	N	A	SA	*n*
Q1 Serving as a peer tutor increased my self-confidence.	2.7%	5.5%	36.1%	55.5%	75
Q2 Serving as a peer tutor improved my academic performance.	2.6	24.0	34.6	38.6	75
Q3 Serving as a peer tutor improved my communication and listening skills.	-	4.1	34.2	61.6	75
Q4 Serving as a peer tutor improved my time management skills.	3.2	29.5	44.2	22.9	75
Q5 Peer tutoring gave me feelings of fulfillment and accomplishment.	1.7	8.9	23.2	66.0	75
Q6 I developed a better sense of responsibility through my peer tutoring position.	4.0	14.0	30.0	52.0	75
Q7 Being a peer tutor allowed me to develop more patience.	1.3	20.0	40.0	38.6	75
Q8 Being a peer tutor helped me be more aware of my learning process.	2.6	16.0	45.3	36.0	75
Q9 Being a peer tutor helped me be more aware of the tutees' learning process.	1.3	14.6	45.3	38.6	75
Q10 My experience as a tutor helped me develop social skills, such as working with diverse groups and empathy skills.	0	12.1	43.2	44.5	75
Q11 Being a peer tutor made me feel more connected to the college.	4.0	8.0	36.0	52.0	75
Q12 I believe that the skills I gained from being a peer tutor will benefit my future professional life.	2.6	2.6	29.3	65.3	75

Note: SD = Strongly Disagree, D = Disagree, N = Neither Agree nor Disagree, A = Agree, SA = Strongly Agree

As Table 2 illustrates, none of the survey items elicited a response of below a Disagree on the scale. Most of the item responses fell in the Agree or Strongly Agree level of the scale. Questions 2 and 4 elicited large numbers of the neutral Neither Agree nor Disagree to these items. Questions that had larger percentages of respondents either agreeing or strongly agreeing with their accompanying statements were 1, 4, 10, 11. One final item of note is that Question 3 and 10 had no Disagree responses.

For missing data, mean imputation was utilized and is also reflected in this table. Each item was not required for participants to submit their survey, so some items had fewer responses than others. For example, Questions 4, 5, and 6 had fewer responses than the total 75. The remainder of the questions had very few unanswered responses and nine of them had at least 70 participants respond.

Table 3 provides results from statistical analyses of the three subcategories of skillset gains, Self-Confidence and Fulfillment, Academic Performance and Learning, and Social and Professional Skills. Within each sub-category of skillset gains, the table is broken down by lower and senior tutors and data is provided for each (number of tutors, mean, standard deviation, and standard error of the mean). The subcategory and total scores were calculated by summing up responses to items from each category (as noted in Appendix B's grid). For example, in the Academic Performance and Learning subcategory, scores from Questions 2, 8, and 9 were added for each respondent. The higher the score for each response, the greater agreement with the statement for that item, the lowest score being 1 and the highest 5. For the first 2 subcategories, the maximum score was 15 and for the Social and Professional Skills subcategory, the maximum score was 30. The maximum total score was 60.

Table 3

Descriptive Statistics of Subcategories by Experience Level of Tutors

	Group	N	Mean	Std. Dev
Self-Confidence & Fulfilment	Lower Tutors	35	12.40	1.71
	Senior Tutors	40	13.40	1.39
Academic Performance & Learning	Lower Tutors	35	11.69	1.47
	Senior Tutors	40	13.13	1.71
Social & Professional Skills	Lower Tutors	35	24.51	2.66
	Senior Tutors	40	25.78	2.38
Total	Lower Tutors	35	48.60	4.54
	Senior Tutors	40	52.30	4.68

Note: Sample size was 75.

This table addressed the second research question for this study, showing that a relationship existed between the number of semesters or years of tutoring experience and tutors' perceived academic performance and skillset gains. The mean score in each sub-category was consistently higher for the senior tutors. For example, the mean score for the lower tutors in Self-Confidence and Fulfillment was 12.40 (SD= 1.72) and 13.40 (SD = 1.39) for the senior tutors in this same sub-category. The highest score means were in Social and Professional Skills. It should be noted, however, that the number of tutors in the lower and senior groups was not the same, as the senior tutors had five more participants.

Independent t-tests were conducted to determine if a significant difference existed in tutors' self-reported Self-Confidence and Fulfillment, Academic Performance and Learning, Social and Professional Skills, and total attitude score based on the number of years of tutoring experience. Table 4 presents the results of these independent t-tests.

Table 4

Results of Independent t-Tests

	t	*df*	Sig. (2-tailed)
Self Confidence & Fulfilment	-2.783	73	.007
Academic Performance & Learning	-3.876	73	.000
Social & Professional Skills	-2.166	73	.034
Total	-3.462	73	.001

Independent t-test results (t = -2.783, df = 73, p = .007) revealed a significant difference in the Self Confidence & Fulfillment at the .01 level. In the Academic Performance & Learning subcategory, the results (t= -3.876, df = 73, p □ .001) also indicated a significant difference in Academic Performance and Learning at the .01 level of significance with the senior tutors reporting higher scores in this area. The total attitude score (t = -3.462, df = 73, p = .001) was also significant at the .01 level; all three p values in these areas were less than .01. By comparison, there is a significant difference at the .05 level for the Social and Professional Skills area (t =-2.166, df = 73, p =.034). The Academic Performance & Learning

category, as was the case with the otter categories, reports perceived gains. Measuring true academic performance in terms of grade point averages proves challenging as there is no traditional cohort for tutors in a tutoring center.

Discussion

In this study, Academic Performance and Learning addressed one of the common areas in the literature. Unger et. al (2014) found that physiotherapy tutors have the benefit of their learning because of the required practice of the techniques. The findings of this current study supported this idea in the tutors' perceived Academic Performance and Learning, as tutors scored this item on the higher end of the Likert scale utilized (sub-category mean of 3.9). However, 24% of the respondents selected the neither agree nor disagree choice when responding to the prompt regarding improvement in academic performance, bringing forth questions of true perceived academic performance gains by the tutors. Al Kharusi (2016) and Clarke, Burgess, Menezes, and Mellis (2015) caution when accepting such neutral scores on this scale as tutors are normally the high performing students, to begin with, and high performers tend to under-estimate their performance. It is still noteworthy that between the lower and senior tutors in the current study, there was a 1.44-point increase in the longer serving tutors in terms of their perceived Academic Performance and Learning. Lower tutors reported a mean score of 11.69, compared to the mean score of 13.13 for the senior tutors. Both the lower and senior tutors come from the sample of those currently serving as a tutor and those that have graduated, as peer tutors are hired at all stages of the academic career. Although a large percentage of all respondents ranked this area gain in the higher end of the scale, the tutors that served a longer tenure perceived greater gains in this and all subcategories.

This study had similar findings to Al Kharusi (2016) in the academic benefits as tutors reported deeper learning and even an increase in academic mastery. De Backer et al. (2012 & 2015) found in both of their studies that the collaborative learning accomplished in peer tutoring was connected to increased amounts of metacognitive strategies for the peer tutors. Although their

2012 study recognized the possible external factors that could have contributed to these metacognitive gains, it is still noteworthy that these skillset gains were evident. Not only did tutors in this current study think their experience contributed to their academic performance, but the experience also allowed the tutors to think in deeper ways, something reflected in items 8 and 9 of the Peer Tutor Experience Survey (PTES).

Social and Professional Skills had the highest mean score for both lower and senior tutors, but this sub-category also had more items from the survey in it. As was the case in the PTES, multiple researchers had previously discussed the impact of tutoring on the peer tutors' soft skills, like that of communication, listening, and cultural awareness. For instance, Al Kharusi (2016) found that tutors were more aware of such values like responsibility, patience and punctuality, and appreciation of diversity. Tutors in one study identified the development of professionalism attributes as one of three main benefits of their experience (Clarke et al., 2015). Of the survey items with the largest percent of agreement were those in Social and Professional Skills, for such characteristics as patience, time management, responsibility, empathy, and professionalism.

The final sub-category of the PTES addressed the Self-confidence and Fulfillment gains perceived by peer tutors. The results reflected similar findings in the literature, like that of Galbraith and Winterbottom (2011). This earlier study found tutors tended to exhibit anxiety going into the tutoring role, but after just three sessions, there was a change in their expectations of the tutees, which may be indicative of an increase in self-esteem. Senior tutors in the current study had mean scores in Self-confidence and Fulfillment a point above those self-identified as lower tutors. In addition to this increase in self-confidence, tutors in previous studies felt more fulfilled in their tutoring role, noting that they enjoyed the role because it allowed them to help others, which made them feel like they have succeeded (Al Kharusi, 2016). Eighty-eight percent of the total responses to item 11 on the PTES were Agree or Strongly Agree, noting a high connection to campus. This connection to the college was also a common theme in previous research related to student employment benefits as well (Fede, Gorman, & Cimini, 2018; Nunez & Sansone, 2016).

Limitations

This study had several limitations that should be recognized, including the sample used. Using a convenience sampling model, the study only sought participants from a state college located in rural South Georgia. The findings from the study, in this case, are not generalizable to other tutoring centers in higher education. Additionally, tutors at this college created an extra limitation because of the lack of relative diversity in terms of age range and race. Most peer tutors at ABAC were traditionally aged students, ranging from 18 to 22 years old, which could impact the perceptions studied due to the life experiences of this age group. The largest percentage of respondents were former tutors, and this could also impact the results, as students that have completed college have more time to reflect on their work experience. A current tutor may not have had the time or life experiences to fully appreciate the gains that their tutoring experience provided. In future studies, the researcher could work more diligently to recruit a greater number of more experienced tutors, which would provide more balance to the sample. Including a larger sample with more current tutors could change the results. Because former tutors may have already graduated successfully, their perceptions of their tutoring experience would be more positive, which would give the results a bias.

It should also be noted that the sample group being studied was or had been employees of the researcher. Although the researcher used anonymous links and procedures to collect the data, there is a concern when researching one's environment. Once again, including more tutoring centers in future studies can help remedy this limitation. Finally, this study sought former peer tutors from ABAC as potential participants but recognizes that recruiting a large enough group of these individuals can be challenging due to out of date contact information and schedules of the former tutors.

Another limitation of this study lies in the instrument (PTES) used to measure the perceived tutor experience. Although the instrument, PTES, was based on a review of the literature (see Appendix B), the survey was researcher-created and was tested for validity. An SPSS report was also run for Cronbach's Alpha, to test the reliability coefficients. For the total instrument's 12 items,

Cronbach's Alpha was .769. The test was also run for each sub-category and was found to have a Cronbach Alpha of .571 for Academic Performance and Learning, a .497 for Self-confidence and Fulfillment, and a .577 for the final sub-category of Social and Professional Skills. The overall Cronbach's Alpha of .769 indicates that the items on the survey have high internal consistency and the scores for the survey as a whole were reliable.

Limitations existed in the use of the survey as well since the survey items note known benefits of tutoring, it is not surprising that the tutors would respond positively and in agreement. Since the questions are phrased in this way, there is some response bias as there is an appropriate response, and tutors may feel obligated to respond a certain way. Another limitation of the study is that the survey questions are not balanced. The survey questions ask about the commonly known benefits of tutoring, and tutors already know what the responses should be or feel obligated to respond positively. Instead of using a survey with this scale, the researcher could ask participants to write about their tutoring experiences, including what they felt were positive and negative about their experience as a tutor. Finally, the researcher recognizes the issues surrounding the classification of the tutors as "lower" and senior" and the perceptions that may accompany such linguistic choices. In future work, the phrasing will be reconsidered to reflect a more neutral manner of referring to the experience level of the peer tutors.

When discussing the results of the gains in the Academic Performance & Learning category, one should be wary of the perceived gains for the more experienced tutors as this may be expected since tutors who do not perform well academically would have to quit their jobs so they can spend more time on their studies. However, with the majority of ABAC students on some type of financial aid, one cannot readily say that all tutors would quit needed jobs when struggling to meet other life and school demands. Finally, the researcher recognizes the issues surrounding the classification of the tutors as "lower" and senior" and the perceptions that may accompany such linguistic choices. In future work, the phrasing will be reconsidered to reflect a more neutral manner of referring to the experience level of the peer tutors.

Implications for Practice

Whether one views peer tutoring from the lens of on-campus work experience or the lens of collaborative learning, the value of tutoring in higher education must be considered beyond how this service helps those being tutored. In a very general sense, on-campus employment allows student employees to build campus relationships and develop a sense of community at their institution. Institutions need to examine how they can duplicate the environment many tutoring centers have created so that more on-campus employees can experience similar benefits as the peer tutors did in this study.

Today's students are often viewed as lacking many of the soft skills required to be successful in life following college. However, participation in meaningful campus employment results in an improvement in such skills as empathy and problem-solving. Tutoring centers serve as spaces of content learning for tutees but should also be valued for the life skills they provide peer tutors. It should be noted that some skill development may be partly due to the intentional training that accompanies working in tutoring centers. Other departments on campus can model this to create meaningful employment positions for all student employees beyond those only housed in the campus tutoring center.

Regardless of whether this learning occurs inside the walls of a tutoring center or not, it is possible to mirror the collaborative environment created in a classroom setting. One of the more popular English professors at the home institution of this study is such because, as he explains, his classroom is modeled after a writing center, with a heavy emphasis on reflection and peer workshops. College classrooms can model tutoring centers' collaborative learning through peer and group work. Colleges may increase retention through such engagement practices in their classrooms.

Recommendations for Future Research

As this study examined only one tutoring center in Georgia and a very specific population of tutors at that center, it is recommended that future research should broaden the sample groups and provide a larger number of tutors for the study. Utilizing other tutoring centers would also allow for a more diverse sample, in terms of race

and age. Since this study was concerned with one drop-in tutoring center, a larger sample from various other types of tutoring centers would also be a direction for future research. Taking in to account the demographics that accompany the various tutoring center formats is something that could bring new perspectives to the perceived gains.

