

AUGUST 2023 | VOLUME 3

TEACHING AND LEARNING EXCELLENCE
THROUGH SCHOLARSHIP

TALES

An open access journal published by
the Community College of Baltimore
County for the advancement of higher
education through research.

IN THIS ISSUE

Invited Perspectives

Featured Tales

Research Articles

Review Articles

You are holding the digital compilation of TALES' third volume (2023). We hope you enjoy reading the articles and find them insightful and inspiring.

Don't stop here—read the articles from our first two issues as well on our website:

<https://tales.journals.publicknowledgeproject.org>

or follow this code:



Tales

INFORMATION AND CONTRIBUTORS

Founded in 2020, Teaching and Learning Excellence through Scholarship is an open-access, peer-reviewed academic journal published by the Community College of Baltimore County. The inaugural issue published in August of 2021 and was recognized with a 2021–2022 Innovation of the Year Award from the League for Innovation in the Community College. TALES is focused on the scholarship of teaching and learning in higher education, especially at community colleges.

EDITORS

- Editor-in-Chief: Robin K. Minor, Associate Professor of Biology
- Associate Editor: Jeremy Caplan, Assistant Professor of Communication and Media Studies
- Managing Editor: Michael D. Hands, Assistant Professor of Physical Science
- Website Editor: Veronica Noone, Assistant Professor of Computer Science and Information Systems
- Graphic Designer: David Zobel, Associate Professor of Arts, Design, Interactive Media

ADVISORY BOARD

- Dallas Dolan (Chair), Assistant Dean, Faculty Training and Development
- Glenda Breaux, Senior Director, Planning, Research, and Evaluation
- Rebekah de Wit, Director, Global Education
- Jackie Dreja McTear, Senior Designer, Creative Services
- Myron T. Strong, Editor, Journal Traverse
- Jamie Witman, Online Learning Librarian, CCBC Library

PEER REVIEW TEAM 2023

- James Braman, School of Business, Technology and Law
- Eric Cotton, School of Mathematics and Science
- Christine Dubowy, School of Mathematics and Science
- Amy Ertwine, School of Health Professions
- Tim Faith, School of Business, Technology and Law
- Connie Hayek, School of Health Professions
- Kelley M. Hovis, School of Mathematics and Science
- Damon Krometis, School of Arts and Communication
- Trisha Kyner, School of Arts and Communication
- Shawn McNamara, School of Health Professions
- Andrew Rusnak, School of Writing, Literacy and Languages
- Joe Sparenberg, School of Mathematics and Science

CALL FOR SUBMISSIONS

TALES is seeking article submissions for the 2023 issue. Please submit manuscripts directly to Robin Minor, rminor@ccbcmd.edu.

For author instructions and a template for articles:
<https://tales.journals.publicknowledgeproject.org/>

LETTER FROM THE

Editor

Welcome to the third issue of Teaching and Learning Excellence through Scholarship (TALES) from the Community College of Baltimore County! Depending on your perspective, 3 years can fly or crawl by, and somehow TALES' trajectory has done both. An enormous amount of planning, collaboration, and editing have gone into each issue, and some of our manuscripts undergo many months of revision as they progress from concept to formatted page. It's the attention to detail and focus on quality by TALES' authors, peer reviewers, and editors that has produced our best issue yet for 2023 and this takes slow, steady effort. On the other hand, our work has been such rewarding, good fun that it seems like yesterday that we were considering what methods we'd use to publish our first issue. We've come a long way in a flash, and this third issue is a natural progression to our best product yet.

Opening this issue is an insightful perspective on 53(!) years of teaching for CCBC that is both witty and inspiring. It illustrates the kind of dedication that CCBC faculty bring to their classes when Dr. Stearns relates how she maintains contact with students decades later who continue to appreciate her for her guidance and support. This issue also boasts the most Featured Tales and research articles we've published yet. The articles range from large-scale, program-wide initiatives to single-section intervention studies, and each is a valuable recount of the authors' efforts to improve higher education. They showcase initiatives both at CCBC and at outside institutions including the University of Maryland Eastern Shore and Montgomery

College, a testament to the service that CCBC provides for our region by hosting an open academic journal that allows us to have a pedagogical discussion with our broader colleagues. I'm very pleased to report that this issue contains TALES' first review paper, which is an academic survey of the existing literature on a topic where the authors summarize the overall state of the topic from the published accounts and provide their insights on the topic. The review paper in this issue looks at published efforts to foster connections between students in online classes and describes several techniques in detail that can adapt to all instructional modalities. This issue has something for everyone, and we hope you appreciate reading the articles as much as we enjoyed putting them together for you.

TALES looks forward to continuing to grow. We have been accepted to the Directory of Open Access Journals, and now that we have published our third issue we will also apply for inclusion in ERIC. The content in TALES is valuable, and we want to share it with as wide of an audience as possible. You can help us with this, and we ask you to please consider the roles you can take to promote the journal. Please read our articles and consider if any of the programs or interventions might be useful to you. Share links to articles with your colleagues and you'll benefit both TALES and spread valuable knowledge. As you try new approaches in your classes consider contributing your own manuscript to the journal—we truly believe that each of us has insights to contribute!

Until the next issue,



Robin K. Minor, PhD | rminor@ccbcmd.edu
Editor-in-Chief
Community College of Baltimore County

Ann K. Stearns, PhD

INVITED PERSPECTIVES

THANK YOU FOR THE MUSIC

THANK YOU FOR THE MUSIC



YEARS

Ann K. Stearns, PhD | astearns@ccbcmd.edu

From the Department of Behavioral Science, School of Wellness,
Education, Behavioral and Social Sciences, Community College
of Baltimore County, Baltimore, Maryland.

"I'm so grateful to have been a part of it all for 53 years"

There were ashtrays on desks in the classrooms. I taught with chalk in one hand and a cigarette in the other. Students lined up under trees, waiting to register for classes in a trailer house on wheels. In September 1970, there were just 2 permanent buildings on the Essex campus. Some of my courses were in the newly built library or administration building. Most were in prefab rectangular classrooms sitting atop concrete blocks: It was like teaching in an oversized shoebox with a door and windows. Except it was fun. I fell in love with teaching right away.

At age 27, I wasn't much older than many of my students, several of whom returned to Maryland for my retirement party a few days ago. Two who are retired now, Dr. Arnie Schuster, then a high school dropout, was my first student to become a psychologist, and Kay Zuna, Master of Social Work, became a social worker working with young girls from troubled families who might be in prison today if not for her. Another, Diane Rode, still works full time now after almost 40 years as a Senior leader, leading a staff of more than thirty, implementing creative arts therapy and live broadcast programming for long-term hospitalized children at Mount Sinai Children's Hospital in New York City. Remarkably, they all 3 recalled a powerful book they read in one of my earliest courses, *Man's Search for Meaning*, by Holocaust survivor and physician Viktor Frankl. It was always important to me to prompt my students to think about finding a purpose in life and using their talents for good.

In the mid-1970s, during my psychology internship at Johns Hopkins, there were cigarette machines in the hospital; the nursing station was filled with smoke; many patients smoked; and I puffed away in a white coat, counseling mentally ill people in a

windowless office. It's hard to imagine that now: With 50,000 students, CCBC's 3 main campuses and 4 satellite sites are all smoke-free. We also are committed to environmental sustainability and educational affordability as evidenced by the solar panels that cover our parking lots, safeguarding energy and saving millions of dollars.

By the early 1980s, quite a few women who had raised or were raising children started coming back to school. I have felt a connection with them as deep as with my younger students. One of those eager learners was then 47-year-old Betty Burman. Thirty-six years later, in 2019, I walked into a classroom to find a bouquet of yellow roses on my desk and 83-year-old Betty (now Loizeaux) back for more learning! She continued to take classes on Zoom through the pandemic, made many valuable contributions to our class discussions, and my younger students loved her. It's one of my favorite things about this wonderful college – we welcome everyone and decade-by-decade we've grown increasingly diverse by age, race, ethnicity, gender, religious and secular beliefs, socio-economics, and nationality.

How blessed my life has been to be a young teacher and then long-time full professor at the Community College of Baltimore County, formed in 1998 when 3 separate community colleges joined into 1, rapidly growing over the decades, increasingly innovative, and award winning among community colleges nationwide. From the 1970s into 2023, we are "CCBC Proud" as together we open doors and we transform lives. Literally hundreds of thousands of our former students are now making our state, country, and world a better place. I'm so grateful to have been a part of it all for 53 years.



FEATURED

TALES

IN THIS SECTION

- Yes, Developmental Students Can Thrive
- Teaching Squares
- ERG's at Montgomery College
- Learning Communities

From the English, Communication
and Languages Department, School
of Liberal Arts, College of Southern
Maryland, La Plata, Maryland.

Kimberley M. Donnelly, MS
kmdonnelly@csmd.edu

Yes, Developmental Students Can
Thrive in Integrated Courses and
Compressed Terms: Leveraging
Institutional Data and National
Trends to Build the Best Reading/
Writing Program

YES, DEVELOPMENTAL

STUDENTS CAN THRIVE

Kimberley M. Donnelly, MS

DEVELOPMENTAL

educators in higher education are caught in a crossfire.

On one side, researchers, organizations, companies, non-profits, practitioners, and to some extent, the public, are clamoring for massive reform in developmental coursework in higher education (American Association of Community Colleges, 2018; Edgecombe et al., 2014; Complete College America, 2012). One such reform is the push for integrated reading and writing (IRW) courses. According to Armstrong et al. (2019), this is the promise of IRW: "Integration is an approach that values literacy-based academic communication processes equally and that coordinates those processes purposefully for new-to-college learners." All of these groups present a compelling argument, but that argument is founded upon a small body of research and practices that work in some situations and with some populations when implemented with fidelity. In spite of that lack of research, some states have forced colleges to develop and implement IRW courses, but Maryland has not.

On the other side, researchers and organizations that have been the backbone of developmental education paint a different picture (Goudas, 2023; Goudas & Boylan, 2012; Saxon et al., 2016a & 2016b). They argue that change and evolution are needed, but not such dramatic, massive reforms,

which may sound like quick and easy fixes, but actually create new barriers and disservice to students, and moreover make a good deal of money for those researchers, speakers, and organizers.

The pressure for redesign of developmental reading and writing programs is intense, but other transformations in higher education are also shaping the future of developmental education. For example, as a result of joining Achieving the Dream's core program in 2019, the College of Southern Maryland (CSM) made a commitment to shift the majority of courses to a compressed 7-week format by fall term of 2021. Part of the Achieving the Dream (2023) mindset is that "Before we can help your institution transform, we have to understand where you've been," which begins with exploring, "your student demographics; your legislative environment; mission and theory of change; past initiatives and student success efforts; and more." Thus in 2020, the time was ripe to take a deep dive into CSM's past practices and data and to cull promising practices from the published literature. This dive was the beginning of an 18-month redesign process.



SUMMARIZING OUR HISTORY

—Leveraging institutional data—

As the Achieving the Dream coaches and the CSM team started to do this work at the institutional level, as Coordinator of Developmental Reading and Writing, I undertook a similar process. While the records were not complete, sufficient data was available to conclude that over the 20-year span from 2000–2020, CSM's developmental reading and writing faculty consistently reaffirmed a core vision and goals, and they piloted, implemented, and evaluated a wide range of success initiatives, placement testing tools, textbooks, software packages, and redesign strategies. Although CSM had always had separate developmental reading and writing tracks, the number of credits required, the levels offered, and the exit criteria fluctuated over the 20-year period.

CSM's data shows that there is no simple, dramatic solution for assisting students to grow into college-ready writers or readers. Regardless of the instructional methods, resources, faculty, and external factors (like Common Core, recessions, and changes in the demographics of Southern Maryland), success rates for developmental reading and writing courses at CSM have held fairly steady, and the subsequent performance of those passing students in the gateway composition course (ENG 1010) has also remained steady. Overall, students who pass their developmental

reading and writing courses perform about as well as their directly-placed peers in ENG 1010. Over the last 20 years, compressed-term courses existed at CSM in occasional "mini" courses or "late-start" courses that were offered irregularly—without any systematic reengineering or assessment. However, institutional data shows that 7-week evening courses in Fall 2019 had higher enrollment and pass rates than 15-week evening courses in Fall 2018. This illustrates that compressed terms held promise for CSM's students.

A close look at CSM's outcomes data showed that 3 of our past initiatives correlated with our best developmental course success and our best subsequent success rates in the gateway college composition course.

First CSM partnered with Charles MacArthur, Zoi Traga Philippakos, and a team from the University of Delaware to pilot an IRW course in Fall 2017 using their instructional approach Supporting Strategic Writers (supportingstrategicwriters.org). Data from that pilot course showed that students who passed the IRW course and took the gateway course in the subsequent semester ($n = 58$) passed the gateway course at a rate of 68%, which was the same as students who placed directly into the gateway course. Students who passed the traditional developmental writing





course and took the gateway course in the subsequent semester (n = 255) passed the gateway course at a rate of 69.6%. This suggests that taking the IRW course did not harm students even though the pace was frantic, and instructors felt that instruction and practice in reading skills was inadequate.

Second, for a short time between 2013–2017, CSM had a Center for Interdisciplinary Studies, and part of the center's charge was to develop a first-year experience, titled Interdisciplinary Studies 1010 (IDS). Although the credit-course version of IDS never came to fruition, a version of IDS was implemented for students who placed into developmental reading.

The course, IDS 1010T, focused on applying active, strategic, and analytic reading approaches to collect content for a public poster presentation. Data showed that IDS students out-performed

their directly-placed peers in ENG 1010, yet IDS 1010T was exhausting to teach. It was fast-paced, high-energy, and high-touch, and it required huge investments in technology and logistics to make the poster sessions and all the other moving parts align.

Third, CSM had worked closely with Rita Smilkstein (2009) and her Tools for Writing curriculum for many years. Students who passed the Tools course (CSM's lowest level) and enrolled in ENG 0900 (our regular developmental composition course) in the subsequent semester nearly always outperformed students who were directly placed into ENG 0900. Tools for Writing taught students to recognize the components of sentences by using sentences written by the students themselves. Students labeled all homework sentences, using a cumulative set of tools. During every class, students wrote sentences on the board, discussed their work, and revised their work.

SUMMARIZING THE LITERATURE

— Promising practices and tensions in the field —

Practitioners and researchers agree that IRW courses must be designed from scratch. IRW courses are not simply a mashup of existing composition and reading course content, assignments, and assessments. Based on experiences at the Community College of Baltimore County, Hayes and Williams (2016) advised others to avoid the urge to try to merge existing courses; instead, they advised others to create something totally new. The same is true for compressed-term courses. Simply collapsing 16 weeks of content and activities into a shorter span, perhaps with

longer class periods, is a recipe for frustration, stress, and disengagement. Achieving the Dream has published a guide for institutions that are adopting compressed terms and the following mindset is emphasized: "We urge faculty to avoid the path of simply stacking multiple class sessions from an existing design into longer sessions. Take the opportunity to approach your course with a fresh lens and ask what is most important for your students to know and to be able to do when they complete the course" (Fladd et al., 2021).



As far as recommendations regarding how to go about that redesign, promising practices abound, yet each practice described in the literature surrounding redesign is fraught with competing views and tensions.

Studying all available institutional data can provide the best lens for viewing and interpreting the scholarly discourse surrounding developmental redesign.

Some of the recurring themes that CSM addressed during our redesign were:

- addressing placement issues, including how much agency students should have (Edgecombe et al., 2014; Hayes & Williams, 2016; Pierce, 2017; Saxon et al., 2016a & 2016b) and the value of combined multiple measures for placement as opposed to alternative single measures (Brathwhite & Edgecombe, 2018; Goudas, 2019)
- determining the right amount of time for the in-person, online, and homework components, which affects decisions about the number of credit hours, the number of courses in the sequence, the course modalities, and the curriculum choices (Edgecombe et al., 2014; Hayes & Williams, 2016; Kalamkarian et al., 2015; Pierce, 2017)
- articulating the purpose for the time-compressed IRW course, e.g., to prepare students for the gateway composition course or to increase retention and graduation rates (Goudas, 2023)
- balancing composition, grammar, and reading instruction, e.g., in a study of available textbooks for IRW, Armstrong et al. (2019) reported that most have only surface integration of reading and writing components.
- discerning a theoretical and philosophical framework, i.e., whether to use a highly structured sequence of lessons (MacArthur & Traga Philippakos, 2017; MacArthur et al., 2022) or whether to guide students through the messy process of doing authentic college work (Hayes & Williams, 2016)
- right-sizing the number of assignments and depth of feedback from instructors, as all of the programs reviewed in CSM's process pointed toward fewer deliverables, with more self-assessment and informal peer and instructor feedback as the formative assessment
- aligning with any first-year seminar courses, e.g., some institutions use a learning community model (Chism Schmidt & Graziano, 2016)

STARTING A NEW CHAPTER:

IRW at CSM in 7-week terms

In January of 2021, after reviewing the extensive institutional historical data about developmental offerings and thorough exploration of promising practices and tensions within the field, a roadmap was developed for transitioning from a multi-course, multi-level program to a streamlined integrated reading/writing (IRW) program. The goal was to build a new IRW curriculum, native to compressed terms and both synchronous virtual and in-person formats, that would leverage practices that had shown the greatest success locally and situate them within the context of promising practices from other institutions and national trends. Key questions explored during course development included a) What is the bare minimum of content, practice, and feedback necessary for students to be able to succeed in credit courses and b) How could CSM capitalize on multiple models that had shown positive results with our student body?

CSM answered those questions by developing and offering 3 unique, interchangeable, native to 7-week and synchronous online, 3-credit courses, any one of which conveys writing and reading equivalency. Think of it like developmental electives; students with GPAs below 2.5 select one course to satisfy the requirement. (Note: Students with 2.5-2.9 GPAs take ENG 1010T, a version of our credit course with enhanced support.)

- IRW 0900A: The Academic Essay
- IRW 0900B: The Academic Presentation
- IRW 0900C: The Writing Portfolio

All 3 courses share the same core student learning objectives; however, the enabling objectives, assignments, and presentation modes vary to take advantage of the 3 approaches that had been shown in the institutional data to work best with CSM's student population. The core learning objectives are that at the completion of the course, the student will be able to:

- Apply the steps of the writing process in order to produce well-developed college-level texts that are clearly organized and in which errors do not interfere with fluent reading and understanding.
- Read sources critically and take notes in order to write summaries and responses.
- Integrate credible source material in their own texts to support claims.

In order to realize this substantial paradigm shift, CSM needed support from a multitude of internal and external partners. For IRW 0900A, the college partnered with Supporting Strategic Writers (SSW, <https://www.supportingstrategicwriters.org/>), led by Charles MacArthur and Zoi Traga Philippakos. The SSW team created a custom curriculum and textbook for the course based on their research and previous collaborations with CSM. For IRW 0900B, an in-house team including the course coordinator plus full-time and part-time faculty mapped out an instructional sequence and created an extensive course shell in CSM's learning management system.

