

Work-in-Progress — School Based Academic Support Resource Assessment: Student Usage, Motivation, Academic Outcome, Behavioral and Attitudinal Impacts

Lisa Lampe, Bridget Mearns, and Brian Paljug

The University of Virginia, ll4uu@virginia.edu, bam4xz@virginia.edu, bjp4qd@virginia.edu

Abstract - In this evidence-based work-in-progress paper, we examine the student usage and varied impact—behavior, attitude, and academic outcome—of academic support in a mid-sized engineering school within a large East Coast public, four-year university. The data includes the complete set of data of academic resource usage (private tutors, graduate student-run tutoring center, student-run on-demand review sessions, and professional academic coaching) for engineering students in mathematics courses for Fall 2014. The students who utilized these academic support resources were surveyed and interviewed to capture self-reported (1) anxiety level, (2) confidence, and (3) motivation associated with their choice in support resource. Our findings suggest that students consume academic support at a higher rate “just-in-time,” in other words, the two days leading up to a test, rather than proactive and prolonged support. With on-going data collection, we hope to use this assessment to help other Engineering School’s assess their programs as well as to continue to improve our current academic resources, create new supports, and gain a more informed understanding of our student population.

Index Terms – academic support, assessment, “just-in-time” support

INTRODUCTION

With very different academic support resources offered at our institution, it comes as no surprise that various constituents—students, faculty, and staff—have differing opinions on the impact that our academic resources have on students. Consequently, we felt it was important to gather data that creates a picture of the strengths and shortcomings of the academic resources in our engineering school.

In this paper, we will provide a baseline for understanding our academic resource-user population for different applied mathematics courses offered during the Fall 2014 semester. By providing answers to targeted research questions, we hope to better understand the needs of our students and how the academic support resources we offer currently meet those needs.

I. Institutional Contexts

Our institution is a public, mid-Atlantic 4-year research university that enrolls approximately 16,000 undergraduate students and is classified as “highly selective” in undergraduate admission. The university offers decentralized academic support through the individual schools and college and centrally offers a myriad of co- and extra-curricular activities. The university wide undergraduate population is about 54% female, 6% African-American, 5.6% Hispanic, and 6% international. Students are drawn from all 50 states and over 100 countries. The 4-year graduation rate from the institution is over 85%, while the 6-year graduation rate is over 90%. The engineering school enrolls approximately 2,700 of those students with slightly different demographics with 31% female, 4% African-American, 5% Hispanic, and 4% international.

OBSERVATIONS AND LITERATURE

In the engineering school’s Office of Undergraduate Programs, we noticed a trend of heavy traffic with students seeking support closer to larger exams, later in the semester, and at times of high stress. Available academic support resources include private tutoring, the Applied Mathematics (APMA) Workshop (a graduate student-run tutoring center for math courses, available weekday evenings), Crunchtime Reviews (a student-run, scheduled on-demand session for students in STEM courses), and academic coaching (mainly instructor-referred sessions with a professional).

From our experience and review of literature, we know that students perform best when they receive academic help early and often, as evidenced by Ebbinghaus [1] & Ambrose [2]. It appears that students are not consuming academic support in ways that will benefit them most over the longest period of time. We know from the Ebbinghaus Forgetting Curve [1] that retention of materials tends to decrease over time. With this information, we hoped our assessment would identify current trends and provide evidence for how students choose to use resources.

RESEARCH AND ASSESSMENT

To create a baseline in data collection to better understand how academic resources are affecting our students, we

pulled information about undergraduate engineering students from our student information system, and narrowed it down to those who were enrolled in an applied mathematics course during Fall 2014 (n=1694). We sorted students into academic resource-users (n=522) and non-resource-users (n=1172) to identify demographic and academic performance trends among these two groups through archived data analysis. To identify usage trends for each service, we also manually digitized the various data collected on usage for each academic resource-user, including service used, month, and a unique identifier (university-given computer identification). Private tutoring requests were tracked by a centralized administrator and captured only requests for tutor contact information. The math workshops captured usage through a paper sign in and Crunchtime Reviews through online session sign up.

Figures 1-4 summarize the main data collected by these means. Figures 1-2 show the final applied mathematics course grade for non-resource-users and resource-users, respectively. Both show a generally downward trend with a spike at the “B” grade.

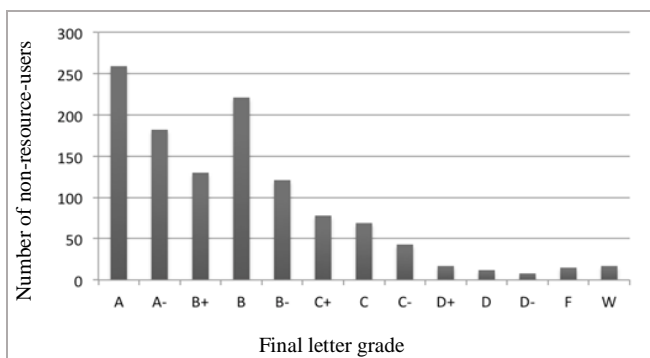


FIGURE 1
NON-RESOURCE-USERS' FINAL GRADES.