Additionally, the peer tutor experience could vary by specific demographics of the tutor. For instance, the way that a science-focused tutor views their academic gains can be unique compared to the way a writing tutor views these same gains. More studies surrounding the tutor experience could also explore how the traditionally aged tutor versus the nontraditionally aged tutor perceives the experience of being a peer tutor. More research in these areas within the peer tutor sample would allow for a new perspective on the experience as it relates to demographic variables. Long-term, the researcher wants to present data about the tutor experience beyond that of one cohort of tutors, which would give a more complete picture of tutor perceptions.

Finally, future research could be focused on the impact tutor training has on these perceived gains. Each center handles its tutor training differently, which could change the perceived gains of the tutors. Tutor training may include soft skill development like communication skills and time management skills. Many tutoring centers create their training based on specific certifying body requirements, which have their own set of topics to cover. Later studies in this field could investigate the relationship between training for tutors and their perceived skillset gains.

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Appendix A
Survey on Peer Tutor Experiences*

The purpose of this survey is to study the attitudes and experiences of being a peer tutor at a small state college in Georgia. There are two parts to this survey, the demographics section, and the tutoring experience section.

Part I: Survey Items

Please respond to the below statements by circling the number that reflects the extent to which you agree or disagree with each statement. For current tutors, think about your experiences so far. For former tutors, think back on your experience while in the tutoring role. Below is the 5-point Likert scale that should be used when rating the statements.

1= Strongly Disagree
2= Disagree
3= Neither Agree nor Disagree
4= Agree
5= Strongly Agree

1. Serving as a peer tutor increased my self-confidence.
   1 2 3 4 5
2. Serving as a peer tutor improved my academic performance.
   1 2 3 4 5
3. Serving as a peer tutor improved my communication and listening skills.
   1 2 3 4 5
4. Serving as a peer tutor improved my time management skills.
   1 2 3 4 5
5. Peer tutoring gave me feelings of fulfillment and accomplishment.
   1 2 3 4 5

6. I developed a better sense of responsibility through my peer tutoring position.
   1 2 3 4 5
7. Being a peer tutor allowed me to develop more patience.
   1 2 3 4 5
8. Being a peer tutor helped me be more aware of the learning process for myself.
   1 2 3 4 5
9. Being a peer tutor helped me be more aware of the learning process for my tutees.
   1 2 3 4 5
10. My experience as a tutor helped me develop social skills, such as working with diverse groups and empathy skills.
    1 2 3 4 5
11. Being a peer tutor made me feel more connected to the college.
    1 2 3 4 5
12. I believe that the skills I gained from being a peer tutor will benefit my future professional life.
    1 2 3 4 5

Part II: Demographic Information

Gender: Male___ Female___Nonbinary/Third Gender_____
Prefer to Self-describe _____ Prefer not to respond _____

Academic Level: Freshman Sophomore Junior Senior

Primary Tutoring Area:

Writing/Humanities _____
Social Sciences _____
Math _____
Science _____
Business _____
Agriculture/Natural Resource Management _____

Race: White/Caucasian Black/African American Hispanic/Latino
Asian/Pacific Islander Other Multiracial Prefer not to respond

Years Served as a Tutor at ABAC:
Less than 1 year 1 2 3 4+

*Note: The survey was created in the online Qualtrics software tool. The questions and answers have been replicated here, but the formatting and presentation are different.

Appendix B
Survey Item Grid

Research Questions:

1) What are the perceptions of peer tutors regarding the influence of the tutoring experience on their academic performance, and their skillset gains (i.e., self-confidence and fulfillment and social and professional skills)?

2) Is there a statistically significant difference in these constructs with more experienced tutors?

Survey Item	Item Topic	Research Literature
2, 8, 9	Academic performance and learning	Al Kharusi (2016); Galbraith & Winterbottom (2011); De Backer, Van Keer & Valcke (2012); Fiorella & Mayer (2013); Dioso-Henson (2012)
1, 5, 11	Self-confidence and fulfillment	Al Kharusi (2016); Iwata, Furmedge, Sturrock & Gill (2014); DeFeo & Caparas (2014)
3, 4, 6, 7, 10, 12	Social and professional skills	Al Kharusi (2016); Arco-Tirado, Fernandez-Martin & Fernandez-Balboa (2011); Dioso-Henson (2012); Brannagan, Dellinger, Thomas, Mitchell, Lewis-Trabeaux & Dupre (2013); DeFeo & Caparas (2014)

Book Review: *Learning Strategies for College and Career* (3rd Edition)

Book Review

Campbell, R., & and Hettich, P. (2018) *Learning Strategies for College and Career* (3rd ed.). Redding, CA: BVT Publishing.

Reviewed by Jennifer Rowe, Trinity University

Primarily a textbook for undergraduates enrolled in student success courses, *Learning Strategies for College and Career*, 3rd. ed. provides a how-to guide for students navigating the college landscape. Written by Rebecca Campbell, Professor of Educational Psychology at Northern Arizona University and Paul Hettich, Professor Emeritus at DePaul University, the text also reflects the wave of recent research in the field of learning theory and educational psychology, picking up on the concepts of growth mindset, help-seeking behavior, and resiliency, among others.

The authors differentiate their textbook from others in the genre by offering a unique student success model, which frames the content and provides students with a concrete process for meeting their own personal and academic goals. The model, "Seven Qualities of Successful Students," or SQSS, argues that successful students share similar qualities; they are "motivated", "reflective", "strategic", "healthy", "responsible", "constructive", and "connected" (p. 17). These qualities drive the organization of each chapter and are referred to repeatedly as Campbell and Hettich emphasize their thesis that "in order to have successful experiences, [students] need to intentionally act in a manner consistent with qualities that lead to success (p. 16).

The format of the textbook is traditional, with chapters following a logical trajectory from introductory matters to deeper dives into learning theory and practice. Chapter 1 provides an overview of the SQSS model, with chapters 2-5 covering motivation,

time-management, help-seeking behavior, and, finally, self-management (which includes, rightly, non-academic factors such as sleep, stress, and general wellness). Chapter 6 addresses how students can translate college skills for the workplace before the authors pivot back to campus in chapter 7 to discuss course enrollment, advising, and reading the syllabus. Chapters 8-12 focus on how students can maximize their performance (1) by reading, studying, and note-taking more efficiently and (2) by positively responding to feedback on tests and assessments.

Learning Strategies for College and Career, now in its third edition, has remained in print for a reason: it offers a workable and up-to-date curriculum for instructors of college success courses. The book is well suited to a younger college audience, particularly those first-year students who struggle with the transition from high school to college, but it would also be useful to those students transitioning to campus from the workplace or trying to bounce back from academic probation. As with most textbooks on this subject matter, (See Christine Harrigan's *Student Success in College: Doing What Works!* or Skip Downing and Jonathan Brennan's *On Course: Strategies for Creating Success in College, Career and Life*, for example) the chapters are organized such that an instructor could pick and choose sections for a syllabus as well as teach concepts out of order. Each is clearly labeled with separate learning goals and framed with a self-assessment and reflection prompt to facilitate the types of metacognitive awareness that the authors encourage. The useful balance of concrete activities (assessments, quizzes), straightforward content, and thoughtful reflection prompts will allow instructors the best chance to have dynamic class discussions about such material that some students (woefully) resist deeply engaging with.

This edition also includes timely updates that reflect important changes to the language of success on today's campuses. For example, the new sections on help-seeking behavior, resiliency toward feedback, and self-management are likely to resonate with students fresh out of orientation programs stressing the same concepts. Those looking for an in-depth discussion of retrieval practice, distributed learning, or interleaving may find themselves wanting. The concepts are indeed embedded or implied in the chapter on

"Thinking & Remembering" and elsewhere but are not particularly highlighted with the type of precise vocabulary that some instructors might desire. Their absence did not bother this reviewer; in fact, I appreciated the authors' more urgent focus on the "higher-level, deep learning that facilitates comparison, application, analysis, and evaluation" (p. 245). To this end, there are some standout activities to be found throughout the book. In Chapter 10, after an overview of note-taking, the authors show how to translate fact-oriented notes into higher-level test questions that prepare students to analyze, compare, and contrast the material rather than simply remember it. In Chapter 12, a useful chapter on "Assessment & Test Taking" somewhat tucked away at the end of the book, there is an excellent diagram that aligns "essay action verbs" from sample test questions with the thinking levels of Bloom's Taxonomy (p. 384).

A clear highlight of the text is Chapter 5, "Strategic Self-Management," with its clear, engaging discussion of how emotions and distorted thinking patterns affect academic performance. Notably, it approaches the concept of mindfulness in a way that eschews the trendiness of the term (thankfully, there are no pictures of students meditating on a hillside here) and focuses on how students might develop better responses to the negative feelings they encounter. Developing these better responses, the authors argue, "will enable [them] to act in a way that is more consistent with their plans and goals" (p. 132). While some of the graphics in the chapter lack clear worth, such as the "Vocabulary of Feelings" (p. 133), which is a simply a grid of faces expressing various emotions from embarrassment to anxiousness, others, like "Stages of the Stress Reaction" (p. 141) and the table of "Distorted Thinking Styles" (p. 144) should be reproduced and handed out to every student entering college. The latter, in particular, provides a well-organized and efficient to-do list for confronting negative thoughts and experiences.

As for other sections of the text, they offer unsurprising, but robust and well-organized introductions to the habits of successful college students. Instructors could design particularly useful class sessions around Chapter 3, "Taking Charge of Your Time," which provides clear, concrete activities for calendar making that would help students visualize their semesters. I imagine students who learn this

method may internalize its simplistic approach to time management. Chapter 7, likewise, presents a clear guide for evaluating one's environment for studying and learning, asking students to consider the concrete cues of their surroundings and to organize study time in productive locations. This chapter also offers a great, specific plan for writing emails to professors and supervisors (p. 197).

The Student Success Showcase, Connect to Campus, Connecting to Your Career, and Closing Comments sections were probably the least useful parts of each chapter, as they are likely to be overlooked in discussion and seem a bit superfluous on a first reading. Though they may offer useful points of discussion to some, they have the effect of pulling focus from the chapters' main ideas. The visual design, similarly, might seem dated to the savvy college student, weary of textbooks and cliched images, a common feature of textbooks in this genre, which is surprising since the content could easily be repackaged in a more readable, shelf-friendly volume that students might save, revisit, and reflect on throughout their education.

In the final review, *Learning Strategies for College and Career* offers a strong, comprehensive introduction to the various ways students might carve out successful paths in college. Given the strength of the text's discussion of distorted thinking, I found myself wishing they had engaged with the role of social media on students' mental well-being, given what we know about its pernicious effects on self-esteem, focus, and overall stress level (Rosenberg). Conversely, I was thankful for the omission of "grit" as part of the text's vocabulary, as it is so often misunderstood and misused by educators in ways that mask inherent social, economic, and racial inequities (Denby) or that take, as Harvard education professor Jal Mehta argues, a "heavily impoverished view of human motivation." The SQSS model, while maybe not convincingly unique, is a good frame to keep the content focused on actions that students themselves have control over, and in this way, the text is empowering. Indeed, instructors previewing other texts like the Harrington or Downing & Brennan will find this text a worthy competitor.

Note: This review is of the softcover textbook only. There are other options, including online, loose-leaf, and customizable versions, some of which come packaged with online instructor supplements and student resources (questions, flashcards, and PowerPoint Slides) that may add to the appeal of the text for some.

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Book Review: *Everything You Ever Wanted to Know About Learning Centers (And Then Some)*

Book Review

Turrentine, P. (2019). *Everything you ever wanted to know about learning centers (and then some)*. Dunedin, FL: H&H Publishing.

Reviewed by Donna L. Fenton

Student success in higher education is a national conversation that reverberates through regions, communities, and families. As colleges and universities recognize student support programs are necessary to facilitate academic success, many have created learning centers and an increasing amount of institutions plan to establish their own (p.1). Turrentine's *Everything You Ever Wanted to Know About Learning Centers (And Then Some)* provides higher education professionals with a guide to develop and operate new learning centers on their campus. It is especially targeted toward postsecondary education professionals who have no experience with learning centers. The task Turrentine's audience is charged with is complex, indeed: No two collegiate learning centers look alike, offer the same services, or serve the same student population(s). The author's confident expertise ameliorates these variables, serving as a consultant for the reader's charge. Throughout this volume, Turrentine advises collaboration, encourages further exploration of relevant topics, shares her own observations, and wisely defers to scholars in a variety of fields for essential best practices.

The thesis of *Everything You Ever Wanted to Know About Learning Centers* is: Creating and operating a learning center is an achievable goal. To convince her audience their mission is undergirded, Turrentine deftly curates and illustrates examples of existing support in a myriad of forms: national standards, historical and ongoing research in learning support and related fields, and active communities of practice. To urge readers into action, the author empowers them with well-organized and detailed facets of the

operation.

The cadence of *Everything You Ever Wanted to Know About Learning Centers* complements the task at hand; background visits precede and prepare readers for the forge ahead. The first two chapters provide a sturdy preamble for the reader's mission. "History" establishes the timeline of student support concurrent with the legacy of higher education. "Defining Learning Centers" helps readers envision unique learning center iterations suitable for their campus. The author presents properties common to learning centers, describes learning center types from Kerstein's Taxonomy of Learning Support Services, and encourages readers to consider characteristics of their new learning center, likely a hybridization of existing sorts.

Turrentine masterfully dials up the tension in the next three chapters which reflects the countless components to consider. In "Establishing a Learning Center," Turrentine wisely advises the reader to comply with national standards set forth by the Council for the Advancement of Standards (CAS) and the National Organization for Student Success (NOSS). She also discusses Christ's best practices, which aptly foreshadow the rest of her book. In "Learning Center Facilities," the author lists Brown's general design principles, then branches into particular choices including color and lighting, flooring and acoustics, and equipment and software. The tension culminates in "Programs and Services," Turrentine turns to Maxwell's 14 functions to supplement her encouragement to readers as they make the calls, including decisions about tutoring, supplemental instruction, diagnostic testing, and online presence.