IRW 0900C resulted from collaborations between the course coordinator and several gateway courses in other disciplines, including science, psychology, sociology, and first-year seminar. College partners, including the enrollment and advising teams, division chairs, and academic affairs team, were involved and supportive throughout the process.

Table 1. IRW Course Outlines

IRW 0900A The Academic Essay	IRW 0900B The Academic Presentation	IRW 0900C The Writing Portfolio
• Introduction to the course • Writing summary-response papers • Argumentative writing with sources	• Get started • Plan for reading • Execute the plan • Synthesize ideas from self and sources • Present and reflect	• How to learn grammar and understand written assignment requirements • Foundations of sentence structure (professor office hour visit paper from FYS 1010) • Major sentence structures (article summary from PSY/SOC 1010) • Giving, receiving, and applying feedback (site visit paper from SCE 1010) • Writing a reflective essay • Portfolio conferences and reflections

EARLY METRICS

Enrollments, pass rates, and gateway composition completion

Historically, CSM offered about 400 seats in the developmental reading and writing courses in the 15-week fall term. Placement into developmental courses was already trending down, and the shift to GPA placement during the pandemic accelerated that trend. In addition, transitioning to a 1-course requirement to fulfill both reading and writing prerequisites eliminated duplication (students taking both reading and writing). Furthermore, the transition to compressed terms changed enrollment patterns. Since IRW was implemented in fall 2021, our fall enrollment is steady at about 200 seats, with about 140–150 seats in fall term 1 and about 50–60 seats in fall term 2.

Overall student success in the gateway composition course (ENG 1010) typically ranges between 65–68% of enrolled students earning A, B, or C as the final grade. As shown in Table 2, students who completed IRW 0900A and took ENG 1010 immediately afterward succeeded at almost the same rate, which is impressive because historically, these students could not have completed both courses in a 15-week period ever before. As of this writing, students are finishing 2023 spring term 2, so data is incomplete; however, the general trends seem to be similar to the 2021 results. Historically, overall gateway course success of students who passed developmental writing averaged about 65%, with a range of about 58–69%. Passing IRW 0900A students in ENG 1010 performed about the same as students in the old paradigm; however, at least for the first year, IRW 0900B students had more

success in the developmental course but less success in the gateway course. All of these populations are small, and the results must be interpreted cautiously; however, CSM suspended the IRW 0900C course beginning in fall 2022 due to the dramatically lower pass rate.

In fall 2021, CSM was careful to offer an excessive number of seats to ensure that students could find a seat that matched their preference for IRW 0900A, B, or C. Interestingly, students showed a strong preference for the IRW 0900A, which is the most traditional option. In addition, a higher percentage of students who passed 0900A were retained into the gateway course in the subsequent term. Disaggregated data showed that male students had the highest pass rate in IRW 0900B. Students identifying as Black or African American had a 75% pass rate in 0900B, but a 60% pass rate in 0900A.

A few more students took ENG 1010 in spring terms 1 and 2; they pulled down the overall success rate for IRW 0900A and nudged up the success rates for 0900B and 0900C as shown in Table 3. Paulson and Van Overschelde (2019) studied a statewide mandate in Texas, finding that community college students who passed time-compressed IRW developmental courses were slightly less successful in gateway courses than those who took full-term and/or independent reading and writing courses, which is consistent with CSM's early results.

HOWEVER, THE TRANSITION TO IRW IS NOT THE ONLY VARIABLE AFFECTING THIS STUDENT POPULATION.

Some students in this population experienced a virtual senior year of high school due to the pandemic. Also due to the pandemic, students in IRW were placed by GPA. Finally, students in the IRW population took ENG 1010 in a 7-week format while CSM was still under pandemic protocols, including most sections in asynchronous online, synchronous online, or hybrid format. Any one of those variables could be responsible for the slight dip in IRW-completers' success in ENG 1010. Paulson et al. (2021) interviewed instructors of time-compressed IRW courses in Texas and found that instructors were most concerned that students were not getting sufficient time to practice and apply the strategies. A few CSM instructors have expressed that sentiment; however, most instructors balance that view with focus on the benefits gained by limiting developmental coursework to the minimum needed for students to function in credit coursework.

Qualitative data for IRW courses is available through our course evaluation system, the IDEA Student Ratings of Instruction: Diagnostic Feedback Instrument from Anthology. When comparing course evaluation results from developmental writing (fall 2019 and 2020) to IRW course evaluation results (fall 2021 and 2022),

scores are generally equivalent with most students rating the old and new courses between 3.8 – 4.8 on a 1 – 5 scale. Written comments that students submitted in an open-ended comment box on the IDEA Instrument were overwhelmingly positive about both developmental writing and IRW.

Outcomes assessment prior to IRW was spotty. Part of the curriculum development process for IRW was to develop shared grading rubrics that are used across all sections of each course. These shared rubrics allow for systematic and ongoing outcomes assessment. Fall 2021 term 1 rubrics for all 3 courses show that by the end of the courses, students were performing well on content, organization, and sentence structure, but struggling with using sources effectively. For example, scores for each criterion on the rubric for IRW 0900A were above 85% for all categories, except for use of sources where scores ranged from 66 – 77%. Prior to IRW, CSM's developmental reading and writing courses did not emphasize writing with sources, so this finding is not surprising. Students in IRW are experiencing a more challenging curriculum in a compressed timeframe. Although we have improvements to make in our curriculum, these scores show that most students are making progress in composing source-based work.

**Table 2. 15-Week Results of IRW in a Compressed Term
(Fall 2021 Term 1 Students)**

	IRW 0900A Essay	IRW 0900B Presentation	IRW 0900C Portfolio
Enrollment in developmental	84	40	20
Developmental pass rate	55 (66%)	29 (73%)	9 (45%)
Enrollment in ENG 1010 in fall term 2	32 (58%)	12 (41%)	4 (44%)
Success in ENG 1010 in fall term 2	20 (63%)	5 (42%)	3 (75%)

Abbreviations: ENG 1010 = gateway composition course; IRW = integrated reading/writing.

**Table 3. 30-Week Results of IRW in a Compressed Term
(Fall 2021 Term 1 Students)**

	IRW 0900A Essay	IRW 0900B Presentation	IRW 0900C Portfolio
Enrollment in ENG 1010 during first year	46 (84%)	18 (62%)	7 (78%)
Success in ENG 1010 during first year	24 (52%)	8 (44%)	6 (86%)

Abbreviations: ENG 1010 = gateway composition course; IRW = integrated reading/writing.

THE BOTTOM LINE

Pass rates before and after implementing IRW are holding steady. Early data shows that some students were able to complete their developmental program in just 7 weeks and were able to complete the college-level composition course in the subsequent 7 weeks, thus completing their credit-level English requirement within their first 15 weeks at CSM. Course-level outcomes assessment shows that students are building the skills needed for success.

After 18 months of implementation, CSM's new IRW curriculum in compressed terms appears to serve students about as well as the former multi-course, multi-level program. Even though the former program was robust, vigorous, and thorough, IRW in compressed terms appears to be equally effective in preparing students for success in credit-level courses, while saving them 15 – 30 weeks of time and up to 9 credits of cost, depending on where they were placed in the old system.

ACKNOWLEDGEMENTS

The author would like to thank Chip Keech and Dr. Erin Ebersole from CSM's Planning, Institutional Effectiveness and Research Department for providing the data for this project. In addition, collaboration with Dr. Charles MacArthur, Dr. Zoi Traga Philippakos, and the Supporting Strategic Writers team was critical to the success of this work. Finally, deepest thanks to the developmental reading/writing faculty and college leaders who supported every step of this process.

REFERENCES

1. Achieving the Dream. *Whole college transformation starts here*. Retrieved June 29, 2023, from <https://achievingthedream.org/foundations-of-transformation/>
2. American Association of Community Colleges. *Institute #7: Integrating redesigned developmental education into pathways*. Retrieved June 29, 2023, from <https://www.pathwaysresources.org/toolkits/pathways-institutes-materials/institute-7-integrating-redesigned-developmental-education-into-pathways/>
3. Armstrong, S., Stahl, N., & Lampi, J. (2019). All the best-laid plans: A content analysis of textbooks driving integrated reading and writing courses in community college contexts. *Community College Journal of Research and Practice*, 44(7), 1–20. <https://doi.org/10.1080/0668926.2019.1616633>
4. Brathwaite, J., & Edgecombe, N. (2018). Developmental education reform outcomes by subpopulation. *New Directions for Community Colleges*, 2018(182), 21–29. <https://doi.org/10.1002/cc.20298>
5. Chism Schmidt, L., & Graziano, J. (Eds.). (2016). *Building synergy for high-impact educational initiatives: First-year seminars and learning communities*. University of South Carolina, National Resource Center for The First-Year Experience & Students in Transition. <https://files.eric.ed.gov/fulltext/ED573736.pdf>
6. Complete College America. (2012). *Remediation: Higher education's bridge to nowhere*. Inside Higher Ed. https://www.insidehighered.com/sites/default/server_files/files/CCA%20Remediation%20ES%20FINAL.pdf
7. Edgecombe, N., Jaggars, S. S., Zu, D., & Barragan, M. (2014). *Accelerating the integrated instruction of developmental reading and writing at Chabot College*. Community College Research Center. Working paper 71. <https://ccrc.tc.columbia.edu/publications/accelerating-integrated-instruction-at-chabot.html>
8. Fladd, L., Iuzzini, J., & Lawton, J. (2021). *Preparing for shortened academic terms: A guide*. Achieving the Dream. <https://files.eric.ed.gov/fulltext/ED621295.pdf>
9. Goudas, A. M. (2019). *Multiple measures for college placement: Good theory, poor implementation*. Community College Data. Retrieved June 29, 2023, from <http://communitycollegedata.com/articles/multiple-measures-for-college-placement/>
10. Goudas, A. M. (2023, March 3). *The elimination of remediation and developmental education is harmful and diversionary* [Conference presentation]. National Association for Developmental Education Conference, Nashville, TN, United States. 2023NOSSEliminationRemediationGoudas
11. Goudas, A. M., & Boylan, H. R. (2012). Addressing flawed research in developmental education. *Journal of Developmental Education*, 36(1), 2–13. <http://files.eric.ed.gov/fulltext/EJ1035669.pdf>
12. Hayes, S. M., & Williams, J. L. (2016). ACLT 052: Academic literacy – An integrated, accelerated model for developmental reading and writing. *NADE Digest*, 9(1), 13–21. <https://files.eric.ed.gov/fulltext/EJ1097459.pdf>

REFERENCES

13. Kalamkarian, H. S., Raufman, J. & Edgecombe, N. (2015). *Statewide Developmental Education Reform: Early Implementation in Virginia and North Carolina*. Community College Research Center. <https://ccrc.tc.columbia.edu/media/k2/attachments/statewide-developmental-education-reform-early-implementation.pdf>
14. MacArthur, C. A., & Traga Philippakos, Z. A. (2017). *Supporting strategic writers: A self-regulated strategy approach—Essays and introduction to writing from sources* [Unpublished manuscript]. University of Delaware.
15. MacArthur, C. A., Traga Philippakos, Z. A., May, H., & Compello, J. (2022). Strategy instruction with self-regulation in college developmental writing courses: Results from a randomized experiment. *Journal of Educational Psychology*, 114(4), 815–832. <https://doi.org/10.1037/edu0000705>
16. Paulson, E. J., Sarker, A. L., Reynolds, J. S., & Cotman, A. M. (2021). Instructors' voices: Experiences with state-mandated accelerated integrated developmental reading and writing coursework in Texas community colleges. *Journal of College Reading and Learning*, 51(2), 110–130. <https://doi.org/10.1080/10790195.2020.1867668>
17. Paulson, E. J., & Van Overschelde, J. P. (2019). Accelerated integrated reading and writing: A statewide natural experiment. *Community College Journal of Research and Practice*, 45(1), 13–30. <https://doi.org/10.1080/10668926.2019.1636733>
18. Pierce, C. A. (2017). Research-Based Integrated Reading and Writing Course Development. *Journal of Developmental Education*, 40(2), 23–34. <https://files.eric.ed.gov/fulltext/EJ1168753.pdf>
19. Saxon, D. P., Martirosyan, N. M., & Vick, N. T. (2016a). Best practices and challenges in integrated reading and writing: A survey of field professionals, part I. *Journal of Developmental Education*, 39(2), 32–34. <https://files.eric.ed.gov/fulltext/EJ1117753.pdf>
20. Saxon, D. P., Martirosyan, N. M., & Vick, N. T. (2016b). Best practices and challenges in integrated reading and writing: A survey of field professionals, part II. *Journal of Developmental Education*, 39(3), 34–35. <https://files.eric.ed.gov/fulltext/EJ1130193.pdf>
21. Smilkstein, R. (2009). *Tools for writing*. Many Kites Press.

Mathematics Department, School of
Mathematics and Science, Community
College of Baltimore County, Owings
Mills, Maryland.

Radhakrishnan
Palaniswamy, MS
rpalaniswamy@ccbcmd.edu

TEACHING

SQUARES

Radhakrishnan Palaniswamy, MS

TEACHING

SQUARES PROGRAM

The Teaching Squares Program involves the formation of a three or four member group of educators from different departments or disciplines. The diversity in knowledge and experience helps to promote cross-disciplinary learning and professional growth among teachers. Once the group has been formed, the teachers select a class they will each teach during the observation phase. Other teachers observe each instructor as they lead the students and engage with them. Participants then meet after they make their observations to provide feedback. The teachers meet regularly to provide feedback in a supportive and constructive manner.

The Teaching Squares Program helps to promote continuous professional growth and development. As teachers observe their peers, they learn practical strategies that their peers use to encourage a collaborative and supportive learning environment. A significant benefit of Teaching Squares is that faculty can observe and learn from their colleagues. In this program, teachers observe their colleagues in the teaching process and give feedback using given criteria. Teaching Squares allows teachers to receive feedback on their teaching approach and strategies from their peers. The program encourages the teachers to reflect on their practice and seek practical

opportunities for development and growth. This program is a multidisciplinary model for instructor reflection and assessment. Furthermore, Teaching Squares provides a sense of togetherness and collaboration among faculty members.

Usually, teachers devote much of their time to preparing lessons, teaching, and assessing students, leaving them with little time to observe and learn from colleagues. Teaching Squares is a structured program that allows teachers to observe and learn from their colleagues. It is a practical approach that can help improve their performance and effectiveness. This is a peer review process that allows collaboration and reflection among faculty members. Teaching Squares is a structured program that involves approximately 3 to 4 faculty members who observe their colleagues in the teaching process and give feedback using given criteria. The program aims to provide faculty with a platform to observe and learn from each other's teaching approaches in a non-competitive and supportive environment. The participating members follow the teaching process of their colleagues and then offer helpful feedback as they engage in reflective discussions.

OVERVIEW

OF THE TEACHING SQUARES PROGRAM

Typically, Teaching Squares begins with forming a 3- or 4-member group of educators from different departments or disciplines. As Widjaja et al. (2017) notes, the diversity in knowledge and experience helps to promote cross-disciplinary learning and professional growth among teachers. The participating teachers agree to work under a structured framework that includes empathy, respect, collaboration, and adherence to non-evaluation. The teachers need to be non-judgemental of their colleagues' teaching approach. The non-judgemental and respectful approach allows the teachers to be reflective and open-minded. During the formation of the group, the participants agree on expected behavior and criteria for engagement and providing feedback.

Once the group has been formed, the faculty members select a class they will each teach during the observation phase. The other 2 or 3 faculty members, depending on the size of the group, observe each faculty as they lead the students and engage with them. Feedback is then provided based on agreed-upon criteria. Some of the criteria faculty use to provide input are the level of student engagement, proficiency

of the strategy used, and effectiveness of the assessment strategy (Lemus-Martinez et al., 2021). As the teachers observe their colleagues engaging with students, they reflect on their teaching strategies and engagement with the learners.

Participants then meet after they make their observations to provide feedback. The faculty members meet regularly to provide feedback in a supportive and constructive manner. The feedback focuses on particular areas of improvement rather than general criticism. Kirker et al. (2021) noted that the provided feedback allows the teachers to reflect on their teaching and areas of improvement, such as classroom engagement, management, assessment, and teaching strategies. Feedback is essential for development and growth as participating faculty members reflect on their performance and incorporate suggestions from their peers. The self-reflection helps the teachers to become more aware of their strengths and weaknesses. As a result, they make more informed decisions about their teaching practices to enhance their performance and student outcomes.

TEACHING

SQUARES PROGRAM IN THE LITERATURE

The structure of the Teaching Squares Program helps to promote continuous professional growth and development. The program is not a one-time activity; participants can repeat the process in subsequent semesters for continuous peer learning and evaluation. Haave (2014) noted that in a supportive and collaborative environment, teachers can learn practical strategies to improve their performance from their peers. As they observe their peers, they learn practical strategies that their peers use to promote a collaborative and supportive learning environment. Also, the team acts as a support system for the teachers to explore and experiment with various teaching strategies and philosophies to enhance student success and retention rate. According to Fleming et al. (2015), teachers who engage in Teaching Squares find that the program is effective in helping them to promote a sense of community and collaboration with their peers. Similarly, Friedman et al. (2022) noted that Teaching Squares helps teachers to learn from their peers' effective teaching strategies and philosophies that can then help to improve their performance and student outcomes.

A significant benefit of The Teaching Squares Program is that it allows teachers to receive feedback on their teaching approach and strategies from their peers. In their study, Atkins et al. (2018) noted that feedback provided by peers in Teaching Squares is more relevant and practical than feedback from outside evaluators. The reason is that participants in Teaching Squares understand the opportunities and challenges of teaching in the same institution. They tend to perceive their peers' feedback as more genuine, and their suggestions are more likely to help them succeed in their teaching careers.

The Teaching Squares Program helps to foster a culture of continuous improvement. The program encourages the teachers to reflect on their practice and seek practical opportunities for development and growth. According to Bereson (2017), Teaching Squares allows teachers to observe and reflect on their teaching and learn from their peers. For example, a teacher who observes

a participant using a technique whereby students in groups study a given concept and then teach their classmates can learn how to increase student commitment and engagement in the classroom effectively. The observation exercise helps the teachers reflect on their teaching strategies and how they can use the observed techniques to improve their performance. Therefore, Teaching Squares fosters continuous professional growth and development for the teachers through self-reflection exercises and peer feedback.

In addition, Teaching Squares helps to promote intercultural teaching competence. The program is a multi-disciplinary model for instructor reflection and assessment. A study by Dimitrov and Haque (2016) noted that The Teaching Squares Program promotes interdisciplinary collaboration and learning. The school environment is diverse, with students and teachers from different cultural backgrounds. In order to effectively teach the students, an instructor must engage with them irrespective of their experiences. A teacher finding it difficult to uphold intercultural teaching competence can learn effective strategies for teaching a diverse classroom from their peers. By observing classes in different disciplines and settings, teachers gain new insights into effective teaching strategies that can be applicable to their profession. As such, teachers better understand their challenges and how best to overcome them.