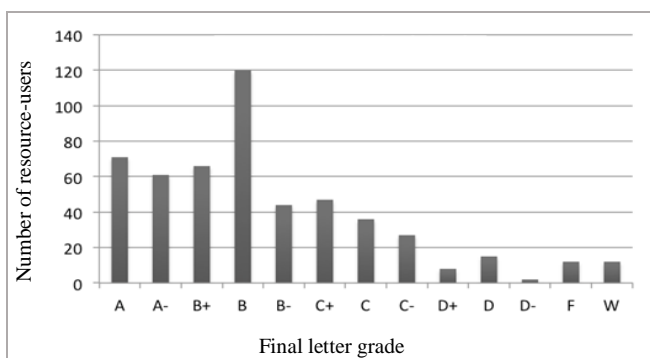


FIGURE 2
RESOURCE-USERS' FINAL GRADES.

Figure 3 charts resource use over the Fall 2015 semester, and Figure 4 shows how many students used each resource a particular number of times. Both clearly show that the Crunchtime Reviews resource is the most popular among students; we discuss this data further below.

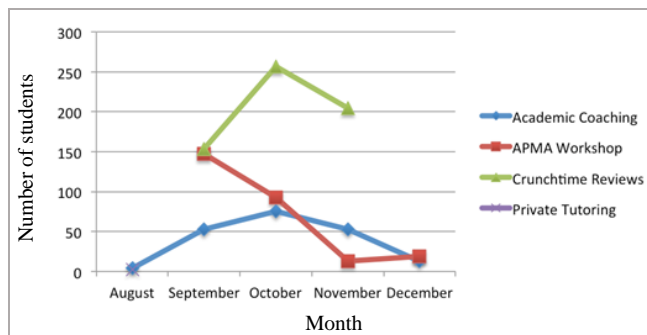


FIGURE 3
SEMESTER-LONG STUDENT USAGE TRENDS.

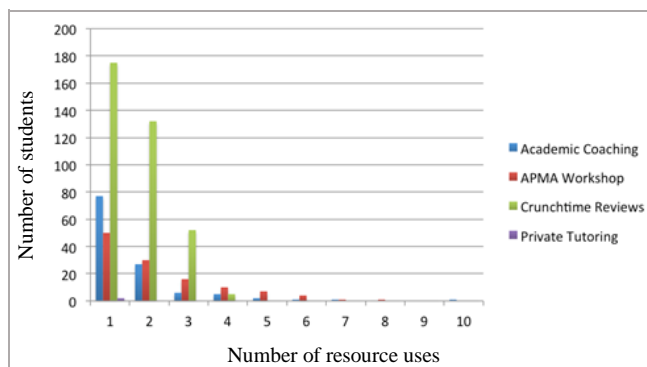


FIGURE 4
NUMBER OF RESOURCE-USSES PER STUDENT.

Within the same student population, we administered a survey and held multiple focus groups to various academic resource-users to understand student-reported usage trends, study habits, anxiety, and confidence levels associated with the resource(s) they use and the frequency with which they use them. All information was self-reported by students. Figures 5-7 show how students reported change in confidence based on resource used.

These procedures were carried out in the Fall 2015 and Spring 2016 semesters, and IRB approval was obtained to gather all data described above.

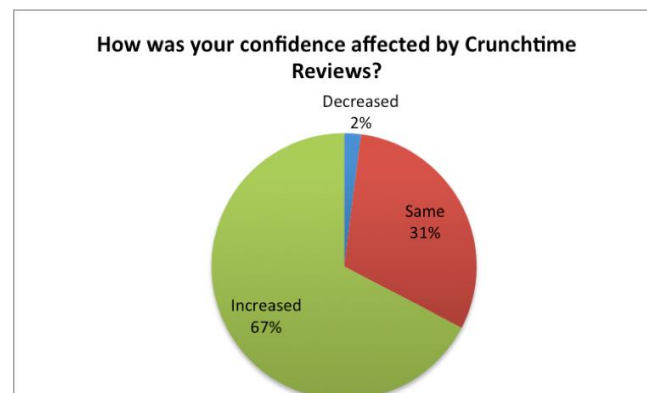


FIGURE 5
SELF-REPORTED CONFIDENCE FROM CRUNCHTIME REVIEW USAGE.