The next two chapters are just as critical, but brief and directive. "Brokerage and Partnerships" emphasizes a tenet that is mentioned throughout the book: Build constituents on campus. Faculty advisory boards are strongly recommended. In "Management and Staffing", Turrentine covers considerations related to hiring, training, certifying, and managing professional colleagues and tutors.

The remaining four chapters focus on learning center activities one should establish during the mission and continue throughout stages of continuous improvement. "Professional Development and Recognition" recommends many resources in the

form of educational opportunities, organizations, and professional conferences. "Evaluation of the Learning Support Center" discusses the evaluation process, benchmarking, and best practices; data generation and analysis are briefly mentioned. The final chapter, "Challenges and Opportunities" touches on the changing landscape in higher education including distance learning assistance and non-traditional students.

Penny Turrentine, Ph.D., is a seasoned practitioner, scholar, and author who served in learning assistance and student support fields for over thirty years. A member of the Council of Learning Assistance and Developmental Education Associations (CLADEA), she is credentialed with their highest honor of Fellow (H & H, 2020; Walker, 2016). Her contributions to Learning Support Centers in Higher Education (LSCHE) and College Reading and Learning Associated (CRLA) are notable (Walker, 2016). Turrentine's expertise is evident throughout her book; she often illuminates her confident recommendations with personal anecdotes from real-world experiences; she also shares pertinent examples from her colleagues' practices. The combination of her voices (expert, practitioner, and fellow professional) not only adds interest to this handbook but also empowers the reader to make informed learning center decisions.

Turrentine tags her intended audience as higher education professionals who are tasked with establishing and operating a new learning center. However, her practical audience lies well beyond these parameters. Learning centers at any age and stage are dynamic; directors regularly seek to adjust their services, expand their staff, or re-assess their operation; and learning center staff (new and tenured) frequently pursue new avenues of professional development. For these reasons, Everything You Ever Wanted to Know About Learning Centers is a valuable guide for all learning center professionals. Despite the absence of writing center coverage, readers of *The Learning Assistance Review* (TLAR) would likely agree this is a relevant and useful resource; they and their team will refer to its comprehensive chapters often.

While *Everything You Ever Wanted to Know About Learning Centers* is unique in its target audience (directors of new learning centers), other books cover similar topics in different formats. Sanders,

Reedy, and Frizell (2018) chose to present learning center topics in a collection of heartily referenced essays. The size of their book (552 pages) and their style choice allowed additional trends in learning support fields to be captured like bridge programs, early alert systems, and academic coaching (Sanders et al., 2018). The Association for the Coaching and Tutoring Professionals, formerly ATP, mirror this expansion; both peer coaching and academic coaching were added to their organization with their 2018 name change (ACTP, 2019). Sanders et al. (2018) also provide discussions on and directions for securing learning center funding, an important subject for new and tenured learning center directors alike.

Everything You Ever Wanted to Know About Learning Centers captured nearly every pertinent topic in the fields of learning assistance and student support. This book also advises new learning center directors to stay current on new and established literature through resources like the website provided by Learning Support Centers for Higher Education (LSCHE). However, in a book replete with a wide range of ideas, lists, and resources, practical ways to conduct empirical research within a learning center was not robustly represented.

Quantitative and qualitative data were briefly mentioned; survey research was only discussed as a qualitative too; educational instruments were labeled expensive. Inquiries of learning center activities could be examined with quantitative designs including experimental, correlational, and survey research (Creswell, 2012). Similarly, applicable qualitative designs could include phenomenology, grounded theory, case studies, and narrative research (Creswell, 2012). Further, designs that incorporate both quantitative and qualitative data like mixed-method and action research could be appropriate (Creswell, 2012).

Qualitative data sources that were not discussed include observations, focus groups (they were mentioned as an assessment tool), and semi-structured interviews (in-depth interviews were deemed too time-consuming). All of these would provide rich data sources for a qualitative or mixed-methods study (Creswell, 2012). Many instruments used in higher education correlation studies and survey research can be obtained at no cost, existing instruments

can be modified and field-tested, or instruments can be created and peer-reviewed (Creswell, 2012). While conducting research is time-consuming and may likely require targeted staffing, it is recommended by most of Turrentine's highlighted organizations. Further, inquiry can provide meaningful intra-campus and inter-campus collaborations, activities that the author strongly encourages.

Turrentine was extremely successful in fulfilling the overall purpose of *Everything You Ever Wanted to Know About Learning Centers*. She states, "the primary purpose for writing this book is that many individuals working in higher education suddenly find themselves charged with creating a learning center having had little or no experience in providing formal learning support services" (p. 132-133). Within this accomplishment, the most outstanding feature for this reader are examples of stand-alone chapters including Chapter 3, "Establishing a Learning Center" and Chapter 5, "Programs and Services." Further armed with three hefty appendices, "Promising Practices," "Essential Readings from CLADEA," and "Tutor Training Bibliography," this handbook becomes anchored as a must-have for not only new learning center directors but also professionals of any tenure who work in student assistance. *TLAR* readers are aware that establishing and operating a learning center requires careful consideration of a countless array of factors. They will feel comfortable for their newer staff members to be guided by Turrentine's richly dense handbook. A follow-up book would be welcome and could include a similarly styled and curated text about how learning assistance affects specific populations like first-generation students, student-athletes, and non-traditional students; how learning centers present in different types of higher education institutions like small liberal arts colleges, large research universities, and community colleges; or examples of recent learning assistance research. Regardless of the area explored, Turrentine's voice is welcome and would add to scholarly discussions about supporting students' learning.

Higher education professionals recognize the importance of providing academic support to students. An action item often chosen to enhance student success is the creation of a learning center. Turrentine identified possible gaps in experience and background

between new and tenured learning center directors. It is important for experienced practitioners to reach out to newer colleagues in any field. Turrentine has done just that for learning assistance. *Everything You Ever Wanted to Know About Learning Centers* will help higher education staff deliver quality support as they continue to enhance student success.

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Assessing Academic Strategies in College Learning Centers: Considerations for Scholarly Practitioners

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Abstract

As learning center professionals, we have much to gain by conducting assessment to understand how our services help college students develop their academic strategies. The type of data we collect makes a difference in the interpretations we can draw, however. An initial step in becoming a scholarly practitioner is to consider the strengths and limitations of different data sources for assessment purposes. This review article discusses how self-report questionnaires, interviews, think-alouds, and study diaries can contribute unique insights into students' academic strategies. Also, it suggests guidelines for evaluating the suitability of various methods in light of assessment contexts, questions, and goals.

Assessing Academic Strategies in College Learning Centers: Considerations for Scholarly Practitioners

Academic strategies refer to the skills, tactics, and methods that students select and apply to attain learning goals. Martha Maxwell (1979), an early advocate of learning center research and practice, was among the first scholars in the area of college student learning to underscore the importance of ascertaining how students come to use academic strategies. This topic continues to hold relevance today as learning center administrators are called to account for the value of the services we provide. Collecting data for assessment purposes allows us to gauge students' initial academic strategies (to identify needs our centers can address) and to measure growth (to document the changes our centers foster). By making informed choices about what data to collect, learning center administrators work toward the goal of becoming scholarly practitioners, that is, those who conduct

scholarly work to understand and share the experiences of the students we serve (Hatfield & Wise, 2015). A first step in this process is to discern the trustworthiness, assumptions, and potential biases of the information we gather about students' academic strategies. This awareness equips us to be informed consumers of the assessments we review and thoughtful designers of the assessments we plan.

This article will review the purposes, strengths, and limitations of four distinct approaches to assessing academic strategies. It will begin with self-report questionnaires, the most commonly used approach in prior decades (Pike, 2011; Winne & Perry, 2000). It will then turn to three assessment methods that go beyond the questionnaire: interviews, think-alouds, and study diaries. To conclude, the article will provide guidelines for thoughtfully selecting a data collection method based on the purpose of the assessment.

Self-Report Questionnaires

Self-report questionnaires (e.g., surveys, scales, instruments, or inventories) are a commonly used quantitative measure of students' academic strategies. They can be used to demonstrate changes in strategies, as is often the case with educational interventions (Bail, Zhang, & Tachiyama, 2008), or to enhance theoretical understanding of academic strategies based on their connections to other beliefs or behaviors that are relevant to students' learning and motivation (Boekaerts & Corno, 2005). The two most commonly used measures are the Learning and Study Strategies Inventory (LASSI; Weinstein, Simmerman, & Palmer, 1988) and the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1991). Both measure learning in terms of motivational, cognitive, metacognitive, and behavioral components (Zimmerman, 2008) and are recommended due to their high reliability and validity (Credé & Phillips, 2011; Griffin et al., 2012). Reliability refers to internal consistency and provides a way to gauge whether the items comprising a scale measure the same construct in the eyes of the respondents; validity refers to how well something measures what it purports to measure (Creswell, 2005).

The LASSI (Weinstein et al., 1988) is a questionnaire primarily used to identify strengths and weaknesses in students' approaches

to learning. The academic strategies assessed by the LASSI include information processing (i.e., connecting or organizing concepts), concentration, selecting main ideas, testing oneself, using study aids, and managing time. The LASSI has been administered to national samples and provides standardized norms (Weinstein & Palmer, 2002). The inventory has test-retest reliability of .88, and eight of ten subscales have coefficient alphas above .80, suggesting high internal consistency among the items (Weinstein & Palmer, 2002). The scales of the LASSI have acceptable concurrent validity with other scales measuring similar constructs (Weinstein et al., 1988), predictive validity of performance measures (e.g., GPA; Weinstein, 1994), and face validity with practitioners in the area of collegiate learning services (Weinstein & Palmer, 2002). The LASSI is considered an "excellent instrument" for these reasons (Pintrich & Johnson, 1990, p. 86) and is used primarily in practical, diagnostic settings.

A second common questionnaire is the MSLQ (Pintrich et al., 1991), which measures cognitive strategies (e.g., rehearsal, elaboration, organization, and critical thinking strategies), metacognitive self-regulation (i.e., the setting and monitoring of learning goals), and resource strategies (e.g., regulating effort, managing time, seeking help, and learning from peers). Developed over a three year period that included pilot testing, factor analysis, and gradual refinement of items (Winne & Perry, 2000), the MSLQ is a widely available instrument with an accompanying manual. A meta-analysis of the use of the MSLQ in 67 independent college-student samples from seven countries and in various subject areas revealed that five of the scales had high mean reliability across studies: elaboration, organization, critical thinking, metacognitive self-regulation, and time and study environment (Credé & Phillips, 2011).

The MSLQ is also a solid choice in terms of its concurrent and predictive validity. Researchers showed positive correlations between the academic strategies measured by the MSLQ and college students' perfectionism (Mills & Blankstein, 2000), procrastination (Wolters, 2003), and levels of motivation over the semester (Zusho et al., 2003). In an early study describing the predictive validity of the MSLQ, Pintrich, Smith, Garcia, and McKeachie (1993) reported that the scales measuring resource strategies, elaboration, organization,

critical thinking, and metacognitive self-regulation had positive correlations with course grades, with correlation coefficients ranging between .17 and .30. Credé and Phillips (2011) concluded, "the MSLQ appears to capture many of the most important constructs that are central to self-regulated learning and should, therefore, be valuable for future investigations of self-regulated learning" (p. 344).

Strengths of Self-Report Questionnaires

One of the primary attractions of self-report measures, particularly when administered via survey research methods, is that they make relatively low demands on time and financial resources. They are straightforward to administer and interpret, and they lend themselves well to electronic distribution and nearly immediate transfer to statistical analysis software (Lavoie & Pychyl, 2001). Self-report questionnaires draw data from a large number of respondents and have fairly generalizable results, particularly when using random, representative, and clearly defined samples (Creswell, 2009). In such cases, self-report questionnaires make up for a lack of depth through their breadth and external validity; in other words, their results provide information regarding how students with similar characteristics to those in a given study would use academic strategies.

Self-report questionnaires lend themselves well to comparison across studies using meta-analysis (e.g., Credé & Phillips, 2011) and through the application of generally accepted criteria regarding reliability and validity (Creswell, 2005). These self-report measures enable scholarly practitioners to investigate specific relationships among various academic constructs (Hofer, 2004), examine differences between groups (Pike, 2011), and study individual differences (Bembenutty & Karabenick, 1998). Pike (2011) argues that self-report data are appropriate for research on college student learning when they are rooted in theory and subject to validity studies. The LASSI (Weinstein et al., 1988) and MSLQ (Duncan & McKeachie, 2005; Pintrich et al., 1991), for example, were developed based on self-regulated learning, information-processing, and motivation theories and research. Additionally, they have been created and tested by preeminent scholars in these areas. The constructs they purport to measure have undergone pilot testing and revision,

typically have acceptable levels of reliability, predict achievement fairly well, and are associated with related constructs yet distinct from dissimilar ones (Pintrich et al., 1991, 1993; Weinstein, 1994; Weinstein et al., 1988). Importantly, not all self-report measures of academic strategies have been tested or connected to theory in equally convincing ways (Wigfield & Eccles, 2000). In addition, researchers should keep in mind that reliability should be calculated for each sample and is a characteristic of the scale only in light of the sample being assessed (Wilkinson & The Task Force on Statistical Inference, 1999). Without these considerations, the limitations of self-report questionnaires can outweigh their benefits.

Limitations of Self-Report Questionnaires

Perhaps the most commonly heard critique of questionnaires is the absence of behavioral measures to corroborate the students' self-reports of the strategies they use. Calibration, "the match between students' self-reports about study tactics and their actual use of tactics," is often assumed but may be lacking (Winne & Jamieson-Noel, 2002, p. 553). Perfect alignment with actual behavior and perceptions cannot be expected from self-report questionnaires. Although some studies have reported alignment between self-reported learning and objective measures of learning (Carini, Kuh, & Klein, 2006; Pike, 2011), other research on self-report questionnaires shows that self-reported behaviors often fail to map onto actual behaviors (Bowman, 2010).