Furthermore, Teaching Squares provides a sense of togetherness and collaboration among faculty members. A study by Andrew et al. (2021) noted that peer-observation initiatives, where teachers observe each other's teaching strategies and provide constructive feedback, allows teachers to connect with colleagues from different departments and disciplines. Collaboration and a sense of community are essential factors that help to enhance morale and job satisfaction. As such, Teaching Squares promotes a sense of belonging, collaboration, and mutual support among teachers, thus enhancing their performance and effectiveness.

+++

TEACHING

SQUARES AT THE COMMUNITY COLLEGE OF BALTIMORE COUNTY

Teaching Squares was started at the Community College of Baltimore County (CCBC) in the fall of 2017 and has been running successfully until the present day. It is a semester-long professional development program and faculty members, both full time and part time, are recruited every semester. Depending on the number of faculty enrolled, groups of 3 and 4 are formed as triangles and squares respectively. During the first week of each semester, the kick off meeting is held and enrolled members choose their group, usually across various disciplines. Faculty members in each group share their class schedules with group members and each group member schedules visits, either face to face or online, to observe their peers.

This is a non-evaluative and non-judgemental observation process, where the observing faculty appreciates the teaching methodology, assessment design, and engagement techniques of the faculty member and reflects later during a meeting. This process involves engaging in a reciprocal classroom

visit, sharing of teaching materials, reflecting on observations, and celebrating best practices with colleagues. At the end of the semester the program members meet to share and reflect on their experiences. This program has helped many faculty members to enrich their teaching styles based on high impact practices that they learned about during the class observations such as contextualized teaching, transparency in learning and teaching, transparency in assessment design, capstone problems, gradebook analysis, collaborative projects, global learning principles, design of culturally responsive teaching strategies, and service-learning principles. This program has a positive influence on participating members to enrol again in a future semester and gain further knowledge from their peers.

Table 1 illustrates Teaching Squares data by semester at CCBC. It includes the number of applicants, squares, triangles, and participating campuses. Ideally, the participants should have diverse teaching experiences and education levels.

+++

Table 1. Participation in Teaching Squares by Semester at CCBC.

Semester	Applicants	Squares Formed	Triangles Formed	Participants Completing the Program	Campuses Represented
Fall 2017	30	4	2	22	No data
Spring 2018	18	4	0	16	No data
Fall 2018	16	2	2	14	C, D, E, O
Spring 2019	14	2	2	12	C, D, E
Fall 2019	15	3	0	12	C, E, O
Spring 2020	20	4	2	6	C, E, O
Fall 2020	8	2	0	8	C, E, O
Spring 2021	14	2	2	14	C, D, E, O
Fall 2021	0	0	0	0	None
Spring 2022	7	1	1	7	C, D, E, O
Fall 2022	7	1	1	6	C, D, E, O
Spring 2023	15	1	3	15	C, D, E, O

All semesters used Share Point, TLR Fair, Vice President's Newsletter, Fall Focus Conference , Professional Development Conference to advertise
Abbreviations: C = Catonsville; CCBC = Community College of Baltimore County; D = Dundalk; E = Essex; O = Owings Mills.

Table 2. Participant Ranks

Semester	Adjunct	Instructor	Assistant Professor	Associate Professor	Full Professor	Coordinator	Repeater
Fall 2017	7	1	9	4	1	0	2
Spring 2018	6	0	4	3	0	3	7
Fall 2018	1	1	7	3	1	1	5
Spring 2019	3	1	4	3	0	2	6
Fall 2019	2	2	7	2	0	1	0
Spring 2020	0	0	3	3	0	0	0
Fall 2020	1	0	3	4	0	0	0
Spring 2021	2	2	6	3	1	0	5
Fall 2021	0	0	0	0	0	0	0
Spring 2022	0	1	4	2	0	0	7
Fall 2022	1	1	4	1	0	0	6
Spring 2023	2	2	7	2	0	2	6

Table 2 presents the different ranks of faculty who participated in Teaching Squares from the fall of 2017 to the spring of 2023. Participants included adjuncts, assistant professors, associate professors, full professors, and coordinators. In addition, the table indicates the number of teachers from different departments who participated in the Teaching Squares program each semester. Table 3 explains the spread of participating members from different schools at CCBC.

Table 2. Participant Ranks

Semester	School of Continuing Education	School of Business, Technology and Law	School of Health Professions	School of Arts and Communication	School of Mathematics and Sciences	School of Writing, Literacy and Languages	School of Wellness, Education, Behavioral and Social Sciences
Fall 2018	0	3	1	0	6	1	3
Spring 2019	0	0	1	1	7	1	2
Fall 2019	0	1	1	1	9	0	0
Spring 2020	0	1	1	1	3	0	0
Fall 2020	0	1	2	2	3	0	0
Spring 2021	0	3	1	0	9	1	0
Fall 2021	0	0	0	0	0	0	0
Spring 2022	0	2	1	0	4	0	0
Fall 2022	1	2	0	0	4	0	0
Spring 2023	0	4	0	2	8	0	1

+++

SPRING 2023

PARTICIPANT TESTIMONIALS

As a mathematics faculty, I liked the philosophy behind teaching an art class helping students think critically in which I found it interesting to know how close art, science, and mathematics (are in) requiring critical thinking to solve problems. I look forward to having many more Teaching Squares experiences in the future.—Kebede

Teaching Squares this semester was very interesting and enriching. Indeed, I connected with a business department faculty on zoom and was able to navigate his business online class and see it was beautifully set up. I learned from him other ways to engage online students and make online classes as inviting as possible. I am glad that I was in Teaching Squares this semester.—Aw

I was in the group with a technology professor and a chemistry professor. I thoroughly enjoyed visiting both colleagues. The technology class was entirely different than what I'm used to. He was teaching high school students about the programs and coding needed to use a lathe. During the 2 hours, I eventually started to catch on. I enjoyed the gentle ways he engaged the class. It was clear they felt comfortable with him, and his confidence in answering questions was apparent. Afterwards, the professor took me to the "lab" or shop where the more advanced students work with the machines to make all types of things like motors and components of machines. It was fascinating! In the chemistry class, which is more closely related to biology that I teach, as I sat in his class I was reminded of how much chemistry I've forgotten. The professor has a warm,

inviting presence. It's clear he makes his students comfortable with his eagerness to answer any questions they have.

I enjoyed watching him interact and the methods he used to teach and encourage them to draw on what they already know to make conclusions about the new material. I would have enjoyed being in both of their classes as a student. This Teaching Squares semester was enjoyable, and I look forward to participating again next semester!—Hovis

I believe Teaching Squares is beneficial. There is no pressure, and you can compare your teaching styles to others, allowing you to take away as much as you need. It was fun. I wish I had more time to devote to it. I think it is good for educators to share what works and what does not.—Lyons

Teaching Squares gave me the opportunity to visit with colleagues outside my department and helped me to find meaningful ways to incorporate their techniques into my own classes.—Krizan

Visiting (in person and virtually) others' classes was beneficial to see how they structure their classes and keep the class engaged. I learned a few skills, such as mindfulness practice that I would like to add into my classes. Also, I really liked the opportunity to meet others outside of my discipline, it is nice to connect with other faculty.—Allen

+++



TEACHING

SQUARES IS VALUABLE TO DIVERSE EDUCATIONAL INSTITUTIONS

Teaching Squares is a unique professional development program offering participants insights into many teaching strategies. Through collaboration, constructive feedback, reflection, and a commitment to excellence in teaching, this program can help faculty members to improve their teaching, engagement, and assessment design practices and provide the best possible education to their students. The Teaching Squares program is a successful strategy to advance professional development in community colleges, because it allows educators to examine one another's teaching styles and innovative approaches and get helpful criticism. The program promotes a culture of collaboration and continual improvement to create a dynamic and productive learning environment for students. Through this program, institutions can demonstrate their commitment to providing high-quality education to their students. This commitment can attract and retain high-quality faculty members and students.

Institutions aiming to initiate their own Teaching Squares programs should strive to fulfill the following objectives: (1) participants will observe, reflect on, and appreciate great teaching strat-

egies, (2) participants will learn directly from their colleagues, and (3) participants will implement teaching, engagement, and assessment design methodologies they observed during the program. Participants should embrace the following core values: respect, empathy, collaboration, and adherence to non-evaluation.

In addition, to promote the most valuable learning experience, participants should have diverse educational levels and represent different areas of expertise. Based on the positive feedback from CCBC's faculty participants, other higher learning institutions should embrace Teaching Squares as well. The program is vital for promoting collaboration and reflective teaching among peers. By providing teachers with a chance to observe, learn and receive feedback on their teaching approach and strategies from peers, the program helps to promote a culture of continuous growth and improvement.



REFERENCES

1. Andrew, L., Wallace, R., & Sambell, R. (2021). A peer-observation initiative to enhance student engagement in the synchronous virtual classroom: A case study of a COVID-19 mandated move to online learning. *Journal of University Teaching & Learning Practice*, 18(4), 14. <https://doi.org/10.53761/1.18.4.14>
2. Atkins, B., Hunter, W. J., Baxter, A., & Natoli, A. (2018, October 30–November 2). *Teaching squares: Crossing new borders*. Universal Design & Higher Education in Transformation Congress, Dublin Castle, Ireland. <https://arrow.tudublin.ie/cgi/viewcontent.cgi?article=1015&context=unides18pap>
3. Berenson, C. (2017). The teaching squares guide: Observe and reflect on teaching and learning. Taylor Institute for Teaching and Learning Guide Series. <https://taylorinstitute.ucalgary.ca/sites/default/files/Teaching%20Squares%20Guide%20Final%20v2.pdf>
4. Dimitrov, N., & Haque, A. (2016). Intercultural teaching competence: A multi-disciplinary model for instructor reflection. *Intercultural education*, 27(5), 437–456. <https://doi.org/10.1080/14675986.2016.1240502>
5. Fleming, G. M., Simmons, J. H., Xu, M., Gesell, S. B., Brown, R. F., Cutrer, W. B., Gigante, J., & Cooper, W. O. (2015). A facilitated peer mentoring program for junior faculty to promote professional development and peer networking. *Academic Medicine: Journal of the Association of American Medical Colleges*, 90(6), 819. <https://doi.org/10.1097/acm.0000000000000705>
6. Friedman, R., George, A., Li, M., & Vijayan, D. (2022). Making teaching communal: Peer mentoring through teaching squares. *Papers on Postsecondary Learning and Teaching*, 5, 67–74. <https://doi.org/10.11575/pplt.v5i.73172>
7. Haave, N. (2014). Teaching squares: A teaching development tool. *Teaching Professor*, 28(1).
8. Kirker, M. J., Oberlies, M. K., Hernandez, C., & DeWaay, S. (2021). Teaching squares: Improving instruction through observation and self-reflection. *College & Research Libraries News*, 82(8), 370.
9. Lemus-Martinez, S. M., Weiler, T., Schneider, G. W., Moulik, S., & Athauda, G. (2021). "Teaching squares": A grassroots approach to engaging medical educators in faculty development. *Medical Teacher*, 43(8), 910–911. <https://doi.org/10.1080/0142159X.2021.1929903>
10. Widjaja, W., Vale, C., Groves, S., & Doig, B. (2017). Teachers' professional growth through engagement with lesson study. *Journal of Mathematics Teacher Education*, 20, 357–383. <http://dx.doi.org/10.1007/s10857-015-9341-8>

From the Office of E-Learning,
Innovation, and Teaching Excellence,
Montgomery College, Rockville,
Maryland.

Christine Crefton, EdD
Corresponding Author
christine.crefton@montgomerycollege.edu

The Role and Impact of Employee
Resource Groups in Higher Education:
An In-Depth Case Study of Montgomery
College's MCRPA

ERGs

— AT MONTGOMERY COLLEGE —

Paul D. Miller, EdD, and Christine Crefton, EdD



Montgomery College (MC) is an educational institution known for its diverse student body and broad range of programs.

Established in 1946 in Montgomery County, Maryland, MC is home to over 50,000 credit and noncredit students from more than 155 countries. Alongside its student body, MC prides itself on its highly dedicated faculty and staff, over 3,500 in total, who are instrumental in driving the college's commitment to academic excellence and inclusivity.

Workplace belonging is a cornerstone for a productive, positive, and cohesive work environment. Studies have shown that feelings of belonging can directly contribute to increased job satisfaction, happiness at work, and reduced chances of burn-out (Black et al., 2019). These feelings also foster institutional commitment and stability and spur creativity and innovation, elements crucial for the

continued success of an educational institution (Zambrana, 2018). MC is no different and has emphasized fostering a strong sense of community within its ranks.

One of the ways MC achieves this is through the Montgomery College Rising Professionals Association (MCRPA). Established in 2011, MCRPA is an employee resource group (ERG) developed for employees by employees, and it seeks to empower its members and support them in their professional journey. The association nurtures a sense of belonging for employees and promotes collegiality, community engagement, and collaboration and, through these efforts, promotes and contributes to student success and productivity.





MCRPA: AN IN-DEPTH EXPLORATION

— of ERGs in Higher Education —

ERGs have become a crucial part of the fabric of contemporary organizations. They serve as platforms that promote unity, equity, inclusion, and social justice within their host institutions (Welbourne et al., 2017). In the context of higher education, ERGs like MCRPA provide a space for faculty and staff to interact, collaborate, and flourish both professionally and personally (Welbourne & McLaughlin, 2013). Its unique approach to community building sets MCRPA apart from typical ERGs. MCRPA does not merely unite individuals based on shared identities but goes a step further, focusing on shared aspirations for personal growth, learning, and community service.

In the context of MC, MCRPA plays an essential role in instigating change, promoting innovation, and cultivating a sense of belonging among employees. This role is particularly valuable for new employees, as it allows them to connect with colleagues beyond their immediate departments and better understand the organizational culture. Moreover, MCRPA serves as a platform for open dialogue, facilitating the exchange of feedback and building trust among its members.

Despite the support from senior leadership and the college's president, MCRPA often grapples with a lack of resources. It would greatly benefit from an allocated budget and recognition of the efforts of ERG volunteers in annual performance reviews. With increased resources, MCRPA could expand its membership and influence by including students in its activities. Such an expansion would allow for a more diverse range

of feedback and representation within the college and the community.

ORGANIZATIONAL STRUCTURE, VISION, AND IMPACT OF MCRPA

The organizational structure of MCRPA is such that it presents additional opportunities for its members to gain professional and leadership experience. Through participation in various committees, members can gain valuable experience and grow on a personal level. However, MCRPA does face challenges. For instance, due to the lack of budget to support its activities, there are no rewards for members to incentivize participation in leadership roles other than intrinsic motivation. Additionally, based on the varying degrees of experience from the volunteer members, the objectives of meetings are not always strategically defined. Despite these challenges, MCRPA has maintained a diverse membership base and implemented robust organizational practices. It also continues to create numerous strategic opportunities for its members.

The vision of MCRPA is centered on providing an inclusive environment where everyone is given the opportunity to develop and succeed. With over 150 active members, MCRPA has shown a clear commitment to fulfilling this vision, and its impact is felt across the college. The work of MCRPA has already begun to transform MC by fostering the development of its employees, empowering members to expand their networks, and increasing opportunities to demonstrate career-ready competencies.



NURTURING LEADERSHIP — AND INCLUSIVITY: —

MCRPA's Innovative Approach and Impact



Building on a rich tradition of fostering leadership skills, self-awareness, empathy, emotional intelligence, and conflict resolution among its members, MCRPA has broadened its scope over the last 10 years. Its focus on personal growth and career development now extends to nurturing others to reach their full potential, signaling the next evolution of the association. The MCRPA logo, depicted in Figure 1, symbolizes this innovative ethos of mutual upliftment, with its design reflecting members helping each other ascend a ladder.

The proposed inclusion of students in MCRPA's initiatives marks an exciting step in this direction. With targeted learning opportunities, scholarships, expanded mentoring schemes, and recognition for exemplary role models, the association aims to inculcate a culture of communal growth that extends to student involvement (Astin, 1999). This progression reflects the broader organizational mission of fostering a diverse and inclusive community within MC and strengthening the commitment to student success.

STUDENT IMPACT

Freeman and Bruun (2022) argue that employee satisfaction in higher education, often overlooked, significantly influences student success. They emphasize

that faculty and staff morale impact the learning environment and student experiences, and they advocate for more research to confirm the relationship between staff satisfaction and student outcomes.

The concept of employee satisfaction influencing student success resonates in testimonials from MCRPA members. Members underscore the organization's role in fostering a supportive community, thereby enhancing employee morale. They describe MCRPA as a tool for retention, enabling them to contribute to a positive culture while promoting wellbeing and finding purpose.

This approach breaks down isolation, providing a platform for knowledge exchange and a shared sense of mission in serving students. Moreover, the members align MCRPA's actions with the core values of MC, noting that the organization effectively translates these values into practice, including through mentorship and skills growth. This collective commitment ensures employees' personal and professional development and has a positive ripple effect on student outcomes, echoing the linkage Freeman and Bruun (2022) highlight between staff satisfaction and student success.



— MEASURABLE — OUTCOMES

An integral part of MCRPA's strategy is its commitment to data-driven decision making. As such, the association uses measurable outcomes to evaluate its success and shape future initiatives. Over the years, MCRPA's membership has grown steadily, a trend it aims to continue, particularly with the proposed expansion of its mentorship initiatives.

By each member identifying 2 students to participate in MCRPA events and targeted professional development programs, the association aims to impact over 200 students directly. Beyond this, MCRPA seeks to reach out to student club representatives, student life contacts, and student council members through the governance system. The shift towards virtual events has expanded the association's potential to engage with students, as physical space limitations no longer constrain it. The potential to impact many students by offering them career-ready competencies and showcasing the practices of an ERG is immense.

Moreover, reaching out to established MC employees could potentially boost membership, facilitate more mentoring connections for employees and students alike, and further embody the association's commitment to mutual support, as symbolized in Figure 1. An indicator of success would be increased membership, enabling the association to impact more students directly.

Looking ahead, MCRPA leadership will continue leveraging available technologies to collect feedback for improving the association's programs and services. This commitment to iterative improvement and adaptation underscores MCRPA's ethos of growth and development for its members and the broader MC community. MCRPA remains poised to help its members and students write their career stories and forge a path toward bright professional futures through its innovative practices and inclusive growth approach.





FUTURE CONSIDERATIONS + PATH FORWARD

Despite its success, MCRPA has yet to receive formal recognition from MC. MCRPA's commitment to aligning with MC's strategic vision and new presidential priorities led to a presentation to the college president. The intent was to demonstrate MCRPA's instrumental role in actualizing the goals of MC's new strategic plan and its dedication to nurturing a vibrant, diverse, and inclusive community at MC.