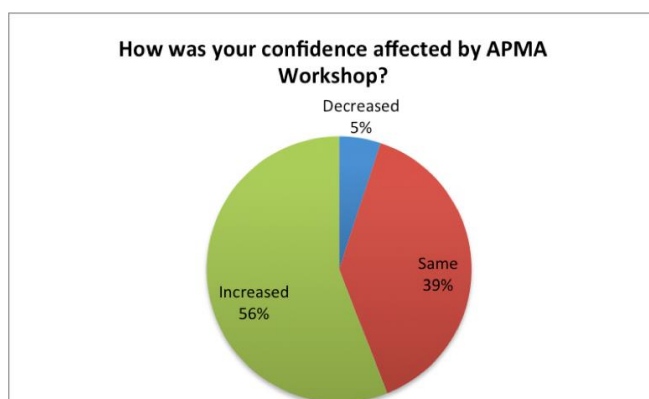


FIGURE 6
SELF-REPORTED CONFIDENCE FROM APMA WORKSHOP USAGE.

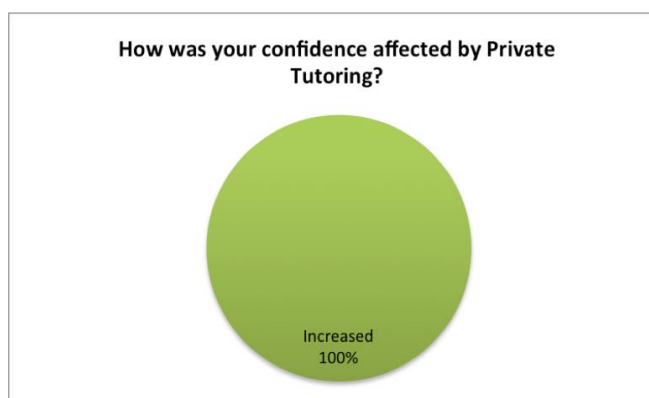


FIGURE 7
SELF-REPORTED CONFIDENCE FROM PRIVATE TUTORING USAGE.

DISCUSSION

Since we only had one sample of students to analyze, we decided to focus on understanding who our academic resource users are compared to our non-resource using population. We found that underrepresented groups are represented higher in academic resource users than those who do not use academic resources, and that the average letter grade was slightly higher at "B" (3.08 GPA) for those who do not use academic resources, as evidenced by Figure 1, compared to "B-" (2.867 GPA) for resource users, as evidenced by Figure 2. We suspect that the proportionally higher number of "B" grades among resource-users is evidence of resource effectiveness.

Through archival data analysis, we were able to identify that Crunchtime Reviews is the most used academic resource with peak usage around midterms (October) while the APMA Workshop was used more at the beginning of the semester than at the end of the semester (Figures 3-4). Academic coaching peaked mid-semester, likely because students are most likely to want to learn new planning techniques when they are struggling after midterms. Private tutoring was generally unmeasurable in terms of archival data since records on private tutoring are kept only between the user and the student tutor. We were able to tell that

students requested private tutoring but were unable to track how many times they used it and when. Better tracking of private tutoring would be helpful for future research.

From survey and focus group data, we were able to determine that students generally feel a decrease in anxiety and an increase in confidence when using academic resources (as evidenced by Figures 5-7), although this trend may vary based on the graduate assistant working in the APMA Workshop or the student instructor running the Crunchtime Review session. These findings seem reasonable due to varied instructor strategies and human error, but provide a framework for creating better systems of evaluating and assessing academic support services.

CONCLUSION

Our assessment allowed us to create a baseline picture of (1) who our academic resource-users are, (2) how they are affected by their choice to use a service and frequency of their use, and (3) what can be done to create more effective academic resources. We hope to use our findings to encourage our various academic resources to place a larger emphasis on understanding who they serve, what they do well, and ways in which they could improve. For the specific resource our office oversees, Crunchtime Reviews, we plan to use this assessment in an ongoing manner to create better policies for student instructors, provide greater professional development in best teaching practices, anticipate high-demand periods of time, and communicate more effectively with the student population.

In the future, we plan to survey students at particular times in the semester—beginning, midterms, and final exams—to better understand the anxiety, confidence, and motivation behind different resource usage in real time. We aim to learn from others' research methods and results to build an even stronger assessment plan in order to provide the best academic resources for our students by utilizing our resources efficiently and effectively.

REFERENCES

- [1] Ebbinghaus, H. (1913). *Memory: A contribution to experimental psychology* (No. 3). University Microfilms.
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AUTHOR INFORMATION

Lisa Lampe Director of Undergraduate Success, The University of Virginia, ll4uu@virginia.edu
Bridget Mearns Graduate Assistant, The University of Virginia, bam4xz@virginia.edu
Brian Paljug Graduate Assistant, The University of Virginia, bjp4qd@virginia.edu