It can be difficult for students to accurately report their academic strategies, and not for a lack of trying. Engaging in introspection for self-evaluation can be mentally taxing (Bowman, 2011) and can reduce the accuracy of self-report data due to "an inability to correctly introspect" (McIntyre & Munson, 2008, p. 238). Although errors can occur in either direction, the tendency is to be overly optimistic. With self-report measures, a factor that can skew students' estimation of academic strategy use is the halo effect (Bowman, 2011). The halo effect occurs when students who generally see their performance in a positive light overestimate their performance in specific areas.

Another possible explanation for miscalibration is that

students intentionally misrepresent their academic strategies. When some answers appear more in line than others with what "good" students do, social desirability bias may occur (Bowman & Hill, 2011). When students recognize certain patterns of strategy usage as desirable, they may report using these strategies frequently while underreporting the strategies they perceive as less desirable. Emphasizing to students that responses will be anonymous and that there are no right or wrong answers may somewhat lessen these sources of error (Norton et al., 2001). Additionally, administering a social desirability measure can aid researchers in determining whether this source of bias substantially changes results (Duncan & McKeachie, 2005).

Another critique of self-report questionnaires is that they have a limited range of responses and may thus only provide surface-level insight into which strategies students use. Boekaerts and Corno (2005) also caution that many questionnaires were developed based on the behaviors of successful students. They may have limited relevance to the strategies of less successful students, restricting what questionnaires can reveal about ways to help students become more successful. On a related note, it is important to acknowledge that most self-report measures begin by approaching the assessment or research question with a specific lens; they gather specific data and, ultimately, may only answer a limited range of questions (Eisner, 1998).

Studies primarily relying on self-report questionnaires have established much of what is known about students' academic strategies, yet they have limitations about how accurately and deeply they portray how students perceive—and use—these strategies. Although self-report questionnaire data provide concrete and efficiently summarized insights, the numbers may not be telling the whole story, and the items in questionnaires may miss much of the nuance associated with the use of academic strategies (Hadwin et al., 2001).

Interviews, Think-Alouds, and Study Diaries

Qualitative methods that take us beyond the questionnaire enhance what is known about students' academic strategies through

first-person accounts, real-time descriptions, and artifacts of learning. Interviews, think-alouds, and study diaries provide richness of detail and flexibility of response options. These methods have the potential to delve deeply into questions of how and why students use or fail to use, certain strategies as well as what meaning these decisions hold (Eisner, 1998). The following section will describe the purpose, strengths, and limitations of three methods that provide an alternative to questionnaires.

Interviews

Interviews are a dialogic approach used to gather insights into students' experiences and perspectives. Through carefully designed interviews, researchers can uncover patterns in students' approaches to learning, investigate students' stories of development, or focus on the perceptions students have about certain topics (Butler, 2006). Qualitative interviews allow researchers to take an inductive approach to generate ideas, patterns, and perceptions from the perspective of the student (Creswell, 2009). This is in contrast to the deductive approach associated with self-report questionnaires, in which researchers collect data to test theories and hypotheses (Cheek et al., 2004). Particularly when little is known about a concept or how a specific population experiences it, interviews provide a means to portray the voice of students and discover students' understanding of concepts (Suskie, 2009). Qualitative interviewing can be viewed as an approach that fills in the gaps about what is known about student learning (Suskie, 2009), particularly through the use of open-ended questions that allow researchers to uncover themes and patterns (Creswell, 2009).

Interviews can take several formats, ranging from structured to unstructured. On one end of the spectrum, unstructured interviews are a narrative approach to interviewing, in which students present their stories and the interviewer plays a minimal, unobtrusive role (Boekaerts & Corno, 2005). For instance, DeGroot (2002) used an unstructured approach in interviews that invited students to "tell me how you go about learning things for school" (p. 42). This approach offered the benefit of not constraining students' responses to any particular category, enhancing the likelihood of reflecting students'

actual academic strategies. It "allowed students to tell their own stories in their own way, yielding rich descriptions of themselves and their experiences that…could not have been obtained in any other way" (p. 50). However, unstructured interviews rely heavily on a skilled interviewer who can refrain from directing the interview and who does not make assumptions regarding shared understandings (De Groot, 2002). Another limitation can be the difficulty in comparing strategies across students or not uncovering details that a student would have shared if prompted.

On the other end of the spectrum, structured interviews involve a specific list of predetermined, ordered questions that build upon one another (Boekaerts & Corno, 2005). Structured interviews have been used to investigate the critical thinking strategies that students use when writing research papers, with the intent of understanding specific aspects of how students choose data sources and progress in their research processes (Whitmire, 2003). The use of standardized questions permits relatively efficient analysis related to specific areas of interest, and less intensive training is required for this method (De Groot, 2002). A drawback is that the strict order of the protocol can lead to unnatural shifts in topics that forestall in-depth exploration of a topic or the natural unfolding of understanding. Additionally, the predetermined list of questions limits the areas that can be addressed (De Groot, 2002). Van Meter, Yokoi, and Pressley (1994) worked around this limitation in their investigation of students' perceptions of note-taking by conducting multiple phases of interviews, with each phase informing the questions that would be asked in the subsequent phase.

Semi-structured interviews provide a middle ground between structured and unstructured interview approaches. Interviewers have a list of possible questions and follow-up prompts, and each interview may take a different direction depending on the information a student reveals (Boekaerts & Corno, 2005). The questions an interviewer asks typically focus on thoughts, feelings, and strategies related to specific facets of a learning environment (Boekaerts & Corno, 2005). For instance, in a study of engineering students' approaches to learning, interviewers asked open-ended questions such as "Can you tell us about the way you have been

studying in this class?" and "What have you really been trying to achieve in terms of learning in this class?" (Gynnild, Holstad, & Myrhaug, 2008, p. 150), allowing students, in their own words, to describe a range of strategies and the intentions behind them. With a list of potential questions and prompts, there is more flexibility in semi-structured interviews as compared with structured interviews; there is also a clearer area of focus, though less possibility of coming across unanticipated insights, than with unstructured interviews.

Focus group interviews extend the characteristics of individual interviews to a group setting. When facilitating focus groups, researchers typically employ a semi-structured protocol to address specific topics of interest while using follow-up questions extensively to gauge the level of consensus and seek out differing viewpoints (e.g., Gullifer & Tyson, 2010). Focus groups are especially well suited to assessing student needs and opinions, and the data gathered can inform practice and policy (e.g., Collier & Morgan, 2008). A primary benefit of the group format is that it enables students to respond to and build upon other students' remarks. Because the quality of information gathered will depend greatly on the group dynamics, however, researchers must exercise special care to invite multiple perspectives into the conversation and to sequence introductions and questions in a way that builds rapport and trust (Bogdan & Biklen, 2003).

Think-Alouds

Think-alouds are a method in which a student articulates their thinking while performing an academic behavior, such as reading or studying. Action and reflection occur at the same time in an attempt to externalize the thoughts and feelings that accompany academic strategies. The thinking occurs at the same time as the event, rather than being retrospective or hypothetical, unlike most other self-report measures (Schraw, 2010). As a concurrent report, think-alouds provide "more accurate and valid indicators of mental activity than retrospective reports" (Schraw, 2010, p. 262). With a focus on students' verbalized thoughts, Pressley (2000) studied the strategies students used while reading, and Hofer (2004) examined students' critical thinking strategies and activation of epistemological beliefs

as they conducted online searches for information for a simulated research paper. Such studies have been used to gain insight into what students do when they are learning and what their related thought processes are.

Think-alouds also can be used to determine which strategies relate to effective comprehension. For instance, Greene and Azevedo (2007) found that students' descriptions of the use of certain academic strategies when learning anatomy (e.g., making inferences, creating analogies, connecting ideas across sources) were positive predictors of their comprehension, as reflected in a model of the circulatory system each student produced. With the think-aloud method, researchers study academic strategies "as an activated situated aspect of cognition" (Hofer, 2004, p. 44). What is more, think-alouds provide access to thinking strategies and processes that may be difficult to ascertain through questionnaires (Hofer, 2004).

That the think-aloud method occurs in real-time means that it is less susceptible to poor memory or inaccurate predictions of how a student would act (Boekaerts & Corno, 2005). But the cognitive load of think-aloud research can be quite high. Schraw (2010) notes this concern as stemming from the approach's nature as an "obtrusive measure … [that] potentially may interfere with information processing because it competes for limited resources" (p. 259). In other words, verbalizing thoughts and feelings can interfere with using the actual strategies, and bringing thoughts and feelings to the forefront may interfere with the direction academic strategies might otherwise take (Boekaerts & Corno, 2005). This tendency is less of a concern for experts than for novices; in this sense, the think-aloud method may be more effective for studying the academic strategies of successful students who consistently use effective cognitive and metacognitive strategies than it is for students who do not tend to intentionally use these sorts of strategies. A concern pointed out by Winne and Perry (2000) is that "there is little … standard information about measurement properties of the think-aloud protocol" (p. 550). This is not to say that think-alouds lack reliability and validity, only that more care must be taken to ensure these qualities than with established methods.

Study Diaries

Study diaries provide an objective record of students' study behaviors and often combine behaviors with associated reflections. Having students keep records of their study methods provides an alternative measure of behavior that may be more accurate and thorough than questionnaires, as it allows students to provide details that may not be accounted for with closed-ended items.

One way to utilize study diaries is as a record of the activities in which students engage. During a specific period (e.g., a week, a semester), students provide information regarding the timing and duration of specific study activities (Vacha & McBride, 1993). Another option is for students, daily, to record the amount of time on study-related behaviors and leisure behaviors (Hensley et al., 2018). Although this information is self-reported by students, the minimal delay between behavior and its measurement makes such methods more conducive to accurate self-observation than self-report questionnaires are. Researchers can then use this information to quantify students' strategies as being reflective of a certain time usage pattern, such as cramming (Vacha & McBride, 1993). Used in this manner, study diaries lend themselves to categorization and analysis. As time passes between the behavior and when it is recorded, though, accuracy can dwindle. Regularly updated time diaries (e.g., for multiple 24-hour periods) are likely to offer the best chance of accurate reporting, but they may involve extensive and time-consuming translation into a data set (Porter, 2011). Coding for core patterns (e.g., consistent wake time, consistent weekday studying) provides a more efficient method of comparing the tendencies among students, but a tradeoff of this approach is that it may not account for the full range of unique attributes in students' time use (Hensley et al., 2018).

With the more reflective form of study diary, students can describe which study strategies they used, as well as the thoughts and feelings they had about these methods (Boekaerts & Corno, 2005). Study diary data may be captured in either written or audio form. In a study of the development of self-regulated learning in a problem-based curriculum (Evensen et al., 2001), six medical students recorded 15-20 minutes of audio diary entries a minimum of three

times per week during a semester. In these entries, they described their plans for studying and their actual study behaviors, as well as reflections about the effectiveness of their strategies.

Reflective study diaries have several key benefits. They allow students to express their experiences in their own words, provide insight into metacognition, and present minimal time-lag between action and recollection (Boekaerts & Corno, 2005). The act of externalizing thoughts brings thoughts to the surface to "extract meaning from them" (Boud, 2001, p. 9), which may be particularly helpful for gaining insight into why, how, and when students use certain strategies. A drawback, however, is that some students may provide more or less extensive details than other students due to their differing levels of verbal fluency or writing efficacy, which may give the appearance of differences in strategies when the actual differences relate to communication skills (Boekaerts & Corno, 2005). An additional limitation is that the act of recording behaviors can influence them, causing them no longer to be a reflection of students' typical academic strategies (McLaughlin, 1976).

Selecting an Assessment Method

As scholarly practitioners prepare to assess academic strategies, it is important to consider the suitability of potential data-collection methods for a given purpose and context. For self-report questionnaires, perhaps the greatest benefit is their practicality, as they can be administered with relatively low cost and time investments and can be analyzed in established ways. However, it is important to consider reliability, validity, and design when using self-report questionnaires to avoid drawing conclusions that may not be warranted (Creswell, 2005). Particularly when multiple researchers are involved in multiple rounds of coding data and interpreting meaning (Jones et al., 2014), interviews, think-alouds, and study diaries can be analyzed in a rigorous manner that yields trustworthy findings. Accordingly, though, administrators must account for the time-consuming transcription, scoring, or coding processes that qualitative analyses often require (Porter, 2011; Schraw, 2010).

To have confidence in our assessments, scholarly practitioners also need to take care in discerning the quality of measurement. For

self-report questionnaires, researchers can measure and interpret overlap with, distinctness from, and prediction of other measures, guided by theory and existing research (Hofer, 2004; Pike, 2011). For interviews, think-alouds, and study diaries, reliability is often gauged by employing inter-rater or inter-coder agreement related to coded text segments. Although qualitative measures provide insights that can go beyond the scope of self-report questionnaires, those who use these approaches must be deliberate and transparent about what they do with the data once they gather them (Schraw, 2010; Winne & Perry, 2000). When evaluating qualitative evidence, scholarly practitioners must consider coherence, insight, and usefulness (Eisner, 1998), as well as credibility, plausibility, and applicability (Jones et al., 2014), to gauge the believability of the interpretations and evidence used to support them. Human interpretation and judgment, though imperfect, are important aspects guiding theory and research.

With any method, scholarly practitioners must be cautious about the potential for bias. For example, bias may occur when students have trouble describing their past or hypothetical behaviors accurately or intentionally skew responses to present themselves in a certain manner. Questionnaires may have one advantage in that researchers can account for social desirability through the inclusion of a narcissism scale or social desirability index (Bowman & Hill, 2011). Yet these methods still make assumptions about students' abilities to respond accurately when given pre-determined response options and are limited by the fact that they ask learners to juggle and consider all of the if-then possibilities about a certain academic strategy to choose a single response (Winne, 2010). Using qualitative methods, scholarly practitioners can uncover students' personal, subjective, detail-rich perspectives related to the use of academic strategies, which can be a benefit over self-report questionnaires with limited response options. However, intrusive measures such as the think-aloud approach and reflective methods such as study diaries may modify how students naturally engage in learning.