MCRPA recommends that MC provide an official endorsement to solidify its status within the college's framework. It also advocates for representation in the college's shared governance structure and solicits funding from MC to support activities and initiatives. With official recognition, representation in shared governance, and adequate funding, MCRPA will be able to fully realize its potential and contribute significantly to the success of MC.

Looking forward, MCRPA aims to continually adapt its operations to suit the evolving needs of its members and MC. MCRPA believes that a holistic approach to employee development that encompasses personal, professional, and community

engagement will drive the college forward. The journey may be challenging, but with collective effort and support, MCRPA is confident it can make a lasting impact.

MCRPA remains committed to cultivating a sense of belonging among employees, fostering an inclusive and productive work environment in line with MC's mission. Its work aims to redefine how ERGs contribute to the higher education sector and continue to drive positive change within MC.

ACKNOWLEDGEMENTS

We would like to express our deepest gratitude to the members and volunteer leaders of MCRPA for their efforts, dedication, and unwavering commitment to our organization.

We are immensely proud of what we have achieved together, and your commitment and dedication are the heartbeat of our organization. Your collective efforts continue to propel MCRPA forward in its mission to empower its members and enhance the Montgomery College community.



+++

REFERENCES

1. Astin, A. W. (1999). Student involvement: A developmental theory for higher education. *Journal of College Student Development*, 40(5), 518-529.
2. Black, H., Greenberg, S., Saulsgiver, K., Sinar, E., Reece, A., Carr, E., & Kellerman, G. (2019). Beyond hedonia: 5 keys to enhancing workplace well-being at scale. *American Journal of Health Promotion*, 33(8), 1212-1217. <https://doi.org/10.1177/0890117119878277c>
3. Freeman, S., & Bruun, W. (2022). Does faculty and staff satisfaction equate to better student learning outcomes and co-curricular experiences? HigherEdJobs. <https://www.higheredjobs.com/Articles/articleDisplay.cfm?ID=3000>
4. Welbourne, T. M, Rolf, S., & Schlachter, S. (2017). The case for employee resource groups: A review and social identity theory-based research agenda. *Personnel Review*, 46(8), 1816-1834. <https://doi.org/10.1108/PR-01-2016-0004>
5. Welbourne, T. M., & McLaughlin, L. L. (2013). Making the business case for employee resource groups. *Employment Relations Today*, 40(2), 35-44. <https://doi.org/10.1002/ert.21409>
6. Zambrana, R. E. (2018). Toxic ivory towers: The consequences of work stress on underrepresented minority faculty. Rutgers University Press.

+++

Monica W. Walker, EdD – Corresponding Author
mwalker@ccbcmd.edu

From the Learning Community Program,
Academic and Student Affairs, Commu-
nity College of Baltimore County,
Baltimore, Maryland.

LEARNING — COMMUNITIES

Monica W. Walker, EdD, Stacie A. Miller, MA,
and Adrianne S. Washington, MSW

“I’m taking the step by learning about my history that many of the people that look like me have been so often deprived of. I am doing this with people who have similar mindsets and undying curiosities of exploring the life, history, and culture of African American individuals and their role in the south.”

—Student participant, 2019 Summer Learning Community

For over 2 decades, the Learning Community Program has impacted students at the Community College of Baltimore County (CCBC), with its emphasis on critical thinking, community, belonging, and student success. Faculty teaching this high-impact practice (HIP) not only implement an integrated curriculum in 2 paired courses representing different disciplines, but also strive to build community among the students and teachers, setting up activities and an atmosphere so that students of diverse backgrounds can build relationships and understanding.

At CCBC, we typically have general education learning communities for first year students in the general college population, as well as ESOL learning communities that link ESOL classes with a general education requirement and allow preacademic ESOL students to earn credit. In 2019, our Learning Community Program reached new heights, as a Mellon Foundation Humanities for All grant paved the way for summer travel themed learning communities to Atlanta, Montgomery, Birmingham, and later New Orleans, as well as taking a deeper look at our own Baltimore during the pandemic.

In these settings and with the support of their learning community faculty, students explored culturally relevant themes, formed a community bond as they journeyed together throughout the country, and gained both academic success and a life-changing experience

Overview of the Literature on Learning Communities

Learning communities, as a nationwide HIP, have contributed to a myriad of positive outcomes that are documented in the literature. Back in 2004, for example, a study by Zhao and Kuh found that “participation in some form of learning community is positively related to student success.” Since then, West and Williams (2017) refer to previous research documenting that learning communities are associated with higher persistence rates and grade point averages as well as “higher student engagement, greater respect for diversity of all students, higher intrinsic motivation, and increased learning,” which they attribute to the community atmosphere. According to Kern and Kingsbury’s (2019) study on retention, students who took learning communities were twice as likely to persist as students who took the same courses as standalone courses. An unpublished dissertation found that learning communities were positively linked with retention at community colleges (Wurtz, 2014, cited in Katsumoto & Bowman, 2021). Katsumoto and Bowman (2021) in their study on international student success, found that participation in learning communities was one of the few HIP experiences that positively impacted international students’ GPA, sense of belonging, and college satisfaction, which they attributed to the “collectivistic environment” in learning communities.



CCBC DATA

ON LEARNING COMMUNITIES

CCBC's internal data concurs regarding the success of learning communities. In January 2023, CCBC's Planning, Review, and Evaluation (PRE) Department provided a data analysis comparing all the learning community sections of courses to standalone sections, for all semesters between summer 2019 to summer 2022 (Breux, 2023). The results, presented in Tables 1-3, indicate that students who enrolled in CCBC learning communities had significantly higher retention rates, success rates, and GPAs (Breux, 2023). In particular, African American and Hispanic/Latino students who enrolled in learning communities had significantly higher retention, success rates, pass rates, and GPAs than their counterparts who enrolled in non-learning community sections, as Tables 4-6 attest (Breux, 2023).

One reason for this success, according to some scholars, is that learning communities have a particular potential for creating a strong sense of community and belonging, which specifically can be built through "active and collaborative learning" as well as through student-faculty interaction, engagement in activities focusing on diversity, and emphasis on higher-order thinking skills (Zhao & Kuh, 2004). Maestas et al. (2007) refers to studies in which learning community students perceived "higher levels of faculty support, peer support, and classroom comfort" and "view[ed] their faculty as being more empathetic and understanding," all factors that contribute to belonging. CCBC learning community faculty strive to intentionally build community and belonging in the classroom; students in the Humanities for All summer travel learning communities had an opportunity to experience these to a greater degree.



Table 1. Next Semester Retention.

Learning Community			Non Learning Community		
Enrollment	N retained	% retained	Enrollment	N retained	% retained
850	642	76%*	37,557	25,792	69%

Table 2. Success Rate by Term.

	Learning Community			Non Learning Community		
Term	Enrollment	N success (ABC)	% success (ABC)	Enrollment	N success (ABC)	% success (ABC)
Summer 2019	21	17	81%	33	25	76%
Spring 2020	144	108	75%*	4,913	3,210	65%
Fall 2020	149	93	62%	8,593	5,302	62%
Spring 2021	205	134	65%*	7,237	4,155	57%
Summer 2021	25	25	100%*	13	11	85%
Fall 2021	178	126	71%*	10,453	6,168	59%
Spring 2022	108	73	68%	6,265	3,813	61%
Summer 2022	20	20	100%*	19	13	68%
Total	850	596	70%*	37,526	22,697	60%

Table 3. GPA Comparisons.		
	Learning community	Non Learning community
N	850	37,557
Mean Term GPA	2.48*	2.19
Standard deviation	1.39	1.34
Significance (2-tailed)	0.000	
Mean difference	-0.29	
Standard error difference	0.05	
Lower CI	-0.38	
Upper CI	-0.19	

* = statistical significance. Abbreviations: CI = confidence interval, GPA = grade point average.

Table 4. All Course Results: Next Semester Retention by Race/Ethnicity and Gender.							
		Learning Community			Non Learning Community		
Race/Ethnicity	Gender	Enrollment	N retained	% retained	Enrollment	N retained	% retained
African American GPA	female	254	197	78%*	11,205	7,235	65%
	male	145	108	74%*	5,419	3,364	62%
	total	399	305	76%*	16,624	10,599	64%
Asian	female	87	75	86%	1,726	1,408	82%
	male	64	40	63%	1,334	1,025	77%
	total	151	115	76%	3,060	2,433	80%
Hispanic/Latino	female	50	40	80%	1,959	1,365	70%
	male	28	20	71%	1,340	919	69%
	total	78	60	77%	3,299	2,284	69%
White	female	102	88	86%	6,909	5,049	73%
	male	71	43	61%	4,959	3,536	71%
	total	173	131	76%	11,868	8,585	72%

* = statistical significance.

Table 5. Success Rate by Race/Ethnicity and Gender							
		Learning Community			Non Learning Community		
Race/Ethnicity	Gender	Enrollment	N success (ABC)	% success	Enrollment	N success (ABC)	% success
African American GPA	female	254	173	68%*	11,200	6,022	54%
	male	145	82	57%	5,406	2,654	49%
	total	399	255	64%*	16,606	8,676	52%
Asian	female	87	70	80%	1,726	1,335	77%
	male	64	40	63%	1,333	902	68%
	total	151	110	73%	3,059	2,237	73%
Hispanic/Latino	female	50	45	90%	1,959	1,155	59%
	male	28	21	75%	1,337	709	53%
	total	78	66	85%	3,296	1,864	57%
White	female	102	85	83%	6,906	4,976	72%
	male	71	44	62%	4,954	3,347	68%
	total	173	129	75%	11,860	8,323	70%

* = statistical significance.

Table 6. GPA by Race/Ethnicity					
Race/Ethnicity	Learning Community Status	Mean Term GPA	Standard Deviation	95.0% Lower CL for Mean	95.0% Upper CL for Mean
African American	learning	2.17*	1.42	2.03	2.31
	non-learning community	1.88	1.32	1.86	1.90
Asian	learning	2.90	1.34	2.69	3.11
	non-learning community	2.54	1.25	2.50	2.59
Hispanic/Latino	learning	2.89	1.00	2.66	3.11
	non-learning community	2.05	1.34	2.01	2.10
White	learning	2.67	1.34	2.47	2.87
	non-learning community	2.58	1.26	2.56	2.61

* = statistical significance. Abbreviations: CI = confidence interval, GPA = grade point average.

HUMANITIES

FOR ALL INITIATIVE AND CCBC TRAVEL LEARNING COMMUNITIES

"In a moment of time, in areas I was standing in, my ancestors were damaged. Even though all of this information broke me down, and made me extremely uncomfortable, it taught me that if we are looking for justice, we have to be comfortable with these feelings. It was amazing to also feel a sense of triumph, resistance, and resilience." – Student participant, 2019 Summer Learning Community

CCBC's Humanities for All initiative propelled our learning communities to another level with its intentional design and purposeful faculty integration of high-impact and experiential activities into courses to foster a humanities mindset for their students' academic, personal and professional lives. Humanities for All engaged faculty as leaders in innovative teaching to enrich curricula and instructional design, with themed learning communities featured as a signature activity, resulting in enhanced student learning experiences, support, and outcomes.

2019 Summer Learning Community: The History of Racial Terrorism

"Another interesting part about the trip was to see how different aspects of society (from mass incarceration to agriculture) have played a major role in civil rights and how all those elements are still important today. I learned so many new facts about racial terrorism to the point where it made me want to cry (16th St. Church specifically)."

–Student participant, 2019 Summer Learning Community

In summer 2019, the History of Racial Terrorism Summer Honors Learning Community, led by Professor Adrienne Washington and Dr. Gretchen Rudham, paired sociology and English literature courses while delving into the history of racial terrorism. Experiences included several HIPs (ser-

vice learning, undergraduate research, common intellectual experiences, global learning and diversity, collaborative assignments and projects) and a travel component empowered students to learn about new cultures. Eleven students of color, between the ages of 19–29, participated in this Special Topics in Literature and Racial and Cultural Minorities hybrid learning community.

For context, the English literature course covered the imagery of the South, themes of memory, truth-telling and resistance, the legacy of dehumanizing images and caricatures during Jim Crow and Segregation, and the reclamation of images in music, film and art. Additional topics in sociology included culture, scientific racism, systemic racism, immigration, history and influence of hip hop, mass incarceration, the media's impact on minority groups, the death penalty, naming patterns among cultures, social inequality, and food insecurity (Rudham & Washington, 2019). Both Honors and non-Honors students were eligible to earn 6 Honors credits during the summer, and students who were not members of the CCBC Honors Program at the start of the learning community were encouraged to apply to the Honors Program upon completion of the experience.

Students and faculty traveled to Georgia and Alabama, visiting the National Center for Civil and Human Rights, the Lynching Memorial and

HUMANITIES

FOR ALL INITIATIVE AND CCBC TRAVEL LEARNING COMMUNITIES

Legacy Museum, the Equal Justice Initiative, the 16th Street Baptist Church, the George Washington Carver Museum, the Booker T. Washington Home, and Tuskegee University among other cultural institutions and historic sites. In Montgomery, Alabama, students engaged in community-based learning and contributed service through a hands-on urban farming day at Eat South, a non-profit organization part of Alabama's sustainable agriculture tradition rooted in the work of George Washington Carver and Booker T. Whatley (Eat South).

As a hallmark of experiential learning in Honors education and HIPs implemented through Humanities for All, this summer Honors learning community fostered CCBC's attainment of long-term goals including participation in activities, measurable change in perspectives toward the humanities, and measurable change in persistence and retention (Walker, p. 1). Moreover, racial affinity was created among the students who also learned to become advocates for social change using digital media production techniques (Rudham & Washington, 2019). Surveys and focus groups provided qualitative feedback and data, and each student submitted 4 video logs (vlogs) to reflect on their travel and learning experiences.

Success rate data reveals that students enrolled in the learning community had a course pass rate of 81%, as compared to students enrolled in non-learning community courses that summer at 76%; see Table 2 (Breaux, 2023).

Multiple HIPs, including community-based and service learning, diversity and global learning, collaborative assignments and projects and undergraduate research, were infused into the learning community to accomplish Humanities for All grant goals and objectives. Consequently, students' engagement in multiple HIPs and co-curricular opportunities through this learning community enabled them to build upon strengths that resulted in perseverance, social capital and enhanced their strong sense of cultural identity (Turner, 2022). All students reflected on the powerful, transformative nature of the 2019 Summer Learning Community and travel experience.

Evident in student reflections via blog entries and videos are 4 recurring themes of connection to ancestors and interacting with history, confidence, connection to peers and interpersonal skills, and the change agent role. To begin, students reflected on their newfound connection to ancestors and opportunity to interact with their history.

HUMANITIES

FOR ALL INITIATIVE AND CCBC TRAVEL LEARNING COMMUNITIES

One student shared that "my experience was overwhelming emotion wise, and it was an abundance knowledge wise. I learned a lot about my culture, my history, my black and white ancestors...I did not expect to become so emotionally connected and invested, but I enjoyed gaining the experience and knowledge." Another student spoke of self-discovery and history learned, sharing "I discovered myself. It was important to physically see the history and sites, and to learn outside of my comfort zone. Standing on the ground where the captives first were held in misery; that to me was haunting and carried a whole lot of baggage in the sense that, what if this were me? What if my family members were going through this turmoil?"

Second, students gained confidence and command not only of course content, but also of their voice, writing, and speaking skills. One student described personal progression and confidence gained in the form of creativity. "My writing has progressed. I found the assurance of a brighter future." Similarly, another student expressed that "I've learned from the course and the readings that we all have individual paths, lives and experiences and that destiny plays a strong role in determining our fates. But it is the hardships, pain, strength, dedication, and yearning for progress and change that builds potential and character."

Additionally, the learning community fostered among students a greater connection to peers and interpersonal skills. As one student participant noted, "it was refreshing to be in a new area with new people. I didn't just learn about myself and my ancestors, I also learned to make friends from all different backgrounds. I thought I would be secluded or only get close with 1 to 2 people, but it turns out I became friends with everyone! And that was something I did not expect!"

A final theme centered on students' self-perception as change agents and an increased desire to contribute to and influence society. One student recalled that "we realized how important we are. It showed me that there is a lot of work to do." Two other students shared a desire to make a positive societal contribution: "These were real events, real stories, real people, real lives, and it pushes me to work 10 times harder, not only for myself, but to create a legacy that won't be forgotten. I have a responsibility to spread the knowledge in a way that is reflective of myself." In addition, a student summarized her learning experience remarking that "this class is [about] spreading the awareness about issues to work altogether to bring a change. The reoccurring themes that were ringing in my mind as I was picturing and reading through the notes and the descriptions around the rooms that I walked through were: Advocacy; Serving Justice; and Empowerment."



CONCLUSION

AND ACKNOWLEDGEMENTS

Through Humanities for All, CCBC faculty and staff encouraged the academic pursuits of thousands of students engaged in HIPs across highly enrolled courses, exposed learners to humanities-enriched curricula and the Honors Program, and increased student engagement. With powerful, life-changing learning communities, students took a humanistic approach to their travel experience as they connected with community residents and learned about the history of each location, while applying concepts learned in class. Recognizing the powerful, transformative impact of the 2019 summer Honors learning community as part of Humanities for All, CCBC facilitated a 2021 summer learning community with the theme "Tapping into the Wire" pairing Sociology 102 (Social Problems) with Digital Media 111 (Visual Communications) for 12 Honors and non-Honors students. Professors Adrienne Washington and Kendrick Kenney led students on a 7-week journey, using the city of Baltimore as the text for the course. Students examined social issues affecting Baltimore, stereotypical media portrayals, and Black excellence as seen in Baltimore citizens. Also, in partnership with Baltimore Oral History, students interviewed Baltimore residents and participated in lectures on local history. Students researched the story of Henrietta Lacks, human trafficking, the impact of homelessness, and food justice.

In 2022, CCBC followed up with a summer learning community with travel to New Orleans, Louisiana using the theme, "Through the Eye of Hurricane Katrina: Social Justice & Media Literacy in the United States." Professors Adrienne Washington and Kendrick Kenney created an experience for students to learn about first-hand experiences of Hurricane Katrina survivors. Students created visual ethnographies and documentaries

highlighting the social problems that were further exacerbated by Hurricane Katrina and the impact of the levees breaking. In partnership with community residents, students participated in service-learning through a park beautification project in the Lower Ninth Ward in New Orleans. Students contributed to a mural project in Odile Davis Park. The mural now serves as a reminder of community, resilience, and cultural connection for the residents, students, and faculty.

The role and importance of community partners was relevant throughout each of the learning communities. Partnerships included institutions of higher education, transfer partners, urban farms, advocacy groups, law clinics, and community shelters. Community partners provided another layer of expertise for students as they researched the impact of specific social issues. Another key lesson learned was the importance of building community among faculty and students. As a HIP, learning communities require a greater time commitment and the travel components result in more time spent outside of the classroom. Students are engaged with faculty and peers while focused on substantive, real world issues. The final key lesson learned throughout this process was the importance of the travel component and building cultural capital for students. Providing students with an opportunity to travel, at no cost, and learn from experts from across the United States has indeed been powerful and life changing.

ACKNOWLEDGEMENTS

We would like to thank the Mellon Foundation for making these life-changing learning community experiences possible.





REFERENCES

1. Breaux, G. (2023). Learning communities analysis for summer 2019–summer 2022: data summary. Unpublished manuscript. Community College of Baltimore County.
2. Eat South (2023). Good Food Day. Eat South. <https://eatsouth.org>
3. Katsumoto, S., & Bowman, N. A. (2021, December 2). The link between high-impact practices and college success among international students. *Journal of Diversity in Higher Education*. <http://dx.doi.org/10.1037/dhe0000364>
4. Kern, B. B., & Kingsbury, T. (2019). Curricular learning communities and retention. *Journal of the Scholarship of Teaching & Learning*, 19(1), 41–52. <https://doi-org.ccbcmd.idm.oclc.org/10.14434/josotl.v19i1.26779>
5. Maestas, R. Vaquera, G. S., & Zehr, L. M. (2007). Factors impacting sense of belonging at a Hispanic-serving institution. *Journal of Hispanic Higher Education*, 6(3), 237–56.
6. Rudham, G., & Washington, A. S. (2019). Summer learning community report 2019. Unpublished report. Community College of Baltimore County.
7. Turner, S. T. (2022). Hispanic student experiences with high-impact practices and transfer success. Belk Center for Community College Leadership and Research, North Carolina State University. https://belk-center.ced.ncsu.edu/wp-content/uploads/sites/128/2023/01/Belk-Center_Hispanic-Student-Experiences_Transfer_Research-Brief-1.pdf
8. Walker, M. (2021). Dean's Note. Humanities for All Newsletter. Fall 2020–Winter 2021, 1. Community College of Baltimore County.
9. West, R. E., & Williams, G. S. (2017). "I don't think that word means what you think it means": A proposed framework for defining learning communities. *Educational Technology Research and Development*, 65, 1569–1582. <https://doi.org/10.1007/s11423-017-9535-0>
10. Wurtz, K. A. (2014). Effects of learning communities on community college students' success: A meta-analysis. [Unpublished dissertation]. Walden University.
11. Zhao, C.-M., & Kuh, G. D. (2004). Adding value: Learning communities and student engagement. *Research in Higher Education*, 45(2), 115–138. <http://dx.doi.org/10.1023/B:RIHE.0000015692.88534.de>

RESEARCH — articles —

IN THIS SECTION

- + Analysis of the PharmD-PA Dual Degree
- + Assessing Selected Teaching Techniques and Their Impact on Student Success in the Classroom
- + A Community College Case Study on Curricular Maps and Student Retention
- + ChatGPT in the English Classroom: 18 Students Test it and Share their Insights
- + Open Educational Resources and Educational Outcomes at a Community College
- + Quantitative Measure of Student Retention of Information in Human Anatomy and Physiology: A Case Study
- + The Value of Critical Self-Reflection in the Development of Cultural Competency

Analysis of the PharmD-PA Dual Degree

Yen H. Dang, PharmD, CTTS-M, and
Gregory K. Shaeffer, MBA, RPh, FASHP

Corresponding author:

Yen H. Dang, PharmD, CTTS-M
ydang@umes.edu

From the Department of Pharmacy Practice and Administration, School of
Pharmacy and Health Professions, University of Maryland Eastern Shore,
Princess Anne, Maryland.

BEYOND THE PharmD

Students' Perceptions of the Pharmacy and Physician Assistant Dual Degree Program

Few pharmacy programs in the United States confer students a pharmacy and physician assistant (PharmD-PA) dual degree after graduation. The objective of this study is to determine students' perceptions of the PharmD-PA dual degree as an alternative method for career advancement.

ABSTRACT

A cross-sectional study was conducted at a 3-year pharmacy program in a Historically Black College and University (HBCU). Students were asked about their familiarity with the PharmD-PA dual degree and its associated benefits and limitations. Students' perceptions of the PharmD-PA dual degree on their career outlook, quality of life, salary, and its ramifications on the healthcare sector were assessed. Descriptive and chi-square analysis were conducted. Seventy-two students completed the survey from all 3 years of pharmacy school, and only 35 students (48.6%) were familiar with the PharmD-PA dual degree program. Students noted the benefits of pursuing the PharmD-PA dual degree to be acquiring prescriptive authority (44.4%),

improved clinical knowledge (29.2%), and better career opportunities (18.0%). The main limitations included the additional time in school (40.3%), financial barriers of the program (26.4%), and increased school workload (16.7%). Most students believed that the PharmD-PA dual degree had positive effects on their job prospects, salary, career satisfaction, and allowed for overall improvements in patient care. Overall, pharmacy students had positive perceptions of the PharmD-PA dual degree program. Schools of Pharmacy should look into the development of PharmD-PA dual degree programs as a unique marketing opportunity for admissions and as a nontraditional method of career advancement.

INTRO — DUCTION

Dual degree programs are offered to prepare students for academic and nontraditional or non-academic pharmacy-related careers

Dual degree programs are offered to prepare students for academic and nontraditional or non-academic pharmacy-related careers. A dual degree is defined as a PharmD combined with a graduate or professional degree in which the credits or time required to complete both degrees is decreased. These programs allow students to gain advanced knowledge and specialized skills beyond the traditional Doctor of Pharmacy (PharmD) degree and allow credentials that allow them to diversify in many practice settings. A study by Migliore et al. (2013) showed that 34% of pharmacy students were interested in pursuing an additional degree after graduation, and 79% of these respondents were willing to take summer classes to obtain these degrees. According to American Association of Colleges of Pharmacy (2021), there are 140 pharmacy schools with accredited professional degree programs and 2 schools with precandidate status. Currently, 101 schools offer dual degree programs with 35 (34.7%) schools offering only 1 dual degree programs while other 66 (65.3%) schools provide at least 2 or more (Pharmacy College Application Service, 2020). The most prevalent dual degree program is the Masters of Business

Administration, found in 79 (78.2%) of these schools. These upward trends in dual degree programs could be a result of methods to make the program more attractive to potential applicants given the decreased admissions pools nationwide (Vuernick et al., 2019).

Few pharmacy programs in the United States confer students a pharmacy and physician assistant (PharmD-PA) dual degree after graduation. There are currently 2 pharmacy schools with active PharmD-PA dual degree programs – the University of Rhode Island (University of Rhode Island College of Pharmacy, 2018) and the University of Washington (University of Washington School of Pharmacy, 2023) (Table 1). Both schools partner with PA programs (the Johnson & Wales University and MEDEX Northwest, respectively) to implement their dual curricula. While University of Kentucky had an established PharmD-PA dual degree program (Pharmacy College Application Service, 2020), the program closed due to low admissions. The University of the Pacific is also in the process of developing their PharmD-PA dual degree program.

TABLE 1.

Current PharmD-PA Dual Curriculum in the United States.

Year	University of Rhode Island (URI)	University of Washington (UW)
Year 1	URI Pharmacy program	UW Pharmacy program
Year 2	Fall/Spring: URI Pharmacy program Summer after Year 2: Application directly to the JWU Physician Assistant Program before September 1st Start of Johnson & Wales University (JWU) PA program (didactic)	Fall/Spring: UW Pharmacy program Summer after Year 2: Application directly to the MEDEX Northwest Physician Assistant Program before September 1st
Year 3	Fall/Spring: URI pharmacy program Summer after Year 3: URI pharmacy clinicals	Fall/Spring: UW pharmacy program Summer after Year 3: Pharmacy rotations and start MEDEX Northwest
Year 4	JWU PA program (didactic)	MEDEX Northwest PA program (clinicals)
Year 5	JWU PA program (clinicals) and URI pharmacy rotations	MEDEX Northwest PA Program (clerkships) and pharmacy rotations (electives) Pharmacy degree in June of their fifth year, followed by their PA certificate in August.

The concept of the existing programs was to create a licensed pharmacy practitioner with an additional year of schooling

(University of Rhode Island College of Pharmacy, 2018; University of Washington School of Pharmacy, 2023)

These cross-trained individuals will fulfill the requirement for provider status and prescription authority upon graduation with only 1 extra year of studies to replace the traditional 1-year pharmacy residency and fellowship route. Pharmacy students are allowed apply to the PA program in their first professional year of pharmacy school after completing PA pre-requisite courses. Additionally, they must take the Graduate Record Examinations (GRE), have direct patient care hours, and interview for program entry. The programs offer a mixture of pharmacy and PA didactic coursework year-round starting in the summer before or summer after entering their third year of pharmacy school. Both programs replace the last 1-2 years of traditional pharmacy school with PA training. Satisfactory grades in basic science and pharmacy courses taken within the PharmD program allow waivers for some PA courses. Rotations are scheduled for both pharmacy and physician assistant areas in the final 2 years of the program. Both degrees are conferred upon graduation of the pharmacy and PA program.

There has been no published literature about impact on pharmacy students' education and career trajectory. The purpose of this study is to assess students' attitudes of this dual-degree program compared to other avenues of career advancement. Additionally, the perceptions of the PharmD-PA dual degree are described in terms of salary, job responsibilities, public interest, and its ramifications on the profession. This manuscript also explores our own stipulations on the impact of the PharmD-PA dual degree on patient care and the healthcare sector.

We hypothesize that pharmacy students would be receptive to the PharmD-PA dual degree and possess positive conceptions of the degree on their job perspective, career outlook, and the medical community at-large. However, we believe that other avenues of career advancement, including residencies and fellowship, will remain more popular choices for professional growth than dual degree programs.

METHODS

A cross-sectional study was created at a 3-year pharmacy program at a Historically Black College and University (HBCU). The HBCU currently does not have a PharmD-PA dual degree track but has both professional programs offered separately.

The survey was distributed to all pharmacy students in the 3-year program with a voluntary participation policy. A brief description of the PharmD-PA dual degree program was provided to students before survey initiation to orient them to the study.

METHODS

The 30-item survey took approximately 20 minutes to complete and answers were submitted anonymously. The survey was emailed twice to the distribution list in Fall 2021.

Demographic information including year of pharmacy school, gender, race, age, education, dual degree interest, and plans after graduation were collected through multiple choice questions. Students were asked to rank their familiarity with PA responsibilities and the PharmD-PA dual degree program concept on a 7-point Likert scale. Additionally, participants compared the importance of dual degrees to alternative methods for career advancement including residency, fellowships, board certifications, scholarly activity, and professional organization involvement. Questions related to benefits, limitations, and options to further increase interest in this new dual educational track were written in short answers. Students rated their perceptions on a 5-point Likert scale of the implications of the PharmD-PA dual degree program on their career outlook, quality of life, salary, provider status and workforce development, and its ramifications on the healthcare sector. While the subject of the PharmD-PA dual degree is novel and there are no other surveys done in the literature to validate these survey questions, other dual degree questionnaires were analyzed and adjusted during survey construction to match

the purpose of this study (Dang & To-Lui, 2020; Gourley et al., 2006; Holtzman & Sifontis, 2014; Jacobs et al., 2017).

The study results were evaluated through the use of descriptive analyses of the variables reporting differences of perceptions of the PharmD-PA dual degree among the study participants. Statistical analyses were performed for categorical data using the chi-square test with a 95% confidence interval. The chi-square test was used to determine if there was an association between 2 categorical variables. These subgroup analyses assessed factors that may have influenced questionnaire results including gender, race, year of pharmacy school, plans after graduation, ideal job setting, familiarity with PA roles, and familiarity with the PharmD-PA dual degree. Responses with p-value less than or equal to the significance level of 0.05 indicated that a relationship existed between the categorical variables. Data were analyzed using SPSS® and Minitab®. The study received approval from the HBCU's Institutional Review Board to be conducted for educational research.

RESULTS

Seventy-two students completed the survey including 32 (72.2%) first-year, 31 (77.5%) second-year, and 9 (30.0%) third-year students (Table 2). The overall response rate was 63.2%. The respondents were mostly female (61.1%) and African-American (54.2%). The average age of survey takers was 23 years and most had a Bachelor's of Science degree prior to starting pharmacy school (45.8%). After graduation, the majority of students wanted to either pursue residency training (47.2%), go into the workforce (27.8%), complete a fellowship (8.3%), or obtain another degree (8.3%).

Ideal pharmacy settings included hospital (70.8%), community (44.4%), ambulatory care clinic (33.3%), and industry (33.3%).

Most students were interested in direct patient care (80.6%), community service (41.7%), and administration (34.7%) as their primary responsibilities in their job. Students believed that dual degrees (34.7%), residency training (34.7%), and board certifications (15.3%) would be the most beneficial to their career advancement.

The leading dual degrees that students were interested in obtaining included PA (59.7%), Master of Business Administration (MBA, 40.3%), and Master of Public Health (MPH, 36.1%).

Students believed that the PA (51.4%), MBA (20.8%), and MPH (19.4%) degrees would complement the Doctorate of Pharmacy the best. While 64 students (88.9%) were familiar with PA responsibilities, only 35 students (48.6%) were familiar with the PharmD-PA dual degree program (Figures 1 and 2). The benefits of pursuing a PharmD-PA dual degree included being able to have prescriptive authority (44.4%), better clinical knowledge (29.2%), more career opportunities (18.0%), improved patient care aptitude (8.3%), and higher salaries (5.6%).

The limitations of the dual degree included the additional time in school (40.3%), financial barriers of the program (26.4%), and increased

school workload (16.7%). Students mentioned that scholarships (70.83%), shorter program duration (18.1%), and increased job prospects and demand (6.94%) to be top motivating factors for them to pursue the PharmD-PA dual degree.

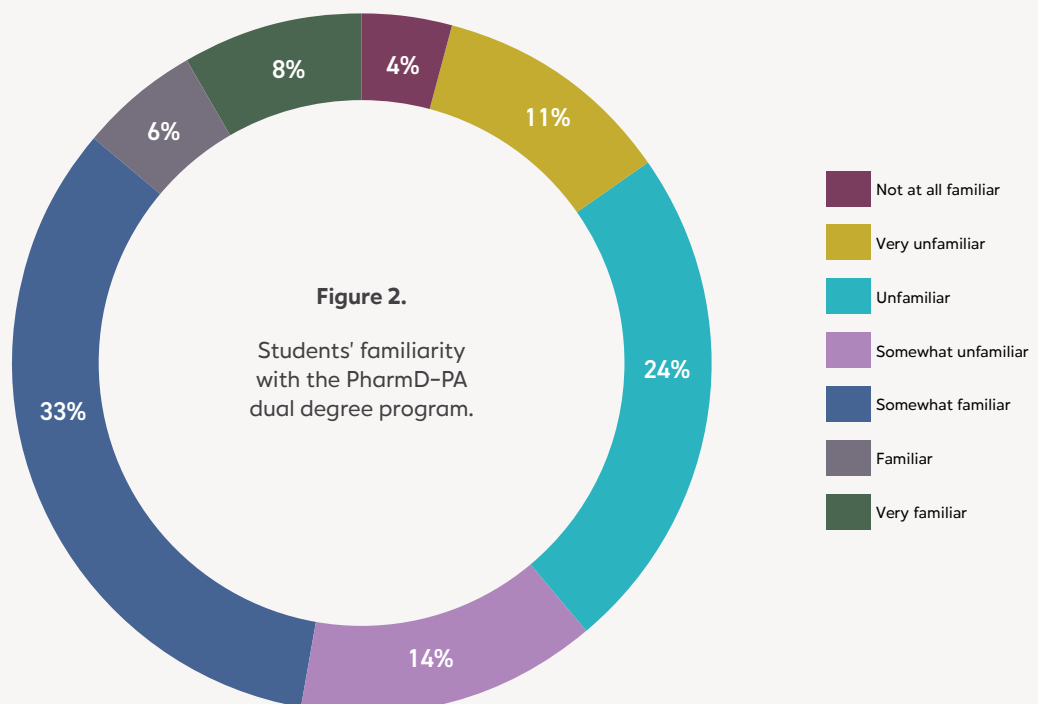
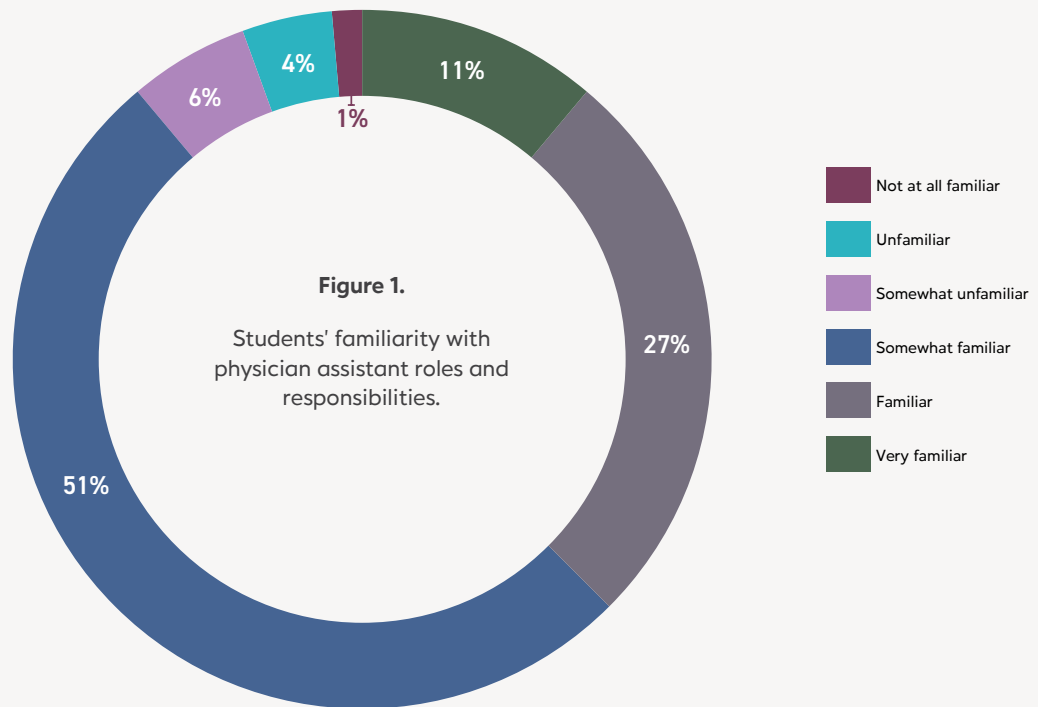
Perceptions of pharmacy students are provided in Table 3 and the following results are provided by comparing "strongly agree" and "agree" to "strongly disagree" and "disagree". In regards to job prospects, 54 students (75%) believed the PharmD-PA degree would allow them to have greater job satisfaction and quality of life. Additionally, 63 students (87.5%) stated that this degree would allow them to be more competitive when looking for jobs, with 61 students (84.7%) reporting more job security, job prospects, and job mobility.