Conclusion

Eisner (1998) noted that "the questions we ask, the categories

we employ, [and] the theories we use guide our inquiry; indeed, what we come to know about the world is influenced by the tools we have available" (p. 28). It is important that we, as scholarly practitioners, acknowledge this point while making conscious decisions about both what insights we seek to gather and what questions, theories, and tools we will use to acquire these insights. Using a specific tool is not inherently better or worse than using another; it depends on the questions we seek to answer; the limitations we are willing to accept; and how we choose to connect findings to theoretical frameworks, draw inferences, and suggest practical significance based upon findings.

Determining the appropriateness of a given method is tied to whether the existing theory and research guide us to investigate specific hypotheses or to seek meaning more inductively (Pike, 2011; Pintrich, 2004). In terms of how useable a certain measure might be, Winne and Perry (2020) acknowledge that "measurements have varying degrees of utility for particular purposes" (p. 561). Ultimately, scholarly practitioners must ask questions such as: Why am I seeking to use this measure? What can, and can't, it tell me? What restraints and resources do I have? Each data collection method has a set of strengths and limitations that make it more suitable for answering certain questions and providing different kinds of insights than others. As such, we must ask what we want to accomplish when selecting measures and again when interpreting the data gathered by them. With this approach, we can strengthen the credibility of our learning centers' assessments as we contribute to the scholarly life of our institutions and profession.

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Meta-Talks: How a Supplemental Instructor Fosters Student Reflection through Everyday Data

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Author Note

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Abstract

We do not learn through experiences alone; we learn by thinking about our experiences. But after disappointing exam results, students can reflect on their performance in unproductive ways, circulating scripted beliefs about why they did poorly: "The professor talks too fast," "The test didn't cover the lectures in class," "I'm not smart enough." At Quinnipiac University, a supplemental instructor used accessible data to guide her first-year Biology students through a process of compelling metacognitive reflection after their tests so that the students could be less reactionary and more proactive in facing subsequent exams. This qualitative case study examines theory and practice regarding this step-by-step method, which can be

readily implemented in a variety of college-level programs invested in academic success.

Meta-Talks: How a Supplemental Instructor Fosters Student Reflection through Everyday Data

In 1910, educational theorist and philosopher John Dewey stated that we often say we *think* something when we merely *believe* it. Dewey distinguished between beliefs with no evidence or testimony to support them and "reflective thought," which he defined as a deliberate examination of the basis or evidence of a belief, a "conscious inquiry into [its] nature, conditions, and bearings" (Dewey, 1910, p. 2). Dewey dedicated his seminal volume on education, *How We Think*, to this process of reflection. Of reflective thought, he wrote, "It alone is truly educative in value" (Dewey, 1910, p. 2).

This case study examines the process by which a supplemental instructor, Erin Nash, guided her first-year biology students at Quinnipiac University through a process of reflection so that they could respond to their test grades with more productive behaviors, not merely react to them with disappointment based on unexamined beliefs about their learning, a response contrary to Dewey's vision of a full education. Seeing reflection as a process that makes "meaning of experience" (Bringle & Hatcher, 1999, p. 179), we could say that Nash's exercises in reflection helped her students create meaning from their test performance so that they could make productive decisions regarding studying and feel more control over the outcome of subsequent tests. Nash's reflection process mainly employed metacognition, or the monitoring, assessment, and evaluation of one's understanding to effectively control behaviors related to learning (Rhodes, 2019). Interestingly, experiences in metacognition require that students serve both as subjects conducting an inquiry and the objects of that inquiry, and this process requires that students think at multiple levels; for instance, considering not only the content of a test but their study behaviors, which manage that content with differing degrees of responsibility and efficiency (Rhodes, 2019).

A central tenet of the International Center for Supplemental Instruction at the University of Missouri, Kansas City, which provides the model for our supplemental instruction program at Quinnipiac University, is that supplemental instructors, or SI's, are peers to the students they assist (International Center for Supplemental Instruction, 2014). SI's effectively remember what it was like to be challenged in a course because they have taken the target class in a prior semester—recent history for most undergraduate mentors. Consistent with the International Center for Supplemental Instruction's model, the SI's at Quinnipiac University, known as "peer fellows," have earned top grades in the courses they support (International Center for Supplemental Instruction, 2014). Following that model, peer fellows each attend their target class once more with its current students. They take notes so that they can help students reinforce the most relevant concepts for group study sessions that take place voluntarily at least once each week. In their study sessions, which are open to all students in the supported course, peer fellows employ a collaborative model of learning in which students are expected to participate by offering questions, solving problems, and sharing their understanding of concepts with their peers (International Center for Supplemental Instruction, 2014). This collaborative setting offers an opportunity for students who may have passively received content in course lectures to translate that content into simpler terms, internalize it in memory, and apply it to real-life situations, thereby solidifying their understanding. Mastering a difficult gateway course for majors in a recent semester, attending the target course again and taking notes with its current students, and employing pedagogy consistent with the International Center for Supplemental Instruction's collaborative model all place peer fellows in a unique position to guide reflection for the students they mentor.

Background

Begun at the University of Missouri, Kansas City, in 1973 by Deanna Martin, supplemental instruction has a long record of demonstrated effectiveness in student participants' academic performance, especially when students attend SI study sessions regularly (Arendale, 1997; Kochenour et al., 1997; McGuire,

2006). Courses supported by supplemental instructors tend to be challenging, "high-risk" courses in those subjects in which there is a history of 30 percent or more students in the course receiving D's, F's or withdrawals (Congos & Schoeps, 1998, p. 49). Researchers in the practice of supplemental instruction have found that students who attend SI sessions regularly earn stronger mean final course grades and are retained at higher rates than those who do not attend, even when accounting for self-selection bias, or the tendency of higher-performing students to seek extra opportunities for learning (Hurley, Jacobs, & Gilbert, 2006; Congos & Schoeps, 1998, pp. 55-56).

For many students, threats to learning extend beyond cognitive difficulties. Anxiety and other mental health concerns in college students have posed a growing challenge nationwide in recent years (DeAngelis, 2019). In 2017, the American Psychological Association published statistics on the percentages of students entering college with significant mental health concerns. In that year, 36% of college students had lifetime diagnoses of mental health conditions, as opposed to two percent in 2007 (DeAngelis, 2019). Within those ten years, the number of students who received any mental health treatment rose from 19% to 34% (DeAngelis, 2019). These challenges, in addition to providing appropriate accommodations for students with disabilities and serving the general population, charge college and university learning centers with the monumental task of promoting student success across ever-widening populations.

Quinnipiac University is a private institution in Hamden, Connecticut, with 6,845 enrolled undergraduate and 2,863 graduate students. It should be noted that the Quinnipiac University Learning Commons robustly supports thousands of students in both the general population and in the cohort of students who have disclosed disabilities to its Office of Student Accessibility staff. For instance, the Peer Fellow Program, in which students voluntarily attend group supplemental instruction sessions that take place each week, served 1,432 distinct students who made 7,091 individual contacts with their supplemental instructors or peer fellows, through the fall 2019 semester, an average of 4.95 study sessions per undergraduate

student. Students who attend the Peer Fellow Program come from a wide variety of backgrounds across the university undergraduate population, which has seen an increase in student diversity in recent semesters. Twenty percent of undergraduates in the class of 2021 identify as first-generation students (Quinnipiac University, 2020). Twenty-one percent of individuals in Quinnipiac University's current first-year class self-identify as students of color (Quinnipiac University, 2020).

The 50 peer fellows at Quinnipiac University support mostly first-year students and sophomores across all levels of ability through their academic challenges and guide them in alleviating academic stressors. The peer fellows are hired by the Learning Commons to support twelve undergraduate programs, including Accounting, Biology, Biomedical Sciences, Chemistry, Mathematics, and Engineering. In two Sunday seminars and bi-weekly small-group appointments that occur throughout each semester, peer fellows undergo training in best practices and metacognition. A trouble-shooting component is woven into training throughout the semester so that peer fellows are well-equipped to handle the "what if" scenarios that inevitably arise in supporting a wide array of students.

Peer fellows must address students' mounting anxiety based on untested beliefs and assumptions about their level of knowledge and how understanding is achieved. Consistent with the "entity learners" developmental psychologist Carol Dweck (2006) discusses throughout *Mindset: A New Psychology of Success*, students may believe that they were not born with the necessary "gift" to excel in a particular course and that their grades are beyond their control. If a grade is poor, a student may conclude, "I can't do this. I'm not a math (or Biology or Chemistry) person," as if ability in a subject is an inherited or inborn entity that one either has or does not have (Dweck, 2006). When that assumption is collective, it may become a powerful shared belief among students, a dynamic that recalls Dewey's (1910) caution against taking more stock in beliefs than we should. In their training, peer fellows are equipped to acknowledge students' negative emotions with compassion, relate to their struggles, and reassure students (based on peer fellows' own experiences of struggle) that their choices can result in a more

successful outcome for the next test.

During her study sessions when students have reacted strongly to disappointing grades, Nash has often cited her initial difficulties with the content. "In fact," said Nash, a junior Physical Therapy major, "when I took BIO 101 my freshman year, I definitely had my own challenges. I remember struggling to learn the steps of photosynthesis, glycolysis, and the Krebs cycle. When I used that experience a number of times to help my students, it appeared to put them at ease a bit, knowing that they were not struggling alone." This compassionate approach, with a peer fellow relating to student struggle, is consistent with what Dweck (2006) called a "growth mindset," the belief that ability can grow with practice and effective strategy, undergirded by strong encouragement.

Peer Fellow Training

Cognitive psychologists Ryan and Deci (2000) noted that intrinsic motivation is predicated on emotions of belonging and connection that are not only experienced in infancy, as when a child's attachment to parents is crucial, but in varying settings throughout a subject's lifetime (pp. 70-71). Intrinsic motivation, the drive to accomplish a task that originates within a person regardless of tangible reward, is "more likely to flourish in contexts characterized by a sense of security and relatedness" (Ryan and Deci, 2000, p. 71). Peer fellow training recognizes that learning is not merely about cognition, but about emotion. The belonging and connection that students feel in the group study session is a powerful antidote to the growing fear (and in some cases, panic) that has characterized students' transition to college in recent years (Cox 2009, pp. 20-21).

To channel Dewey, while deliberately examining the basis or evidence of fear-inducing beliefs that result in negative emotion ("I'm stupid"; "this course is too hard for me"), peer fellows like Nash are trained to summon empathy. They foster relatedness in study sessions by recalling their own mistakes and by modeling specific study strategies that work more efficiently than the shallow methods students have often employed before these conversations took place. Peer fellows are trained to continually monitor the affect, or emotional atmosphere, of their study sessions to redirect students

when necessary and create the optimum space for learning.

The emotional monitoring that peer fellows are trained to employ calls to attention the power of cognitive biases of which students may have initially been unaware. Monitoring cognitive bias is an important step in metacognition, as unconscious biases are heuristics, or mental shortcuts, that can distort students' views of their performance (Dwyer, 2018). For instance, consistent with a self-serving bias, a student may reason that she failed a test because the teacher hates her, but when she does better, her higher grade is due to her competence (Dwyer, 2018). In another instance, a student may fall into confirmation bias, which entails gathering only that evidence that reinforces his untested beliefs. The student may claim, "He's too difficult to understand and everyone agrees with me," when he has discussed his teacher with only three of his closest friends who happen to agree with him. A student may also claim, "She [the professor] doesn't teach, care, or want us to pass, so I'm not going to," leading to increased perceived difficulty and often a self-fulfilling prophecy.

Regardless of the irrationality of students' conclusions, peer fellows acknowledge that such mental shortcuts arise in stressful environments where grades and self-esteem are at stake, and they redirect fearful and unproductive conversations. Peer fellows are trained in key principles that characterize productive reflection: approaching students as equals free of judgment, revisiting mistakes that are very likely based on shallow study strategies, discussing more effective learning methods to achieve deeper understanding, and illuminating cognitive biases—all with student well-being as a goal.

Data-Gathering

Student well-being is also at the center of data collection in the Peer Fellow Program. Though many colleges and universities use data analytics effectively to identify at-risk students and offer appropriate supports (Kirp, 219),"Big Data" (Selingo 2017) is likely more often used for advertising purposes, such as purchasing names of high school sophomores and juniors from the ACT and College Board, consistent with the data mining of aggressive consumer marketers (Selingo, 2017). In contrast, much of the information-

gathering in the Peer Fellow Program is deliberately contained and student-centered, serving students on a small scale within specific courses. For instance, over three semesters, Nash and her colleague, peer fellow Olivia Rua, conducted surveys regarding students' approaches to test preparation in the BIO 101 course sections that they supported. Nash revealed the anonymous results to the students within each section in such a way that students could see the daily study strategies they chose, from attending class to taking notes through specific methods. They could then compare the strategies A students consistently chose versus those chosen by the group with lower grades. We call the information gathered this way "everyday data," because not only is the data informal and contained within relatively small classroom groups; it also centers around daily choices the students made leading up to their exams. Without revealing the identities of the students behind the data points, students could use the results of the surveys to interpret which choices were effective and which were ineffective. In this way, the data itself "spoke" to the group without the students having to confess any bad habits. Nash guided metacognitive reflections based on this everyday data and ultimately helped students recognize the study approaches that worked best.

Method

With the assistance of peer fellow Olivia Rua, Nash approached first-year students across the various sections of their supported professor's fall BIO 101 and spring BIO 102 classes with a qualitative survey tool that Nash created and distributed via Google Forms (see Appendix A for a step-by-step instruction guide for using Google Forms this way.) Nash and Rua surveyed these groups of students across three semesters: 25 of 69 BIO 101 students completed surveys in fall 2018, and 49 of 99 BIO 102 students completed surveys in spring 2019. 57 of 93 students completed the surveys in fall 2019. The survey was run twice in fall of 2019 (in BIO 101) to create extra opportunities for metacognitive conversations. It should be noted that though each class had a different group of students, 54 of the 139 students (39 %) who took BIO 101 in fall 2019 returned to the same professor in BIO 102, affording these

students extra opportunities to reflect on any changes they may have made in their study methods.