Fifty-four students (75%) reported that the PharmD-PA degree would increase their likelihood of obtaining the ideal first job, and 42 students (58.3%) were willing to spend more time in school for the dual degree compared to on-the-job training. Higher starting salaries (70.8%) and a positive return on investment (75%) were perceived with the concurrent degrees.

TABLE 2. PARTICIPANT DEMOGRAPHICS.

Factor	Sub-Factor	n (%) (N = 72)
Gender	Female	44 (61.1)
	Male	28 (38.9)
Race	African-American/Black	9 (54.2)
	Asian or Pacific Islander	13 (18.1)
	Caucasian	15 (20.8)
	Other	5 (6.9)
Highest education level	High school graduate	5 (6.9)
	Associates degree	20 (27.8)
	Bachelor's degree	42 (58.3)
	Master's degree	5 (6.9)
Current pharmacy Year	First-year	32 (44.4)
	Second-year	31 (43.1)
	Third-year	9 (12.5)
Plans after graduation	Residency	34 (47.2)
	Fellowship	6 (8.3)
	Workforce	20 (27.8)
	Dual degree	6 (8.3)
	Other	6 (8.3)
Pharmacy setting preference	Community	32 (44.4)
	Hospital	51 (70.8)
	Ambulatory care clinic	24 (33.3)
	Industry	24 (33.3)
	Academia	8 (11.1)
	Other	1 (1.4)
Most beneficial for Career Advancement	Residency	25 (34.7)
	Fellowship	6 (8.3)
	Dual degree	27 (37.5)
	Board certification	11 (15.3)
	Other	3 (4.2)
Main responsibility after Graduation	Direct patient care	58 (80.6)
	Staffing	16 (22.2)
	Research	17 (23.6)
	Administration	25 (34.7)
	Teaching or precepting	17 (23.6)
	Community service	30 (41.7)
	Pharmacy organization	21 (29.2)
	Other	3 (4.2)
Dual degree interest	Doctor of Philosophy (PhD)	10 (13.9)
	Master of Public Health (MPH)	26 (36.1)
	Master of Business Administration (MBA)	29 (40.3)
	Master of Public Administration (MPA)	6 (8.3)
	Juris Doctor Degree (JD)	9 (12.5)
	Master of Sciences (MS)	11 (15.3)
	Physician Assistant (PA)	43 (59.7)
	Other	13 (18.1)
Dual degree complementing PharmD the most	Master of Public Health (MPH)	14 (19.40)
	Master of Business Administration (MBA)	15 (20.8)
	Juris Doctor Degree (JD)	2 (2.8)
	Master of Sciences (MS)	1 (1.4)
	Physician Assistant (PA)	37 (51.4)
	Other	3 (4.2)

FIGURES 1 AND 2



Respondents believed that the Accreditation Council for Pharmacy Education (ACPE) should push for the development and accreditation of more PharmD-PA programs and that the workforce was large enough to justify it (76.4%).

Additionally, 67 students (93.1%) perceive that it will have positive implications for the healthcare community at large and provide them competence in a patient care clinical position.

Participants stated that PharmD-PA degree holders are better equipped to work in medically underserved communities (83.3%) and primary care specialties (86.1%). Fifty-eight students (80.6%) believed that the PharmD-PA dual degree was the best pathway for pharmacists to obtain provider status and prescriptive authority.

First- and second-year pharmacy students believed the PharmD-PA degree will let them obtain their ideal first job compared to third-year students ($P = 0.0024$). First- and second-year pharmacy students believe the workforce is large enough to justify having a PharmD-PA degree compared to third-year students ($P = 0.0058$). First- and second-year stu-

dents believe that they will have a positive return on investment if they pursue the PharmD-PA degree compared to third-years ($P = 0.0024$). Additionally, the first- and second-year students believe that the PharmD-PA dual degree is the best way for them to obtain prescriptive authority ($P = 0.0408$). Females believe they have a positive return on investment if they pursue the PharmD-PA dual degree compared to males ($P = 0.0389$). Those interested in the PharmD-PA degree the most were willing to spend more time in school to gain the dual degree rather than training on the job compared to those interested in complementing dual degrees ($P = 0.03996$).

Participant race, educational degree, level of baseline dual degree interest, graduation plans, type of pharmacy setting after graduation, familiarity with PA roles, and familiarity with the PharmD-PA program had no correlation to their responses in the PharmD-PA survey questions ($P > 0.05$).

DISCUSSION & CONCLUSION

Program diversification and distinction by developing additional degree programs beyond the PharmD have increased in popularity in recent years as students are able to have experiences outside the profession of pharmacy. Our study shows that most pharmacy students are interested in pursuing a dual degree for PharmD-PA and have positive perceptions of the degree on their career aspects. Migliore et al. (2013) interviewed pharmacy students interested in pursuing an additional advanced degree after graduation from the PharmD program due to improved knowledge (25.3%), career advancement (19.9%), and financial incentives (4.8%).

DISCUSSION & CONCLUSION

In a similar study by Jacobs et al. (2017), students' perceptions who were enrolled in a PharmD and MBA dual degree program agreed that they would be more competitive in the job market (95%), earn a higher salary (96%), and have more opportunities for career advancement (95%). Like this study, participants also perceived that they would have a positive return on investment and have increased job satisfaction through the dual degree. Dual degrees including the PharmD-PA program offers participants opportunities to advance their pharmacy careers at the margins of other disciplines.

The American Society of Health System Pharmacists Foundation Pharmacy Forecast 2020: Strategic Planning Advice for Pharmacy Departments in Hospitals and Health Systems forecast panelists predicted that there was a 57% likelihood that colleges and schools of pharmacy will offer a PharmD-PA degree (Vermeulen et al., 2020). From an educational standpoint, the curriculum is shortened with summer sessions in school and some PA courses are waived for academic credit if students obtain a minimum satisfactory pharmacy grade. Overall, the benefit of obtaining the doctoral and masters degrees with only 1 extra year of schooling offers less time constraints than individuals who pursue these pathways individually after graduation. This dual degree is a unique marketing opportunity to benefit both schools as admission competition grows where incoming students who are accepted into the pharmacy program are guaranteed to

fill PA seats if they meet program requirements. Vuernick et al. (2019) suggested non-doctoral and dual degree offerings as a method to improve enrollment given the recruitment challenges in pharmacy schools as well as serve a new source of revenue streams. Dual degree programs are easier to begin than other programs as they are designed using existing curricula, courses, and faculty members that already exist in the institution.

Upon graduation, with a set of diverse skills and credentials, these dual degree holders are able to obtain jobs in both pharmacy and physician assistant fields to balance a dynamic job market. With the projected 2% decline in pharmacy employment compared to a 31% physician assistant growth over the next 10-years, the combination of credentials can allow pharmacy students to fall into another job market until pharmacy jobs become available again (U.S. Bureau of Labor Statistics, 2021a & b).

While residency, fellowship, and dual degrees allow students to be more competitive in a declining job market, one major advantage of the PharmD-PA dual degree over post-graduate training is that dual degree holders have prescription authority upon graduation. The PharmD-PA dual degree program can be an alternative pathway to students interested in provider status as physician assistants are already recognized as mid-level providers and have established themselves to practice with physicians in most patient care activities.

The benefit of the PharmD-PA dual degree on patient care outcomes could be immense. Most PA programs offer students 2-3 courses in pharmacology in their training before graduation.

With a specialized pharmacy background, these concurrent degree holders will be better equipped to prescribe pharmacological interventions and provide medication education for their patients, ultimately optimizing patient care. Students will obtain a holistic model of education where they focus on pathophysiology, diagnosis, and pharmacology and become experts in both the pharmacy and PA fields. With healthcare provider shortages especially in medically underserved or rural areas, this pipeline of PharmD-PA degree holders could be an innovative method to create more mid-level practitioners for a rapidly growing and aging population (Staton et al., 2007). Integration of the PharmD curriculum with the PA dual degree will create stronger learning experiences and potentially enhance clinical and economic outcomes for patients.

Currently, the existing programs offering PharmD-PA dual degrees have few applicants. This economic variance for institutions pursuing the PharmD-PA dual degree is compounded by many schools of pharmacy offering a variety of other dual degree programs (e.g. PharmD-MBA, PharmD-MPH) that have higher popularity among applicants. Additionally, schools will need to provide either full-time equivalents or workload redistribution for a dual degree program coordinator or director that oversees students' entry and progress in the track. Both the school of pharmacy and PA program will need to ensure that the program complies with the accreditation standards from both Accreditation Council for Pharmacy Education and Accreditation Review Commission on Ed-

ucation for the Physician Assistant. Faculty in both programs will have to work together to monitor the progression of students in their didactic and experiential activities for accreditation compliance. Another limitation to the dual degree holder is the exponential growth of PA educational programs themselves that could lead to new graduates saturating the growth market in a similar fashion to pharmacy. There have been 112 new ARC-PA accredited PA programs since 2015, representing a 67.8% increase in new educational programs, which could affect supply and demand of graduates in the future (Accreditation Review Commission on Education for the Physician Assistant, Inc., 2021).

It is important to note that in this study while the majority of students indicated that the dual degree would be most beneficial for career advancement, only 8.3% of respondents had plans to pursue it. In a cross-sectional study of student perceptions of a PharmD-MPH dual degree program by Holtzman et al. (2014), many students believed that time commitment (19.9%), increased workload and stress (11.2%), and tuition cost (10.3%) were the notable disadvantages of pursuing the dual degree. Students entering the PharmD-PA dual degree program will need to maintain the minimum grade point average needed to advance in each program as failure of a course will delay and complicate the dual degree pathway. While students benefit from having some academic credit waived, this is offset by having less time off in a condensed program as classes are mostly year round.

“Students will also have to pass both the pharmacy and PA board exams in order to obtain licensure as well as comply with state requirements in both fields for continuing education for license maintenance.”

This could be burdensome on students who are licensed in more than one state or pursue advanced certification or specialties. Finally, there are financial burdens for students to consider as their schooling will be longer compared to those who do not pursue dual degree programs. However, despite these limitations, the results of this study support modifying the pharmacy curriculum to accommodate students seeking the PharmD-PA dual degree.

This was the first study of its kind about the perceptions of a PharmD-PA dual degree program, and the first study about dual degrees among HBCU students. Additionally, the survey questions assessed both personal and professional consequences of the dual degree career path including changes in responsibilities, practice setting, salary, and job satisfaction. Limitations include the cross-sectional nature of the study that prevents making causal inferences on the findings.

The response rate was low at a single-center, 3-year HBCU program so the generalizability of the study could be affected. Finally, the students' exposure to PA responsibilities from interprofessional development and experiential education coursework may bias the results. Students may relay a more positive attitude towards the PharmD-PA dual degree based on their current experiences and the value of the survey may only be limited to these settings.

The interest from students with implementation of the PharmD-PA dual degree as well as the rise of other dual degrees programs in the profession provides preliminary data for program proposal and development. The PharmD-PA dual degree could have important ramifications for the profession in its ability to change education tracks, healthcare practitioner roles and shortages, job satisfaction, and financial outlook. While better job satisfaction and competition were beneficial factors, the ultimate benefit would allow these dual degree holders to have prescribing power and improve patient outcomes. This could ultimately reverse physician shortages especially in the primary care sector and in medically underserved areas. However, the popularity of the program in existing schools of pharmacy remains low and it is unknown if students will select this avenue for career placement compared to other dual degree programs or postgraduate training. Further analysis of programs currently offering the PharmD-PA dual degree including outcomes data are warranted to provide additional support and assist new programs in the decision-making process.

Despite these uncertainties, schools of pharmacy should look into the development of PharmD-PA dual degree programs as a unique marketing opportunity for admissions and create opportunities for students to pursue the dual degree as a non-traditional method of career advancement.

REFERENCES

1. Accreditation Review Commission on Education for the Physician Assistant, Inc. (2021). *ARC-PA accredited PA programs*. <http://www.arc-pa.org/accreditation/accredited-programs/>
2. American Association of Colleges of Pharmacy. (2021). *Academic Pharmacy's Vital Statistics: Institutions and Programs*. <https://www.aacp.org/article/academic-pharmacys-vital-statistics>
3. Dang, Y. H., & To-Lui, K. P. (2020). Pharmacist perceptions of and views on postgraduate year 3 training. *American Journal of Health System Pharmacy*, 77(18), 1488-1496. <https://academic.oup.com/ajhp/article-abstract/77/18/1488/5878816>
4. Gourley, D. R., Rowell, C., Wingate, L., Yates, C. R., Gourley, G. K., & Miller, D. D. (2006). Status of PharmD/PhD programs in colleges of pharmacy: the University of Tennessee dual PharmD/PhD program. *American Journal of Pharmacy Education*, 70(2), Article 44. <https://www.ajpe.org/lookup/doi/10.5688/aj700244>
5. Holtzman, C. W., & Sifontis, N. M. (2014). Pharmacy students' perspectives on a PharmD/MPH dual degree program at a large metropolitan school of pharmacy. *Pharmacy Practice*, 12(1): 1-5. <https://doi.org/10.4321/s1886-36552014000100003>
6. Jacobs, D. M., Daly, C. J., Tierney, S. L., O'Brien E., & Fiebelkorn, K. D. (2017). Attitudes and perceptions of dual PharmD/MBA degree program students. *American Journal of Pharmacy Education*, 81(4):1-6. <https://doi.org/10.5688/ajpe81471>
7. Migliore, M. M., Costantino, R. C., Campagna, N. A., & Albers, D. S. (2013). Educational and career goals of pharmacy students upon graduation. *American Journal of Pharmacy Education*, 77(9), 1-4. <https://doi.org/10.5688/ajpe779187>
8. Pharmacy College Application Service. (2020). *Dual Degree Programs*. <https://www.pharmcas.org/school-directory/explore-and-compare/dual-degree-programs>
9. Staton, F. S., Bhosle, M. J., Camacho, F.T., Feldman, S. R., & Balkrishnan, R. (2007). How PAs improve access to care for the underserved. *Journal of the American Academy of PAs*, 20(6), 32-36. <https://doi.org/10.1097/01720610-200706000-00008>
10. University of Rhode Island College of Pharmacy. (2018). *URI, Johnson & Wales to offer dual degree in pharmacy, physician assistant studies*. <https://web.uri.edu/pharmacy/2018/09/05/uri-johnson-wales-to-offer-dual-degree-in-pharmacy-physician-assistant-studies/>

11. University of Washington School of Pharmacy. (2023). *PharmD-PA Program*. <https://sop.washington.edu/pharmd/curriculum/concurrent-degree-info/pharmd-pa/>
12. U.S. Bureau of Labor Statistics. (2021). *Occupational Outlook Handbook: Pharmacists*. <https://www.bls.gov/ooh/healthcare/pharmacists.htm>
13. U.S. Bureau of Labor Statistics. (2021). *Occupational Outlook Handbook: Physician Assistants*. <https://www.bls.gov/ooh/healthcare/physician-assistants.htm>
14. Vermeulen, L. C., Swarthout, M. D., Alexander, C., Ginsburg, D. B., & Pritchett, K. O. (2020). ASHP Foundation Pharmacy Forecast 2020: Strategic planning advice for pharmacy departments in hospitals and health systems. *American Journal of Health System Pharmacy*, 77(2), 84–112. <https://doi.org/10.1093/ajhp/zxz283>
15. Vuernick, E. L., Josefiak, K. F., Spooner, J. J., & Kennedy, D. (2019). Non-doctoral and dual degree offerings in US pharmacy schools. *American Journal of Pharmacy Education*, 83(7), 1528–1533. <https://doi.org/10.5688/ajpe6917>

// Research Article //

Assessing Selected Teaching Techniques and Their Impact on Student Success
in the Classroom

Timothy S. Faith, JD

Corresponding author:

Timothy S. Faith, JD

tfaith@ccbcmd.edu

From the Legal Studies Department, School of Business, Technology and Law,
Community College of Baltimore County, Baltimore, Maryland.

TEACHING ————— TECHNIQUES & STUDENT SUCCESS

Student success in college courses is important to students and faculty, though what variables predict student success are myriad and can be difficult to collect by faculty.

ABSTRACT

Student success in college courses is important to students and faculty, though what variables predict student success are myriad and can be difficult to collect by faculty. Given the complex interaction of these variables, many of which are external to the classroom, a faculty member could be excused for thinking that the work of the faculty may not be impactful at all as to student success. However, this study considers several teaching techniques, including chunking course materials and assessments into smaller units, expanding practice homework assignments,

and automating some course feedback to students through software, and identifies that increasing the number of exams that cover smaller portions of material appears to increase the average student pass rate of exams, but expanding homework and automating course/assignment feedback to students does not significantly impact student average exam grades. However, the use of intelligent agents did appear to negatively impact the rate at which students completed all exams in the course.

INTRO — DUCTION

Business Law I is a 3-credit survey course in the management program.

As a survey course on business law, a variety of topics are included: constitutional law, the court system, torts, criminal law, contracts, uniform commercial code, intellectual property, business ethics, and agency and employment law. A variety of teaching techniques have been employed in the course. A natural question is whether any of these teaching techniques or assignments have a positive impact on student learning and success in the course.

To evaluate this question, the following observational study was developed that examines student learning outcomes in the form of average

exam scores in relation to the implementation of several teaching techniques, including: chunking homework and assessment of materials in the course into smaller portions, the use of a journaling assignment to invite students to extend their knowledge through independent research on concepts introduced in the course, and the use of automation for student follow-up on attendance, missed assignments, and success. Additionally, the study examines whether the use of intelligent agents within the learning management system (LMS) impacts the rate at which students complete all exams in the course.

METHODS

Student learning in the Business Law course has generally been assessed based on course exams.

Student success rates (defined as those students earning an ABC grade) vary in the study period with an average success rate of 53% in the course (including students that withdrew) as described in Table 1.

Table 1. Summary of Success Rates (ABC) by Calendar Year.					
	2016	2017	2021	2022	Total
Success Rate	62%	65%	44%	48%	53%
N	125	131	164	174	594

METHODS

Table 2. Summary of Success Rates by Treatment.

	Intervention	Success Rate	<i>N</i>
Problem sets	6 or fewer problem sets (control)	55%	465
	12 problem sets (treatment)	47%	129
Assessments	3 exam format (control)	58%	275
	4 exam format (treatment)	49%	319
Intelligent Agents	No intelligent agents (control)	54%	510
	Use of intelligent agents (treatment)	51%	84

The following were treatments implemented during the study period, and the success rates of each treatment are summarized in Table 2:

Assessment using 4 exams rather than 3 exams during the semester in an effort to chunk materials into smaller portions;

Expansion of homework problem sets (multiple choice questions related to course materials) from 6 sets to 12 so that student homework would also be chunked into smaller portions;

Implementation of intelligent agents within the LMS to message students automatically based on certain conditions.

METHODS

A summary of which sections of students were included in the control or treatment group for each of the above treatments is described in Table 3. Treatments (a) and (b) were originally inspired by a study by Humphries and Clark (2021), which suggested that students preferred shorter lectures and chunked course materials over longer lectures. Research by Fulkerson and Martin (1981) suggested that having shorter but more frequent quizzes may correlate with higher average scores, though such students did not do better on average on a cumulative final exam as compared to students with larger but less frequent quizzes during the semester. With regards to treatment (b), a wider educational debate exists as to the merits of homework generally and its impact on student achievement, as discussed by Trautwein (2007). Trautwein states that an increase in homework frequency was a significant predictor of achievement at the class level in study 2 of a multi-level model developed based on data collected for a larger international study.

In study 2, data were collected from 2,216 German mathematics students in 91 classes, and a positive, significant relationship was found between homework effort by students and success on mathematics exams in study 3 discussed in the same paper. Similarly, Bowman et al. (2014) reported that higher average time spent on online chemistry homework correlated with improved exam and course grades.

With regards to treatment (c), the use of automated reminders was studied in a small sample of math and economics students, and the authors found an increase in completion rates compared to a control group not exposed to the reminder software (Carmean & Frankfort, 2013). A separate study with the same software at a community college found an increase in retention rates from fall to spring when comparing students exposed to the reminder system with students that served as the control group (Maslin et al., 2014).

Table 3. Student Groupings into Control and Treatment Groups.

	Control Sections	Treatment Sections
4 unit exams	• All 2016 • All fall 2022	• All 2017, 2021 • Spring and Summer 2022
12 problem sets	• All 2016, 2017, 2021 • All spring 2022 sections	• All summer and fall 2022
Intelligent agents used	• All 2016, 2017, 2021 • Summer 2022 • One in-person and 2 online sections of fall 2022	• All spring 2022 • One in-person section of fall 2022

Other authors studied the use of email and text message reminders to students with a flipped classroom, and found that the “consistent nudging via text messages appears to be pivotal in ensuring student success” (Sherr et al., 2019). These authors concluded that text messaging was significantly related to student success and retention when such messages were sent consistently.

Other authors studied the use of email and text message reminders to students with a flipped classroom, and found that the “consistent nudging via text messages appears to be pivotal in ensuring student success” (Sherr et al., 2019). These authors concluded that text messaging was significantly related to student success and retention when such messages were sent consistently.

The present study is observational rather than a randomized controlled trial because students could not be randomly assigned to courses offered as this would be impractical for college enrollment (Adelson, 2013). Observational studies create a strong possibility of bias due to confounders in the observed data, where a baseline covariate within the population may be the true cause of the observed result, rather than the treatment being analyzed by the study (Austin, 2011). In a randomized controlled trial, an unbiased estimate of the average treatment effect can be calculated by a difference of the means of outcomes between the control and treated populations. However, an observational study's control and treatment groups may vary such that other covariates, including, for example, the age, family income, or race distribution of each group, may bias the difference between the observed means. One methodology discussed in the literature to counter this problem is the use of a propensity score.

Rosenbaum and Rubin (1983) originally developed the propensity score as expressed in the following formula: $e_i = P(r_i | Z_i)$, where e_i is the preference score of the individual i , Z_i is a vector

of features or characteristics for individual i , and Z_i is a binary variable indicating whether or not individual i is a match.

The purpose of calculating a propensity score is to create a similar treatment and control group so that the distribution of known covariates is similar between the groups, “[T]hus, in a set of subjects all of whom have the same propensity score, the distribution of observed baseline covariates will be the same between the treated and untreated subjects” (Austin, 2011). Fischer's (2015) implementation of propensity score matching (PSM) was “to create subsets of students who were statistically similar across three important covariates: age, gender, and minority status” by regressing the bivariate treatment condition on these covariates and matching using “nearest neighbor matching with calipers” to create homogenous treatment and control groups.

Predictors of student success in college courses have been extensively studied in the literature. Alyahyan and Düşteğör (2020) identified numerous factors from prior research that may correlate with student success, including past student performance such as high school grade point average (GPA) and/or student GPA in prior college courses; student demographics such as gender, race, and socioeconomic status; the type of class, semester duration, and program of study; psychological factors of the student such as student interest, stress, anxiety, and motivation; and e-learning data points such as student logins to the LMS and other student LMS activity.

METHODS

An initial dataset of 594 enrollments was collected from students enrolled in my Business Law courses from sections taught in Spring 2016, Fall 2016, Spring 2017, Fall, 2017, Spring 2021, Fall 2021, Spring 2022, Summer 2022, and Fall 2022. Enrollments included students that completed the course, along with students that withdrew before completion. The 5 students that withdrew from the course are excluded from this analysis, as data for these students was unavailable. Data collected included average score on exams in the course, whether the class was taught in person/remote synchronously, whether the class was a full-term (14-week) course, whether the student was male, overall credit hours attempted by the student, and overall GPA of the student.

GPA's were grouped into categories to simplify the matching process.

- GPA >3.75 was grouped as 4
- GPA between 3.25 and 3.75 was grouped as 3.5
- GPA between 2.75 and 3.25 was grouped as 3
- GPA between 2.25 and 2.75 was grouped as 2.5
- GPA between 1.75 and 2.25 was grouped as 2
- GPA between 1.25 and 1.75 was grouped as 1.5
- GPA between 0.75 and 1.25 was grouped as 1
- GPA between 0.25 and 0.75 was grouped as 0.5, and below 0.25 the GPA was defined as 0.

The following dependent variables were defined: whether the student received a passing average exam grade (an average of at least 60%), the final grade in the course (A grades were coded as 4, B as 3, C as 2, D as 1, and other grades

as 0), and whether the student completed all of the exams in the course. The following treatments were defined: *isTreatmentPST1* (whether the student had a total of 12 problem sets during the course, or had 6 or fewer problem sets), *isFourExamsT1* (whether the student had 4 exams with 1 for each of the 4 units, or whether the student had 3 exams where the unit exams on contracts were combined), and *isTreatmentAAT1* (whether intelligent agents were used in the course).

A subset of data was defined for students who had at least 12 attempted credit hours and attempted all of the exams in the course of 395 student enrollments. The purpose of this subset was to identify the student's prior performance at the college by the student's cumulative GPA, which prior research identifies as an important covariate related to student success (Alyahyan & Düşteğör, 2020).

A linear regression model was defined, looking for a relationship between average exam grades and the treatments above, along with several independent variables. The result of each of these models is described in Tables 4, 5, and 6, below. Several covariates discussed below seem to confound whether the treatments studied in these models were the cause of the variation in student performance or completion.

To control for confounding covariates, PSM was implemented for this subset of students using the *MatchIt* library within R. PSM was used to estimate the Average Treatment Effect on the Treated (ATT) for 3 treatments noted above on average student exam scores by using the *comparisons* function within the *MarginalEffects* library. This function takes as input each preference score-matched model, and compares that with a subset of the treated observations to provide an estimated ATT. A total of 3 models were defined (4 Exams, 12 Problem Sets, and Intelligent Agents) to evaluate the ATT.

METHODS

Table 4. Effects of Select Variables on Exam Scores.		
	Estimated effect on average exam score	p value
4 exams	+0.05	0.02*
12 problem sets	-0.02	0.26
Online students	-0.03	0.02*
Full term students	-0.05	0.02*
Remote synchronous students	-0.04	0.08
Male students	+0.03	0.0003***
Intelligent agents used	-0.05	0.004**
Overall GPA	+0.09	>0.001***
Overall hours attempted	0	0.46

Significance: * 0.05, ** 0.001, *** 0.0001. | F = 19.16, adjusted R-squared = 0.3154.

METHODS

Table 5. Effects of Select Variables on Pass Rates.		
	Estimated effect on overall pass rate	p value
4 exams	+0.04	0.640
12 problem sets	-0.003	0.961
Online students	-0.07	0.446
Full term students	-0.09	0.261
Remote synchronous students	+0.07	0.445
Male students	+0.07	0.057
Intelligent agents used	+0.05	0.489
Overall GPA	+0.32	>000.1***
Overall hours attempted	0	0.667

Significance: *** 0.0001. | F = 14, adjusted R-squared = 0.2433.

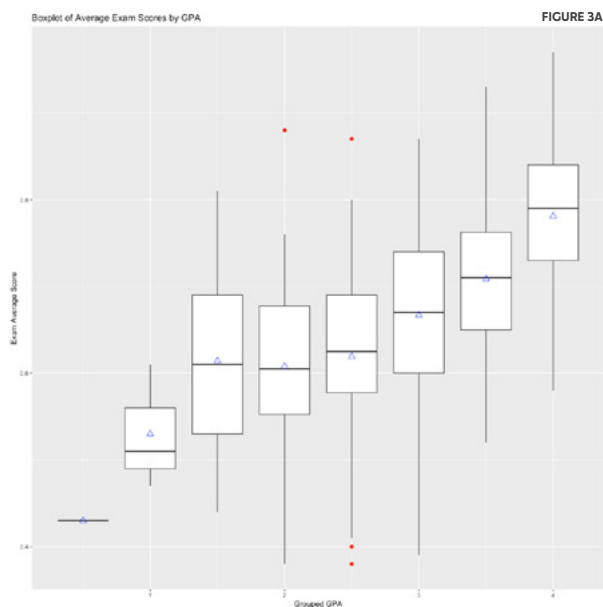
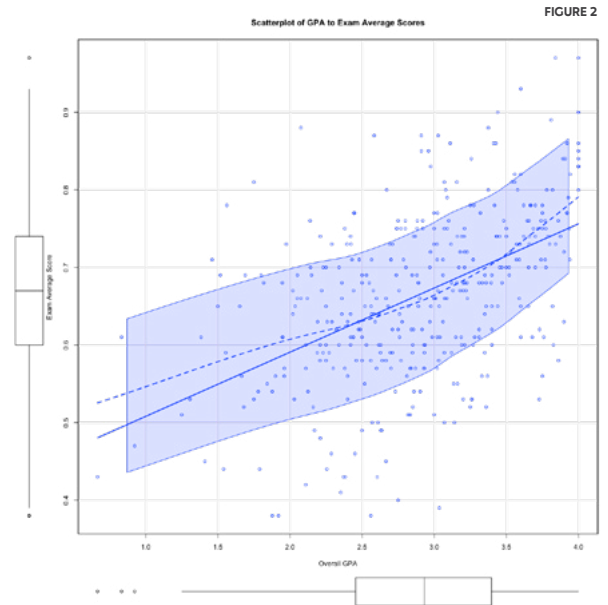
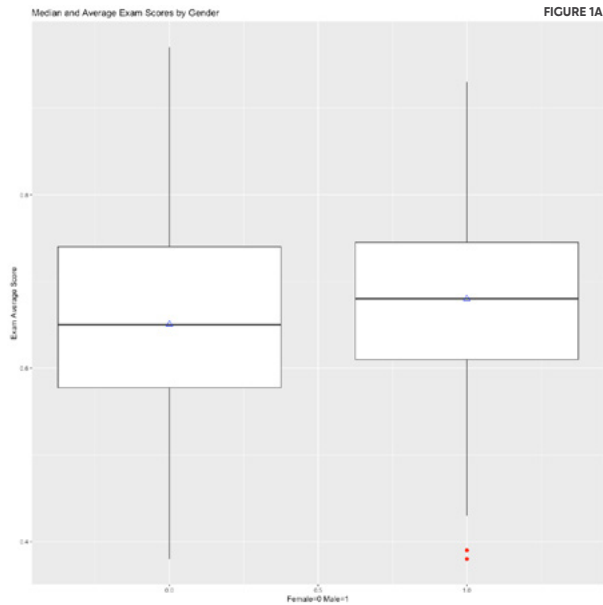
METHODS

Table 6. Effects of Select Variables on Grades.		
	Estimated effect on overall pass rate	p value
4 exams	+0.21	0.200
12 problem sets	+0.10	0.517
Online students	-0.25	0.026*
Full term students	-0.08	0.576
Remote synchronous students	+0.12	0.502
Male students	+0.16	0.028*
Intelligent agents used	-0.11	0.376
Overall GPA	1.10	>0.0001***
Overall hours attempted	0	0.414

Significance: * 0.05, *** 0.0001. | F = 42, adjusted R-squared = 0.510

METHODS

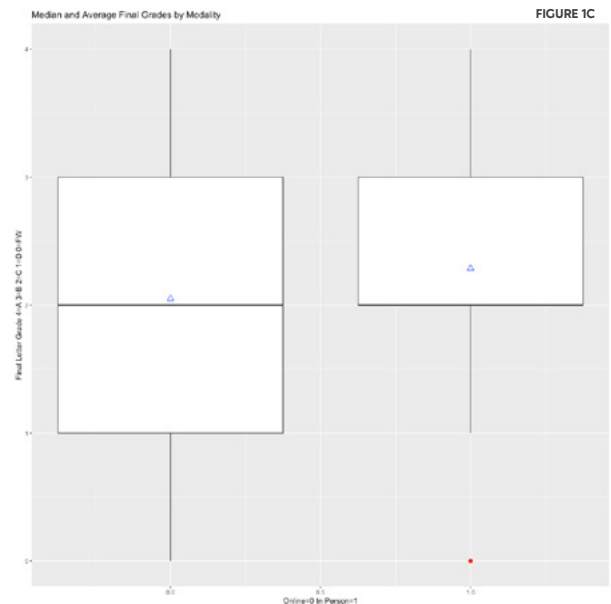
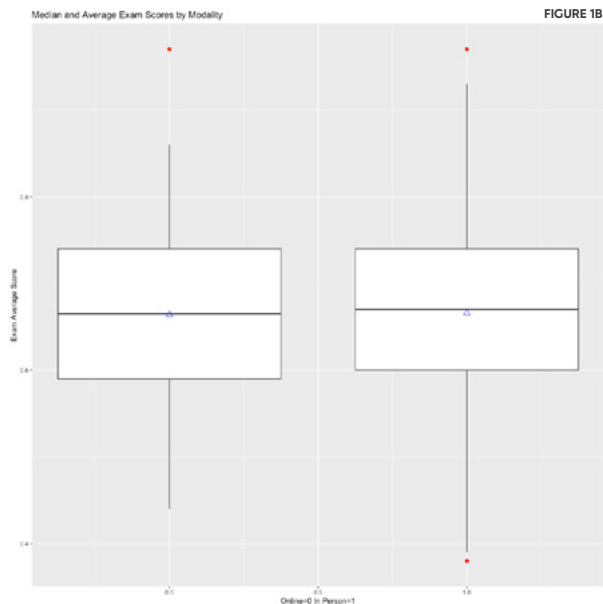
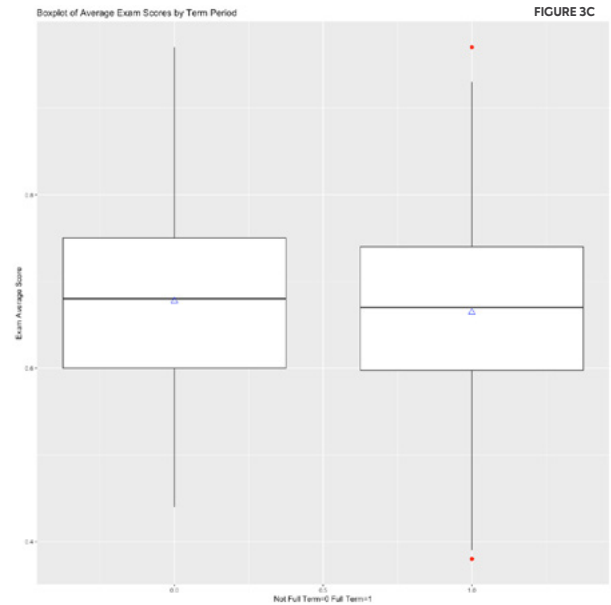
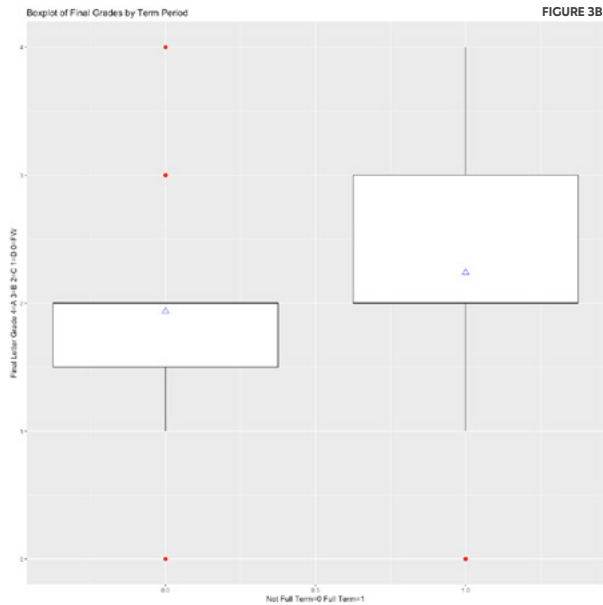
FIGURE 1A, 2 AND 3A



In defining the PSM models, I investigated variations in student outcomes based on available independent variables, noting that male students tended to have a higher average exam score than female students (Figure 1A), and that a correlation of higher exam scores and higher cumulative grouped GPA was present in the data (Figures 2 & 3A). These correlations persisted when examining the overall final grade in the course.

METHODS

FIGURE 3B, 3C, 1B AND 1C



In addition, I noted that full-term students, which are those students that completed the course in a traditional 14-week period, had a higher mean and median final grade in the course compared to students that took the course in a compressed period (Figure 3B), though this was reversed when examining average exam grades (Figure 3C).

I also investigated whether average exam scores might be related to whether the course was taught in person, and found that there was a small variation on the mean

or median for this independent variable (Figure 1B), however a substantial difference was found for overall student grades based on modality (Figure 1C). Independent variables that showed variation on the mean of a dependent variable were used in matching for each of the PSM models on the premise that balancing students between control and treatment groups would improve the overall reliability of the models for further analysis.

All of the models described below used whether the class was in person, the grouped GPA of the student, whether the student was male, and whether the class was a regular, 14-week term to match treatment with control enrollments.

I first attempted 1:1 nearest neighbor PSM without replacement with a propensity score estimated using logistic regression of the treatment on the covariates and also genetic PSM with a population size of 1,000 (Griefer, 2022), but both of these methods resulted in poor balance. Instead, I implemented a “full” PSM, which had an adequate balancing for the 4 Exams, 12 Problem Sets, and Intelligent Agent models, as more fully described in Figures 6, and 7A and 7B for these models (Austin, 2010; Ho, 2011).