After exam grades were made available to students, students received a link to the Google Forms survey to reflect upon the recent exam, their preparation, their grades, and habitual practices both within and outside the classroom. The survey asked students to reflect on eight general topics, such as habits they engaged in regularly as they related to academics and studying, methods of taking notes during lecture, the content of notes taken during a lecture, and the level of satisfaction with their score on the most recent exam (see Appendix B). Based on her experience observing students and her recent memory as a BIO 101-102 student herself, Nash offered more specific study strategies within Survey Question No. 6 which students could choose, as well as opportunities to write in their habits if these options did not reflect an approach they regularly employed (see Appendix C). To prevent skewed results, Nash and Rua maintained students' anonymity throughout all phases of survey distribution and data analysis. When they discussed the overall data with students, Nash and Rua did not require or encourage any student to identify themselves with their specific answer. Conversations regarding data remained around general trends and patterns as opposed to singling out specific respondents.

Nash created graphs of the data that specifically depicted the study habits employed by her students. Habits utilized by students reporting an A in the course at the time of the survey distribution were extracted and examined separately (see Appendix D, Figures 1 through 4). These graphical representations were reported back to the students on a brief document containing each graph that Nash posted on the course's online homepage to ensure it was accessible to all registered members of the class. Further conversations regarding observed trends were conducted in peer fellow study sessions regarding what the data meant to students and how they could use it to reflect on their habits and consider making changes. This means of reflection provided an opportunity for students not just to engage in metacognition individually, but also collectively as a group in SI sessions that took place outside of class. The central point of the surveys was not to quantify changes in study habits across semesters

and varying cohorts of students but to allow the student-generated anonymous data to "talk" among peers about which study methods were consistently the most effective when examined across three semesters.

Results

It can be helpful for students to reflect on their studying by seeing what successful peers within their class are doing. Yet more convincing evidence in the effectiveness of strategies is found by comparing survey results from 4 distributions to create a more generalized overview of habits that work for students. Students need to see the habits most often utilized by students reporting an A that appear across each survey collection gathered four times through three semesters: fall 2018, spring 2019 (see Table 1), and fall 2019 (see Table 2).

Table 1. Most Commonly Occurring Study Habits Among Students Reporting an A and A-, 2018-2019 Academic Year

FALL 2018 BIO101: Exam Two OCTOBER 2018* *n=17*		SPRING 2019 BIO102: Exam Two MARCH 2019 *n=42*	
5. Come to every class	96%	5. Come to every class	98%
13. Take breaks while studying	96%	13. Take breaks while studying	80%
8. Study alone primarily	92%	19. Study in a quiet environment	78%
19. Study in a quiet environment	92%	8. Study alone primarily	71%
14. Complete online practice exams	80%	26. Get a decent amount of sleep	63%
7. Attend peer fellow [SI] sessions	72%	7. Attend SI leader [Peer Fellow] sessions	61%
22. Exercise regularly	64%	16. Look through the study materials posted on Blackboard, if provided	57%

Table 2. Most Commonly Occurring Study Habits Among Students Reporting an A and A- between Exam Two and Exam Four, Fall 2019

FALL 2019 BIO101: Exam Two OCTOBER 2019 *n=31*		FALL 2019 BIO101: Exam Four NOVEMBER 2019 *n=32*	
5. Come to every class	97%	5. Come to every class	75%
14. Look at or complete practice exams on Mastering Bio	84%	8. Study alone primarily	75%
8. Study alone primarily	77%	13. Take breaks while studying	75%
Take breaks while studying	74%	14. Look at or complete practice exams on Mastering Bio	69%
7. Attend Peer Fellow [SI leader] sessions	71%	19. Study in a quiet environment	59%
19. Study in a quiet environment	65%	10. Create or complete my own diagrams for complicated processes	53%
26. Get a decent amount of sleep	61%	7. Attend Peer Fellow [SI leader] sessions	50%

Patterns emerged from this data that allowed Nash to discuss with her peer learners the common habits of BIO 101 and 102 students by grades earned. Students earning B+ and below could compare the graph of their habits to the approaches of those earning A's. These common approaches by grade are illustrated in Appendix E, Figures 1 and 2. Because of the variance among bar graphs in each set, the data is not presented in descending order.

The two groups of students completing the survey, those earning an A or A- and those with a B+ or below, chose unpredictably similar study methods. Seven of thirty habits topped the list as the most frequent approaches the students chose (see Appendices F and G). Within these seven habits, however, the data shows subtle differences. Students who earned B+ and below appeared to lean on breaks 92% of the time, while the cohort earning A's appeared to lean on breaks 81% of the time. (the percentage of students relying on breaks in this group dipped below 75% for two tests in fall of 2019).

While both groups acknowledged the importance of attending SI (peer fellow) study sessions, fewer than 50% of students earning B+ and below reported that they attended peer fellow sessions before the November 2019 exam. In contrast, from fall 2018 through fall 2019, an average of 64% of the A students reported that they attended study sessions as a learning strategy. Though 50% or more of the A students reported getting a decent amount of sleep as a study strategy across the three semesters, fewer B+ students (30% to 40%) reported that attention to sleep was a study strategy in fall 2019.

Importantly, one of the eight anonymous questions concerned how far in advance of an exam students chose to study (see Appendix H, Figures 1 and 2). Students earning A-range grades tended to begin studying a few days before the exam and were less likely to study the night before or the day of the exam. Though there was a concentration of students earning a B+ or below studying a few days before the exam during the fall semesters, more of these students studied the day of or the night before their exams.

Discussion

In their study sessions, Supplemental Instructors do not merely repeat the content provided by the professor in class. They combine discussions regarding content with ways to study it (International Center for Supplemental Instruction, 2014, p. 10). Survey results from Nash's three semesters allowed for metacognitive reflections about the specific habits that were consistent in students reporting an average in the A range. The habits were discussed in combination; particularly, the tendency for A students to combine their study approaches with the habit of studying a few days before their biology exams.

As conversations developed within the group during peer fellow sessions, individual students began to share how they were newly combining various study habits (such as attending peer fellow sessions and completing practice exams) to find the best fit. Not every student who engaged in these conversations made changes to their study habits as a result of these conversations, but students commented on how seeing how their high-achieving peers studied made them feel more confident in their habits, particularly when the student's habits matched the A students' habits. Students also had a chance to modify habits that might work when appropriate limits are observed. For instance, breaks are indeed necessary for mental rejuvenation, as they "increase productivity, replenish attention, solidify memories and encourage creativity" (Jabr, 2013). But the trick is to return to studying after sufficient downtime. As a result of analyzing the survey data, Nash could now see the need to advise students to take a short break of 5-15 minutes after every hour of studying and a longer break of 30 minutes or so after two hours of studying, but always with the aim of returning to the task punctually (Jabr, 2013).

At the end of each semester, students were given another survey to evaluate their experience in the peer fellow program in BIO 101 or 102. Two of these questions are directly relevant to the metacognitive conversations Nash conducted with her students: "The peer fellow helps me determine the causes of my difficulty"; and "The peer fellow provides study strategies that have helped me build my confidence level in the course." The wording of the

two questions deliberately implies that students participate in their learning, a principle central to supplemental instruction (International Center for Supplemental Instruction, 2014, pp. 10, 18-19, 36-40). Calculating averages through fall 2018, spring 2019, and fall 2019, we found that 86% of the students who answered the question, "the peer fellow helps me to determine the causes of my difficulty" across three semesters either strongly agreed (an average of 19 students in a group of 26 participants in peer fellow study sessions) or agreed (an average of 3.3 students per class out of a group of 26) that the peer fellow did indeed help the students determine the causes of their difficulties, one of the central aims of Nash's metacognitive talks about study skills with her students throughout the three semesters.

Regarding the question, "The peer fellow provides study strategies that have helped me build my confidence level in the course," we found that 90% of the students who answered that question across three semesters either strongly agreed (an average of 19 students in a group of 26 participants in study sessions) or agreed (an average of 4.3 participants in study sessions) that this dynamic was in place. One of the student evaluation comments sums up Nash's approach well: "Erin was an amazing peer fellow. Not only did she give great study habits in the study session, but she replied to emails quickly if I ever had any additional questions. Her study guides always helped me prepare for exams and made me feel confident during exams."

Conclusion

The anonymous study skills survey allowed first-year biology students to reflect on their existing habits and to monitor their learning in terms of the methods that worked best for their peers earning A's, all in an environment free of judgment or authority. Educators have promoted peer learning because of its powerful influence as the "predominant socializing agent during the college years" (Ender & Newton, 2000, p. 34). College students, who may likely live away from home while they are in school, find in their peers a "major source for gratification and validation […] Because of the important reliance on peers during these formative years, peer educators can be particularly influential as models and mentors to

other students" (Ender & Newton, 2000, p. 34).

Nash's "meta-talks" allowed for thinking on a level beyond the course content (the Greek "meta" means "beyond"), so that students could gain self-awareness regarding their study approaches. Though Nash facilitated this metacognition, it originated with the students themselves, employing data easily accessed in a few minutes on any given day after a test. We encourage any interested educator at the college level to tailor this process of gathering "everyday data" to serve metacognition in their programs. (Appendix A provides steps for setting up Google Forms with students).

To refine this case study, we would consider having students consistently complete the surveys in class to collect a wider sample set, since some sections of the BIO 101 and BIO 102 completing their surveys outside class resulted in narrower samples. We would perhaps divide the graphs so that A and B students were together in one cohort, with C and below students in another. That way we could determine if there were stark differences in study habits between the two groups. To widen the support available to students, we would also report our findings to interested faculty, all the while maintaining student confidentiality.

Nash's meta-talks with her Biology students, based on the accessible data she collected in surveys that took only minutes for students to complete, revealed that study approaches such as attendance at peer fellow sessions and completion of practice exams need to be combined with appropriate timing—usually a few days but not more than a week before the exam. More importantly, based on survey results in which a majority of students confirmed that Nash's peer fellow sessions helped them determine the causes of their difficulty and provided them with study strategies that increased their confidence in the class, we can argue that the students were growing in agency as a result of the peer fellow sessions.

Social learning theorist Albert Bandura (2006) characterizes individuals he calls "agents of action" as "self-reflective" and "self-examining" (p. 165). But agents of action do not only reflect on their qualities and experiences; they make appropriate changes within themselves when their prior approaches have not worked: "Through functional self-awareness, they reflect on their efficacy, the soundness

of their thoughts and actions, and the meaning of their pursuits, and they make corrective adjustments if necessary" (p. 165). A change of approach as a result of reflecting on one's ineffective habits is a step added to Dewey's (1910) idea of a full education, in which reflective thought alone is "truly educative in value" (p. 2). Nash sought to lead her students through both steps—reflecting on learning experiences and then taking action by employing study habits in new combinations—so that students knew exactly how beneficial choices could determine their success.

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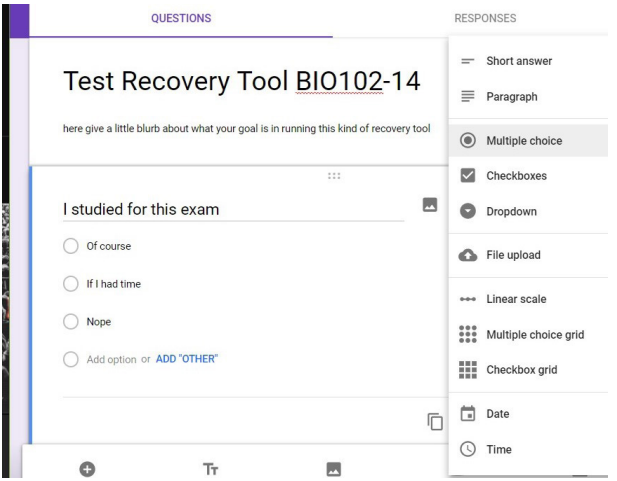
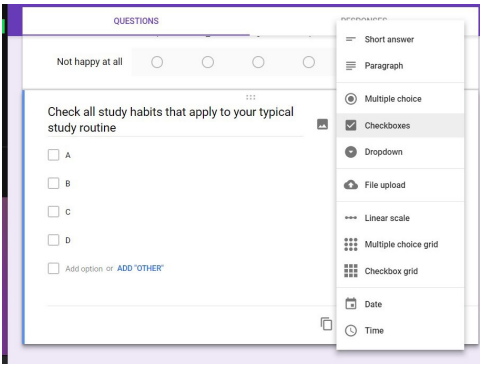
Appendix A
Instructions for Creating a Metacognitive Google Forms Survey

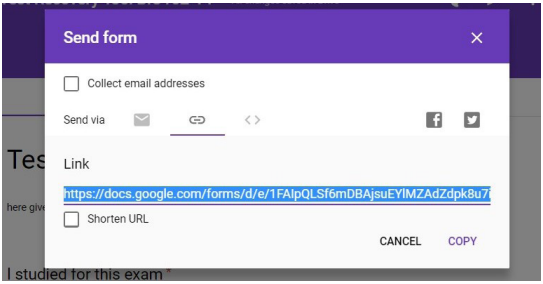
1. Open Google Forms.
2. Type in your first question.
3. Add in your options, pressing "enter" to add another option and choose the type of question.



4. Mark each question as "required."
5. To add the next question, click the plus circle.
6. For a scale question (ie rate from 1-5), choose "linear scale" and put in your scale and each end's definition.
7. For a "check all that apply" type question, choose "checkboxes". Click ADD "OTHER" to give an option for students to write in a response.



8. To send your survey to your students, click “send” in the top right of the page.
9. Click the link icon to generate a link to your survey so it can be completed by your students. This link can be copied here and then pasted into an email or Blackboard announcement (or equivalent) to send your students.



10. Once you begin getting responses from your students, you can see their responses as a whole by viewing from “summary” or you can see each individual response by viewing from “individual”. There will be a tally next to “Responses” of how many responses you have collected since the last refresh.
11. By exporting the raw data, you can generate a new chart displaying the results or use the one automatically generated by Google.
12. Once you are satisfied with how your chart looks, click to download the image you have created. It works to download it to your computer as either a .png or .pdf file, depending on how you want to share it with your students.

Appendix B
Questions Included in Nash's Surveys

1. I studied for this exam… For example, "yes," "no," "only if I had time."
2. Are you happy with your grade on this exam?
3. How far in advance did you start studying for the exam?
4. How did you take notes with respect to the content of your notes? For example, did you write down everything the professor said or just the points he stressed in class?
5. How did you format the structure of your notes? For example, did you write your notes by hand on paper?
6. Check all of the habits that typically applied to you and your studying routine.
7. My grade at this point in the semester is (*this is ANONYMOUS. No one will not be able to link your response with you as an individual).
8. Any other comments.

Appendix C
Specific Study Habit Choices Presented within the Surveys (Question No. Six, Appendix B)

Study in long marathon sessions.
2. Read over my notes within 2 days after class.
3. Study in groups primarily (outside of SI leader sessions).
4. Read the PowerPoint and/or chapter prior to coming to class.
5. Come to every class.
6. Check in with the professor when there are things I do not understand.
7. Attend SI leader sessions.
8. Study alone primarily.
9. Rewrite my notes in my notebook.
10. Create or complete my own diagrams for complicated processes.
11. Study in little bits every day.
12. Study alone and attend SI leader sessions.
13. Take breaks while studying.

14. Complete practice exams in online component of course.
15. Study while watching Netflix, playing video games, etc.
16. Look through the study materials posted on Blackboard, if provided.
17.Rarely sleep more than a few hours.
18. Use someone else's flashcards.
19. Study in a quiet environment.
20. Study in groups (outside of Peer Fellow sessions) and attend Peer Fellow sessions.
21. Eat healthy foods on some sort of schedule.
22. Exercise regularly.
23. Study in bed.
24. Regularly pull all-nighters.
25. Ask clarification questions.
26. Get a decent amount of sleep.
27. Make my own flashcards.
28. Study both alone and in groups (outside of Peer Fellow sessions).
29. For complicated processes, look at diagrams completed by someone else.
30. Watch YouTube videos to help me understand complicated processes.
31. I make my own flashcards on Quizlet.**
32. I make my own study guide.**
33. **Student write-in options.

Appendix D
Study Habits Students Reported at the Time of Each Survey Distribution (see Appendix C for a clear representation of the numbered Study Habit Choices)

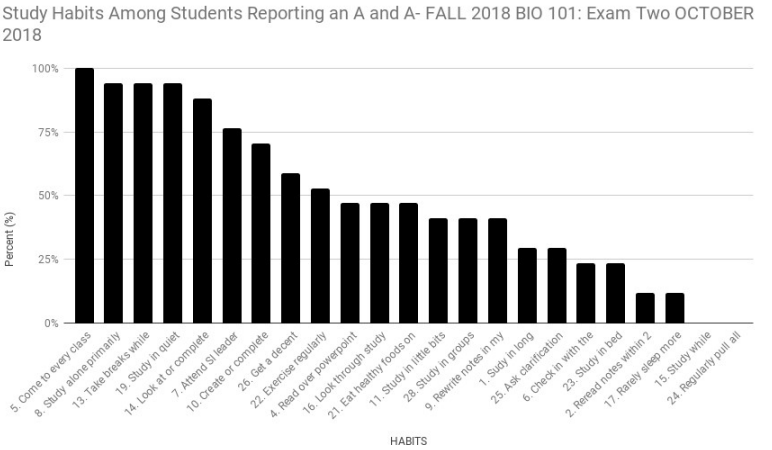


Figure 1. Study habits among students reporting an A and A- Fall 2018 BIO 101: Exam Two October 2018

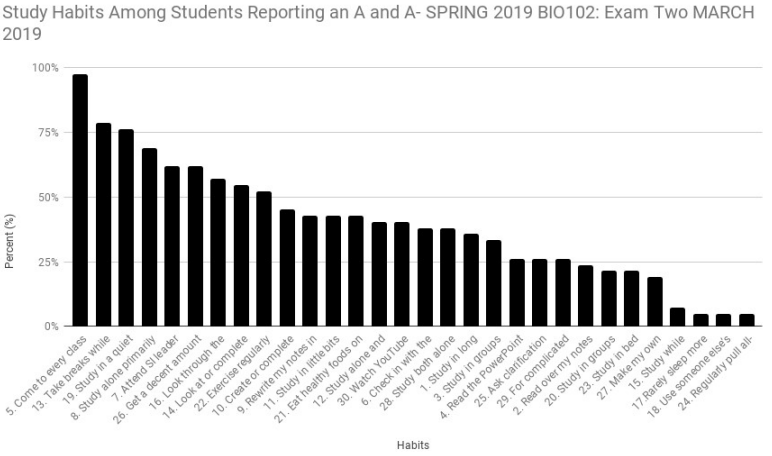


Figure 2. Study habits among students reporting an A and A- Spring 2019 Exam Two March 2019

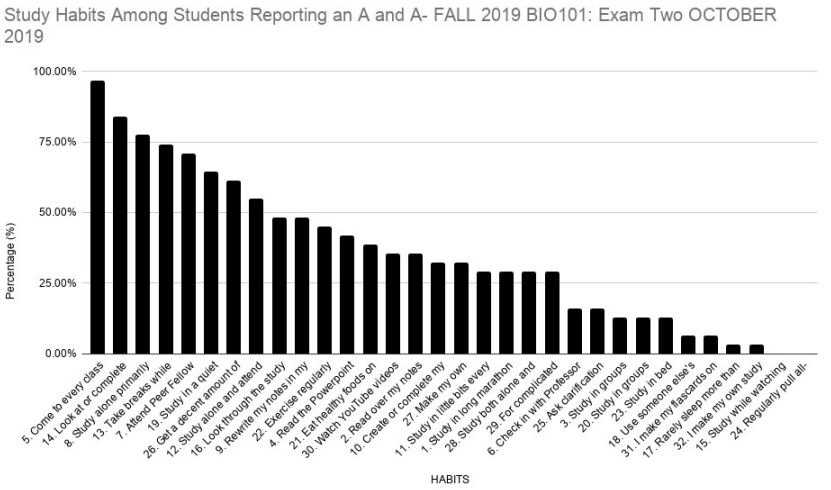


Figure 3. Study habits among students reporting an A and A- Fall 2019 BIO 101 Exam Two October 2019

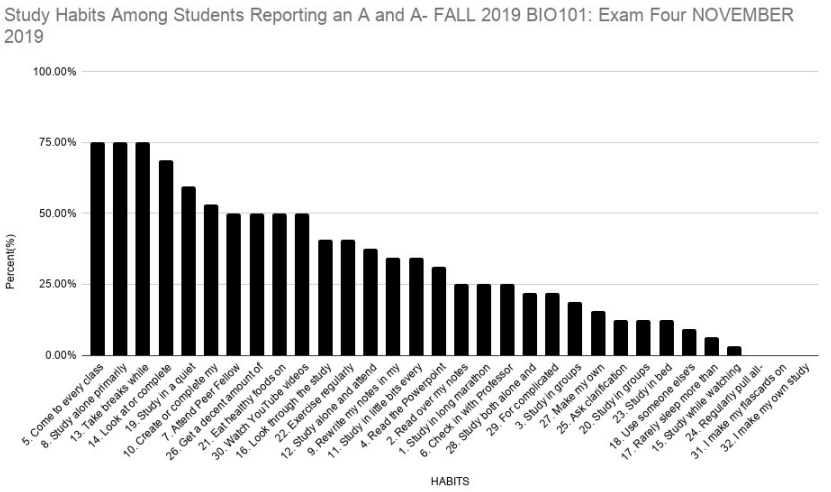


Figure 4. Study habits among students reporting an A and A- Fall 2019 BIO 101: Exam Four November 2019

Appendix E
Most Commonly Occuring Study Habits by Grade Group

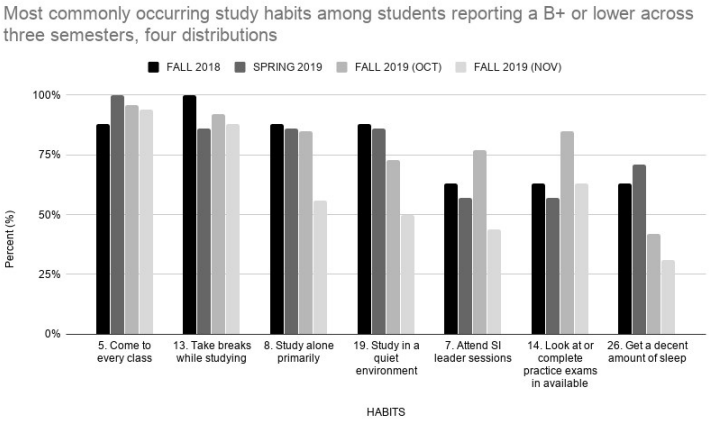


Figure 1. Most commonly occurring study habits among students reporting a B+ or lower across three semesters, four distributions

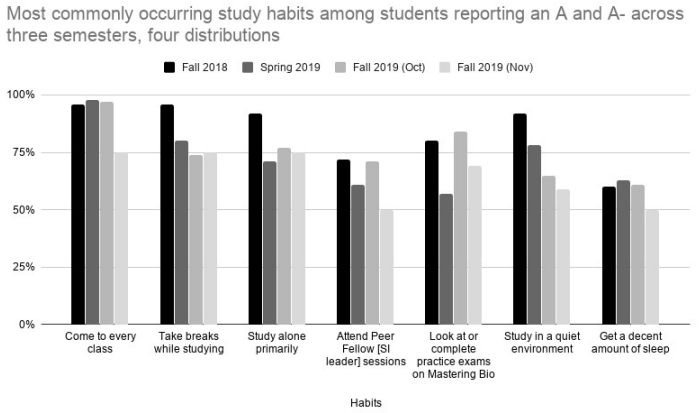


Figure 2. Most commonly occurring study habits among students reporting an A or A- across three semesters, four distributions.

Appendix F
Most commonly occurring study habits among students reporting B+ and below across three semesters, four distributions

Come to every class (95%)
Take breaks while studying (92%)
Study alone primarily (79%)
Attend Peer Fellow [SI leader] sessions (60%)
Look at or complete practice exams on Mastering Bio (67%)
Study in a quiet environment (74%)
Get a decent amount of sleep (52%)

Appendix G
Most commonly occurring study habits among students reporting an A or A- across three semesters, four distributions

Come to every class (92%)
Take breaks while studying (81%)
Study alone primarily (79%)
Attend Peer Fellow [SI leader] sessions (64%)
Look at or complete online practice exams on Mastering Bio (73%)
Study in a quiet environment (74%)
Get a decent amount of sleep (59%)

Appendix H

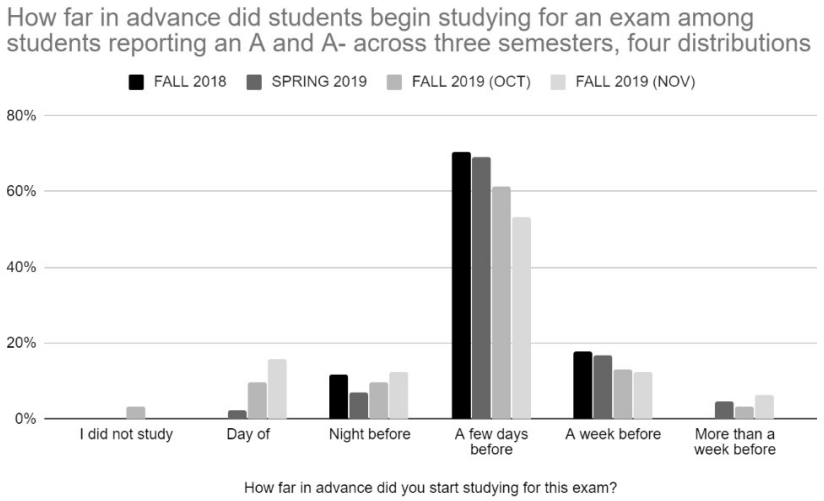


Figure 1. How far in advance students began studying for an exam among

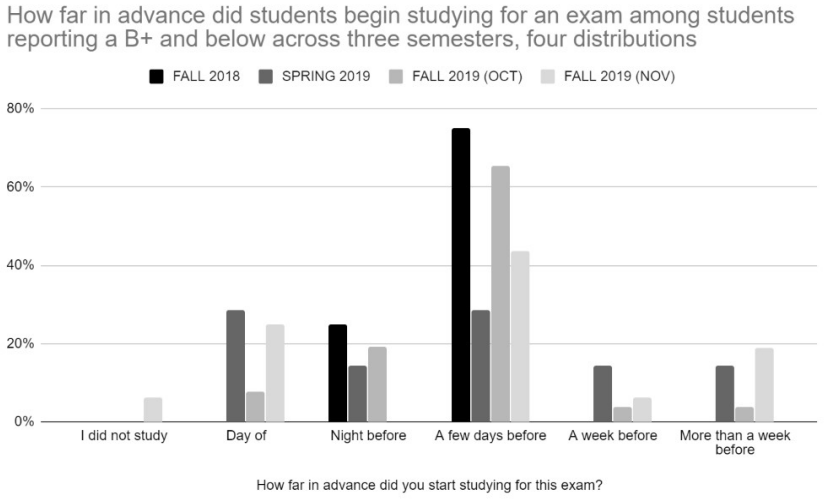


Figure 2. How far in advance students began studying for an exam among students reporting a B+ across three semesters, four distributions

Connecting the Dots: Preparing for the Underprepared

Renee Just
Daryl Bruner
Catawba College

Abstract

When academic success professionals work collaboratively with faculty, we can better connect the dots between how students present in the classroom and what services are most needed to support student success. If high school students believe academic records are irrelevant, it undermines the need (incentive) to exert effort in studies and academic habits. The result: institutions are forced to incorporate additional academic success services, as well as extended services provided through student affairs.

Connecting the Dots: Preparing for the Underprepared

Background

There is a lack of literature on the topic of unpreparedness in college; however, there appears to be ample literature that connects unprepared students to high school as well as parental higher education. Furthering on Goyette & Mullen (2006), Bourdieu & Passeron (1979) argue that a student's success in higher education is directly related to a parent's non-economic cultural habits as well as behaviors such as family background, commitment to education and social class.

According to the US Department of Education (2012), one half of the college student population consists of first-generation students. Tierney et al (2006), Pike & Kuh, (2005) and Warburton et al (2001) purport that first-generation students often come from a lower socio-economic background and may lack preparatory skills from parental modeling. A further point to consider is that business

students are more likely to come from a lower socio-economic status over those pursuing arts and sciences (Goyette & Mullen, 2006).

Against the systemic backdrop of the k-12 priority to 'teach to the test,' rather than learning how to learn, it is no wonder first-year college students drop out at such high rates. Especially when one takes a closer look at their profile. In their 2018 report, the Higher Learning Commission noted that today's students are "not just going to college, but working, raising families, and engaging with their communities." Further, the Lumina Foundation reported that 42% of first-year students are living near or below the poverty line, and the US Department of Education (2017) reports that 74% of all undergraduates have at least one nontraditional characteristic.

While Plavin-Masterman (2017) believes that no matter how much faculty or instructors discuss assignments and expectations, students always find ways to re-interpret them and either result in being unprepared or completing the wrong assignment. Conversely, Gabriel (2008) and Collier & Morgan (2008) purport that if faculty ensure additional time expressing their expectations of students, students will be better prepared and will deliver higher grades. However, if one supports Bourdieu's (1979) theory, no amount of discussion will provide clarity to the students.

According to the Missouri Department of Elementary and Secondary Education (2006), a rising number of unprepared students have enrolled in community college, which has resulted in the community college system needing to accommodate remedial courses for incoming students. They reported 29.6% of newly enrolled students were taking remedial math classes, 16.9% remedial English and 10.1% intensive reading (2006). This supports Bourdieu & Passeron (1979), Goyette & Mullen (2006) and Gabriel's (2008) theory that students are entering college today without adequate preparation to succeed; specifically, lacking skills in reading, writing and studying.

With students entering higher education unprepared, institutions are forced to incorporate additional accessibility services such as tutoring, writing, and math centers as well as extended services provided through the dean of students' office. While higher education institutions appear to be assuming additional

responsibilities and financial burdens, classroom teaching has not advanced at the rate of services needed (Dotzler, 2003).

Some argue that while millions buy into the education for all movement, tuition costs have gone up and institutions have not been able to keep up with demand. Additional arguments have appropriated the expectation of college for all which has seemingly caused a decline in motivation and incentive – two major proponents of social implication. According to the Wisconsin model in sociology, while students' aspirations are the central component of success, their family backgrounds and individual mental capacity highly influences their success rate (Sewell, Haller, & Portes, 1969). Dominica, Conley, and Farkas (2011) examine student motivation and incentive rates based on the 2009 speech of Barak Obama calling for the expansion of higher education and additional educational training for all. Following that, Goyette (2008) extends "nearly 85% of U.S. 10th graders say they plan to earn a bachelor's degree or higher, up from less than 45% in 1980." Some argue that while millions buy into the education for all movement, tuition costs have gone up and institutions have not been able to keep up with demand.

Rosenbaum (2001) suggests a perverse effect on this ethos with one of the most stunning statements; if high school students believe high school records are irrelevant given this new educational norm, it undermines the need and incentive to exert effort in their studies and academic habits. Further, he purports 40-50% of high school students believe there are no penalties or consequences associated with poor performance, as it is an expectation that they will move onto a 4-year degree-granting institution. Rosenbaum (2001) further states high school students lack the connection to their studies in high school and success in college. Based on several scholars, high school students are under the impression that low performers will still be rewarded with college opportunities, thereby prompting a lack of motivation to engage and study in preparation for college. This poses the question if the college for all ethos has had an adverse effect on high school teachers and students to properly prepare for advanced academics?

College readiness is both a long-term and short-term developmental matter. The 80/20 principle, credited to Italian

economist Vilfredo Pareto, is useful to help both faculty and students understand the breakdown of the onus for learning. In the K-12 system, teachers were responsible for 80% (or more) of their student's learning as measured through mandated testing. The student was only responsible for showing up. In higher education, that equation is flipped. The student is now responsible for (at least) 80% of their learning and will only get about 20% (at most) of content knowledge from classwork.

With students entering college at rates higher than ever before, the focus must shift from degree-granting to readiness for the academic journey as well as the journey of life. Given the shift society has endured over the past two decades with more students seeking a 4-year degree as a path to success and economic prosperity, preparation is more critical than ever before.

Proposed Solution

High school teachers spend large amounts of time throughout the academic year focusing on students passing or meeting the national standards testing. Since President Bush instituted "No Child Left Behind" there has been an institutional debate on preparedness and effectiveness. If K-12 teachers focus on exam scores, how are we preparing students for success: academic or otherwise?

The primary obstacle facing an educational shift is the strategy that is employed in the K-12 educational system that must move away from test-taking and lean into a content/skills approach. In addition to students needing basic time management skills, there are also other needs; to discover their learning style, to be held to standards of excellence, and they must understand that they are responsible for their actions/outcomes, including consequences that may follow.

Educators around the globe are experiencing frustration with younger generations who enter 4-year degree institutions unprepared. This unpreparedness isn't as much to do with laziness as it is to do with other moving parts. While the FBD presented embodies feedback from nine colleagues and 26 students where eight core categories were identified as factors of unpreparedness (Experience, Ownership of Learning, Un-Engaging Curricula, Time, Personality,

Peer Pressure, Professors, and Don't see the Relevance), it appears the core issue is larger than anticipated when I began examining the issue of unpreparedness of my students attending a small, private liberal arts institution in North Carolina.

When K-12 teachers focus on testing, they miss the opportunity to aid the students in true learning that consists of a foundational skillset of reading and processing materials according to their learning style. Mindless reading (Reichle et al, 2010) is simply reading words on a page, lacking comprehension or memory of the actual content. While Eason, et al (2012) and Lee & Shute (2010) affirm students with more astute metacognitive abilities tend to be higher learners and are better able to achieve higher standing; this does not correlate to their actual understanding of their learning styles or how to go about expressing or improving them.

Consider for a moment an individual with a learning style that is visual, and application-based. They may not learn through being talked (audio) at or read to, and possibly do not learn through test-taking as a result of a lecture (audio). Therefore, when tested, the learner does not personalize results, rather, they look to supplemental materials and ways in which their learning journey can be enhanced with the ultimate goal of improving test scores. Abbas (2012) contends that educators must first understand their learning style to understand a student's learning style and there is often a mismatch of styles potentially resulting in lower learner achievement.

Universal Design for Learning seeks to provide an academically accessible environment that is usable by all learners to the greatest extent possible and is built to accommodate individual learning differences and styles. Advances in technology over the last 20 years have led to huge advances in both neurological and learning sciences. Research has shown that the brain is made up of hundreds of thousands of neurological networks—each formed in response to the need for completing a task (Smith, 2003). For example, when given the command to 'cross your arms,' we complete the task in almost a reflex-like manner. Our brains process the command and then, through a series of neurological connections, the brain choreographs all the movements required to cross our arms. These neurological connections form a network designed to complete the task of

crossing one's arms—it becomes 'hardwired' in the individual's brain. Further, these networks are uniquely sequenced in each individual in the same manner as the uniqueness of our fingerprint. When asked to cross our arms the other way, there is processing delay as the task requires a different set of neurological connections to be made before the task can be completed.

When applied to the science of learning, these findings lend support to our understanding of how individuals learn. A learning environment designed to meet the needs of the 'average' learner fails to allow for learning variances and a jagged learning profile (CAST, 2014). For instance, a learner may be a very eloquent speaker with a tremendous vocabulary, yet consistently do poorly on written assignments. In this case, the learner will be at an academic disadvantage due to dyslexia in a course that is writing-intensive. With this in mind, the Universal Design for Learning framework embraces the variances in the individuals learning profile as yet another layer of depth to the diversity of who we are as being human.

Based on the work of Russian psychologist Lev Vygotsky, and less directly, American Benjamin Bloom, the Universal Design for Learning framework has three guiding principles: Flexibility in Representation, the way knowledge, and information is shared; Flexibility in Expression, how the assessment of learning is measured; and Flexibility in Engagement, the ways that learners interact with the knowledge and information that sustains interest and persistence (Meyer, 2014). Dr. Leonard Sweet, former Vice President of Academic Affairs at Drew University describes today's college students as EPIC-- Experiential, Participatory, Image-driven, and Connected. Application of the Universal Design for Learning framework makes a great match for educating today's college students (Elmore, 2013). It is worth noting that in the United States, the Universal Design for Learning framework is increasingly incorporated in our public education system, and as these students begin to consider college, their families are looking for similar educational environments for their students.

Universal Design for Learning is a framework, not a protocol, meaning that traditional lecture and exam modalities will remain a part of the framework. The difference in design when applying the

principles of UDL to a course is that lecture and exams are but one way the material is conveyed. A course can be planned to include an exam, a paper, a presentation, and a project—all weighted equally, as means by which students can demonstrate what they have learned. By incorporating these various assessment methods into a course, more students have a better opportunity to demonstrate what they have learned in ways that best suit their learning profile. This design represents the shift from a structure that accommodates weaknesses to a structure that enables strengths and allows the individual to be an individual. While it doesn't accommodate individualized needs, it enables individualized learning styles that show comprehension of the material at hand. For example, a dyslexic student may struggle to take a traditional written exam or writing a paper, but because of their dyslexia, the student may have developed excellent oral presentation skills, or possess the ability to create remarkable projects that can be used to assess their grasp of the material being covered. By designing learning environments that allow students to work to their strengths, we provide greater opportunities for all learners to develop competence, confidence, and independence.

Multiple courses of action are necessary. First, there should be collaborative initiatives towards what those at the college/university level can do to effect change and get students up to speed; second, establishing supportive standards for students to improve their overall success rates; and finally, engaging in additional scholarly work to examine the exact breakdown in rigorous academic preparation so that necessary changes may be made. It is evident from the research that if students are not prepared for college, they have a higher risk of dropping out or failing which ultimately impacts their ability to achieve economic success.

Consider the work of Bourdieu & Passeron (1979) who operate on the premise that behaviors are non-economic based and more to do with factors of social life, familial life, status quo, and upbringing. With that being said, the varying generations within our society have their history, value-shaping experiences and motivational patterns. The striking difference in the mindsets, motivations, and behaviors of these generations in the workforce has the potential to bring both challenges and opportunities to the organizations they serve.

Take the Millennial Generation; it has been shaped by the events of the Desert Storm, the Columbine shootings, the Clinton sex scandals, and 9/11 (Zemke et al., 2000). Further, the Millennial Generation came of age in a period of cell phones and the Internet; essentially, they grew at the rate of technology. With that said and understanding that their medium has been ever-changing; this may provide insight into why their learning styles seem to challenge the age-old norms. The only reality this generation has ever known is that of an online, networked society in which everyone is connected to everyone else and information is but a few keystrokes away (Oreg, 2003).

Intuition and enrollment dependent institutions, as White (2016) states, "We must abandon once and for all the college-ready paradigm that has allowed higher education to deflect accountability. It is time that we fully embrace the burden of being student-ready institutions." When Faculty collaborate with the Academic Success Professionals on their campuses, the partnership can help transform the classroom experience for both the faculty member and their students. Indeed, as David Kirp points out in his book, The College Dropout Scandal, students need to know that their faculty and the institution 'has their back' (page 4).

Helping faculty and students gain a better understanding of how students learn is a benefit of working with Academic Success Professionals. While faculty are experts in the content areas, most doctoral programs do not include any kind of pedagogical training, as they focus more on research. In contrast, professionals working in Academic Success often have extensive training in the science of learning, curriculum development, student development, higher education administration, and financial management.

Systemically, this is a complex issue. Organizationally, if faculty unite as an inter-disciplinary front, it is possible to impact the students' outcomes. Collectively, we must make students accountable beginning in their First-Year Seminar (FYS) course as freshmen, through graduation. As a united faculty we must help students understand they have choices, however, there are always consequences to follow. (Example: I assess learning through research papers, presentations, and projects. On presentation day

when class begins at 8 am, I lock the door promptly at 8 and do not allow students entry to the class. They receive a zero (0) and are not granted a make-up opportunity. This is to teach responsibility, accountability, and ownership while preparing them for the working world. Behaviors historically provide insight into ways all learners perceive and respond to the environment: the place where learning occurs, within respective learning styles (Celce-Marcia, 2001).

Another solution organizationally would be a series of seminars aimed at establishing a solid foundation. They might include:

1. Learning Styles: What are They?
2. Time Management Skills and Why They're Important
   a. What's important and what's not
3. Strategic Planning for Homework
   a. It Begins with an Outline
   b. Concept Mapping
4. Managing Athletics and Academics
5. Breaking the Cycle - Owning Up
   a. Decision Making
6. Personal and Academic Responsibility: Why They Matter
7. Motivate, Not Procrastinate

In support of the proposed programming, Abbas (2012) exerts the necessity of multiple learning opportunities that enforce learning styles, strengthen core abilities, overcome weaker skills and pave the path for effective learning. Further, the programming is supported under the self-regulated learning research that identifies goal setting, planning, motivation and self-monitoring as a pathway to engage students in achieving higher levels and to learn more effectively (Zimmerman & Moylan, 2009). Systemically, we need to make appropriate adjustments to help this generation of young adults and the generations after them to be prepared for academic success that hopefully translates to economic prosperity.

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The Learning Assistance Review (TLAR), the national peer reviewed official publication of the National College Learning Center Association (NCLCA), publishes scholarly articles and reviews that address issues of interest to learning center professionals (including administrators, teaching staff, faculty, and tutors) who are interested in improving the learning skills of postsecondary students. Primary consideration will be given to articles about program design and evaluation, classroom-based research, the application of theory and research to practice, innovative teaching and tutoring strategies, student assessment, and other topics that bridge gaps within our diverse profession.

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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.

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