One additional model was defined to examine whether the use of intelligent agents had an impact on students taking all the exams in the course for students who had attempted at least 12 credit hours at the college using 537 enrollments. Figure 7C illustrates the resulting balance obtained using exact matching for this model. The matching for the Intelligent Agent model resulted in discarding 86 control and 3 treatment observations from the model.

After matching, all standardized mean differences for the covariates were below 0.1 and all standardized mean differences for squares and 2-way interactions were below 0.15. Full matching meant that all treated enrollments were matched with a control enrollment, so no enrollments were discarded by the matching procedure for the first 3 models. Exact matching resulted in discarding 3 control units, though this loss was acceptable as the overall balance of the model was achieved (Austin, 2011).

To estimate the treatment effect and its standard error for each model, I fit a linear regression model with whether the student passed the exams (an average score on the exams of at least 60%) as the outcome, and the treatment, covariates, and their interactions as predictors, and then included the full matching weights in the estimation. The “lm” function was used to fit the outcome, and the comparisons function in the marginaleffects library was used to perform a g-computation in the matched sample to estimate the ATT (Griefer, 2022).

The source data for the study was collected from instructor grade books for each of the semesters noted above and was imported into a MySQL database. Data on students that withdrew was collected separately from institutional data sources.

Certain variables, such as student gender, overall credit hours attempted, and cumulative GPA were collected from institutional data sources. The open source statistical package, R version 4.2.2, was used for multivariable linear regressions, preference score matching analysis, and Love, Scatterplots, and density plots were created using the libraries RMySQL, MatchIt, Cobalt, ggplot2, and MarginalEffects.

RESULTS

Table 2 summarizes student success rates in the course for certain variables, without any regression or PSM applied to the dataset. The reader will note that at first blush, the treatments applied within the course do not appear to yield a higher success rate when compared to a control group to which the treatment was not applied.

However, this result could simply be by chance. Therefore, an initial multivariable model was developed, to which a linear regression was applied in an effort to determine which independent variables, including both fixed effects (such as the student's gender, class modality, class term) and random effects (such as the treatments applied, student overall credit hours attempted and student cumulative GPA).

RESULTS

Table 4 summarizes this initial regression. This regression suggests that some of these variables are significantly related to average student exam results, including having 4 exams rather than 3 ($p = 0.02$), and using intelligent agents ($p = 0.005$), while other treatments like more homework problem sets are not significantly related. The regression also strongly suggests that there is a significant relationship between cumulative GPA of students and average student exam results. The scatterplot in Figure 1A illustrates that higher GPAs tend to cluster with higher average exam scores, consistent with Tables 4, 5, and 6.

In contrast, no pattern emerges in the scatterplot in Figures 1A and B when plotting cumulative credits attempted by the student and average student exam scores, also consistent with the analysis presented in Tables 4, 5, and 6. The inference of this data is that just exposure to college courses does not correlate with performance in college courses, though prior success in college courses may correlate with future student success.

A regression was also constructed to compare the overall success rate (students earning an ABC) in the course with same variables as above, the results of which are reported in Table 5. Of note is the fact that no variables are significantly related to the overall course pass rate, except the student's cumulative GPA ($p > 0.0001$). Drilling a bit deeper, a final

regression was constructed to examine individual letter grades received in the course with the same variables, the results of which are reported in Table 6, where the final letter grade was assigned a number from 0 to 4, with A=4, B=3, C=2, D=1, and all other grades, 0.

This analysis suggests that online students had a significantly lower letter grade compared to non-online students ($p = 0.03$), though the analysis also suggested that cumulative GPA is significantly correlated with a higher letter grade in the course ($p > 0.001$).

However, as noted above, observational studies may be biased by baseline characteristics of persons included in the study, such that certain characteristics in the population better predict the dependent variable than the treatments studied. As noted above in the literature and the above regression models, prior GPA is a strong predictor of student success in subsequent courses and likely is an important covariate that would improve the clarity of the analysis if properly controlled for through an alternate statistical method (Austin, 2011). Austin notes several other educational researchers that have used PSM to address this concern. Fischer (2015) also uses PSM in a study of the use of open educational resources in an observational study of the impact of such resources on student performance to better control for the uneven distribution of certain student characteristics that tend to predict student success.

RESULTS

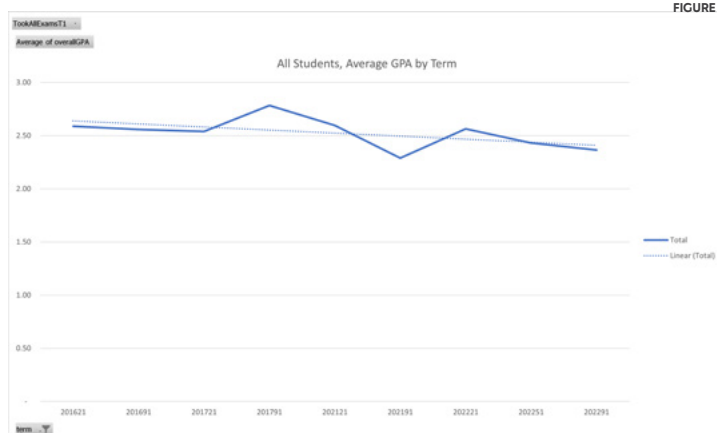


FIGURE 5

A question arises as to whether there is an uneven distribution of students based on cumulative GPAs among the control and treatment groups included in this data subset.

There appears to be a declining trend in the average GPA of students taking the course as described in Figure 5. This trend may be an important confounding covariate that may better explain student performance rather than the treatments implemented in the course, given that many of the control enrollments are sourced from when student average cumulative GPA was higher. To try to balance control and treatment groups with similar students, I implemented PSM using the R "matchit" function, for the purpose of calculating an estimated ATT for each of the 4 treatments in the study.

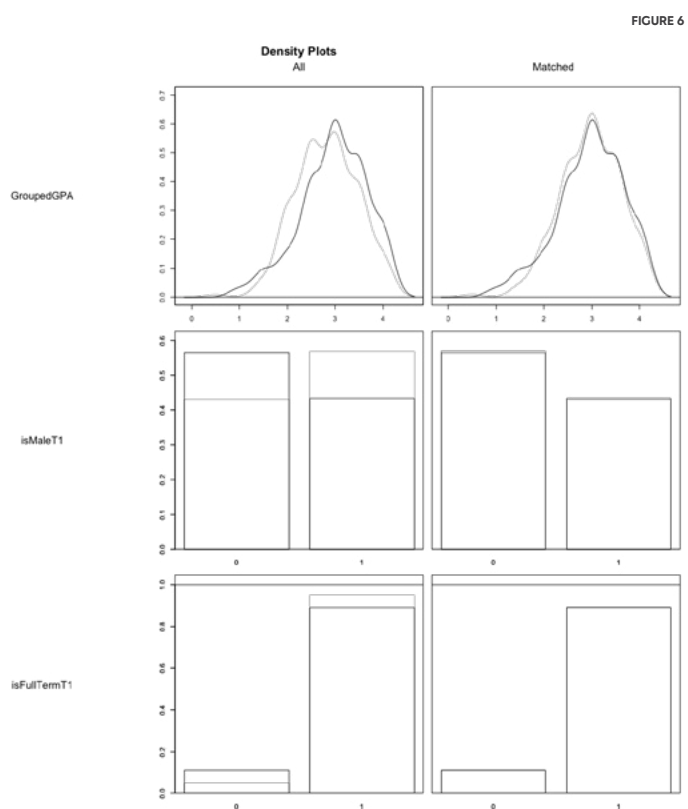


FIGURE 6

The 4-Exams Model was used to evaluate the ATT associated with using 4 exams to assess student learning, rather than 3. Figure 6 is a density plot illustrating the balance of the model after matching compared with the unbalanced starting data. The estimated effect was 0.162 (SE = 0.0413, $p > 0.001$), indicating that students who completed 4 unit exams on average were more likely to earn a passing average exam grade compared to students who were assessed using 3 unit exams.

The 12 Problem Sets model was used to evaluate the ATT associated with the use of additional homework and its impact on the average student exam pass rates.

FIGURE 7A

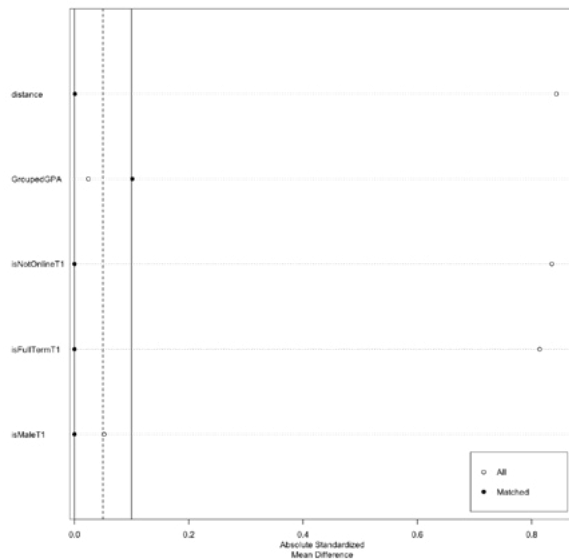


FIGURE 7B

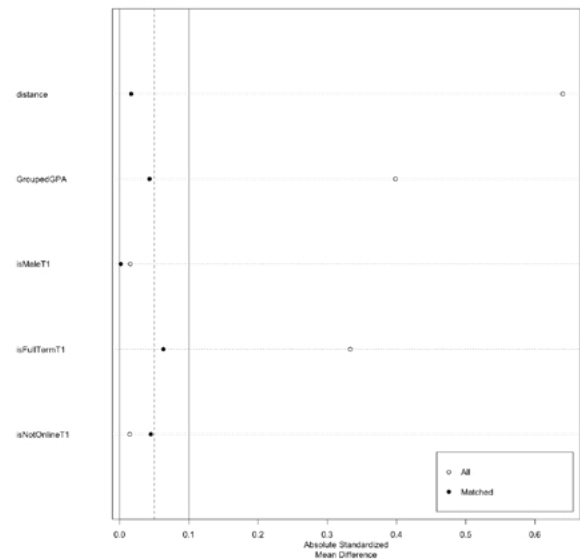


Figure 7A is a Love plot illustrating the balance of the model after exact matching between the treatment and control observations. The estimated effect was -0.0036 ($SE = 0.0616$, $p = 0.95$), indicating that having more problem sets as homework assignments probably had no impact on the frequency at which students passed the exams on average in the course.

The Intelligent Agents model was used to evaluate the ATT associated with sending automated reminders to students concerning attending to the course, advising students when they missed an assignment, and encouraging students to reach out when they did poorly on one or more assignments during the semester, and the impact of this messaging on average student

exam pass rates. Figure 7B is a Love plot illustrating the balance of the model after using subclass matching between treatment and control observations.

The estimated effect was 0.0303 ($SE = 0.0587$, $p = 0.61$), indicating that the use of automated agents did not have any significant impact on the average student pass rate of the exams. The careful reader will note that the initial pool of students ($n = 594$) is substantially larger than those included in the above analysis ($n = 395$) of the 3 treatments on average exam pass rates for those that took all the exams.

A substantial subset of students (51) withdrew from the course as summarized below in Table 7 and a substantial subset of students (177) did not complete

all exams in the course. For students (56) with less than 12 attempted credit hours, less than half (21/56) completed all exams, and the majority (38) failed or withdrew from the course.

These raw numbers indicate a substantial student loss rate across the study period of approximately 47% (students that earned a DFW as a percent of all students enrolled), with a notable increase in the withdrawal rate starting in 2021 compared with the 2016 and 2017 semesters included in the study as indicated in Table 7.

Superficially, one might conclude that the treatments implemented in 2021–2022 may be exacerbating withdraw and/or failure rates in the course.

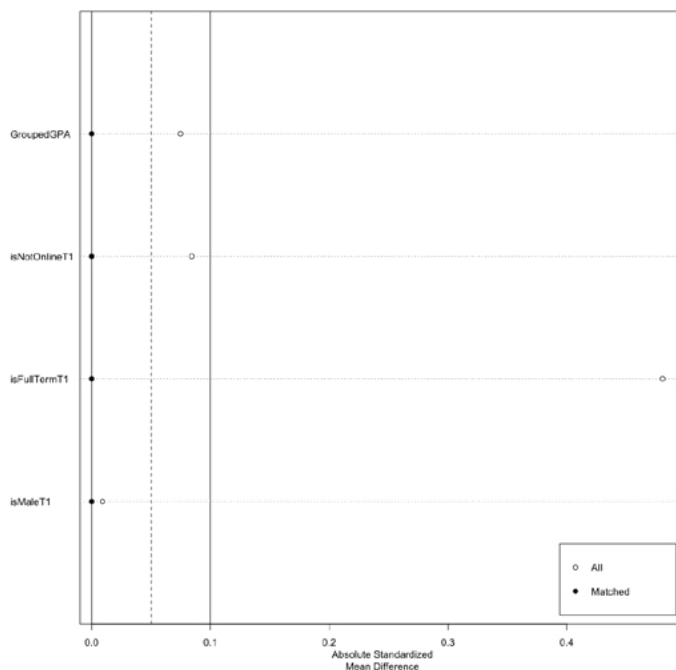
Table 7. Withdrawal Rates by Semester.

	SP 16	FA 16	SP 17	FA 17	SP 21	FA 21	SP 22	SU 22	FA 22	Total
Withdrawals	3	4	5	3	4	12	7	0	13	51
Did not take all exams	7	6	15	4	22	26	23	6	18	127
Took all exams	44	61	61	44	78	32	43	15	49	417
Withdrawal Rate	5.6%	5.6%	6.2%	5.9%	3.8%	17.1%	9.6%	0%	16.3%	8.9%

I therefore studied whether a treatment that increased teacher-student interactions might increase the rate at which students completed all exams in the course.

(Cifuentes & Lents, 2010).

FIGURE 7C



Several other researchers studied the use of automated reminders and found that these resulted in improved student outcomes and retention (Carmean & Frankfort, 2013; Maslin et al., 2014; Sherr et al., 2019). The Intelligent Agents model involves messaging students who are not logging into the course weekly, and also sending students automated feedback on certain homework assignments during the semester, resulting in increased teacher-student interactions through course messaging beyond course announcements and automated calendar reminders within the LMS. I studied the effect of intelligent agents on students completing all exams in the course.

After matching, the Love plot in Figure 7C illustrates balancing of the matched model. The estimated effect was -0.12 ($SE = 0.0448$, $p = 0.008$), indicating that the use of automated agents significantly reduced by 12% the frequency at which students completed all the exams.

DISCUSSION & CONCLUSION

Breaking up assessments in the course into 4 units from 3 seems to increase exam pass rates by approximately 16%, while the other 2 treatments did not seem to have a significant effect on the average exam pass rate of students who took all the exams during the course and attempted at least 12 credit hours at the college.

However, the use of intelligent agents appears to have significantly reduced the rate at which students completed all the exams in the course by 12%, suggesting that the additional reminders may have been discouraging.

DISCUSSION & CONCLUSION

This may be the result of messaging-overload for students that were struggling to keep up with the class, discouraging them from attempting all of the exams.

As noted above, there are myriad variables that may have some statistical significance to student success, though not all of these variables could reasonably be included in the present study. A follow-up study on these preliminary findings may expand the control and treatment groups to include additional observations to improve the overall matching using larger pools, and also to include additional independent variables from institutional research sources for these students which may contribute to student performance. For example, collecting data on student performance in 2014-2015 and 2018-2020 may help to expand both control and treatment groups to improve matching performance and reliability.

Also, collecting data on race/ethnicity, student age, student poverty status, student motivation, and student LMS usage may better explain variations in student outcomes and may result in better matches between control and treatment groups, and a better estimate of the ATT of any particular treatment considered in the study.

The bulk of this study is focused on students with sufficient credit hours at the college to establish a base cumulative GPA; the remaining sample of students was not studied as student GPA prior to work at the college was not available for this study. Such students that are new to college courses may be an important population to study in a separate analysis with additional data, including student high school GPA and other variables that are strongly correlated with student performance. Conclusions reached here may not be more generalizable outside of the context of a business law course when the course subject matter does not lend itself to a combination of lecture and student discussion of scenarios applying law concepts.

Finally, some of the students in the treatment groups were exposed to more than one treatment concurrently and the combinations of treatments may impact average student exam scores and/or the rate at which students complete all exams in the course, however, this was not studied.

REFERENCES

1. Alyahyan, E., & Düşteğör, D. (2020). Predicting academic success in higher education: literature review and best practices. *International Journal of Educational Technology in Higher Education*, 17, Article 3. <https://doi.org/10.1186/s41239-020-0177-7>
2. Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioral Research*, 46(3), 399–424. <https://doi.org/10.1080/00273171.2011.568786>.
3. Bean, J. C. (2001). Engaging ideas: *The professor's guide to integrating writing, critical thinking, and active learning in the classroom* (1st ed.). Jossey-Bass/Wiley.
4. Bowman, C. R., Gulacar, O., & King, D. B. (2014). Predicting student success via online homework usage. *Journal of Learning Design*, 7(2), 47–61. <http://dx.doi.org/10.5204/jld.v7i2.201>
5. Barkley, E. F. (2010). *Student engagement techniques: A handbook for college faculty*. Wiley.
6. Carmean, C., & Frankfort, J. (2013). *Mobility, connection, support: Nudging learners to better results*. EDUCAUSE Review. <http://www.educause.edu/ero/article/mobility-connection-support-nudging-learners-better-results>
7. Cifuentes, O. E., & Lents, N. H. (2010). Increasing student-teacher interactions at an urban commuter campus through instant messaging and online office hours. *Electronic Journal of Science Education*, 14(1), 1–13.
8. Fulkerson, F. E., & Martin, G. (1981). Effects of exam frequency on student performance, evaluation of instructor, and test anxiety. *Teaching of Psychology*, 8(2), 90–93. https://doi.org/10.1207/s15328023top0802_7
9. Goacher, R. E., Kline, C. M., Targus, A., & Vermette, P. J. (2017). Using a practical instructional development process to show that integrating lab and active learning benefits undergraduate analytical chemistry. *Journal of College Science Teaching*, 46(3), 65–73.
10. Grier, N. (2023, June 13). *MatchIt: Getting started*. <https://cran.r-project.org/web/packages/MatchIt/vignettes/MatchIt.html#assessing-the-quality-of-matches>

11. Ho, Daniel, Imai, Kosuke, King, Gary, Stuart, Elizabeth A. (2011) *MatchIt: Nonparametric Preprocessing for Parametric Causal Inference*. <https://r.iq.harvard.edu/docs/matchit/2.4-20/matchit.pdf>
12. Humphries, B., & Clark, D. (2021). An examination of student preference for traditional didactic or chunking teaching strategies in an online learning environment. *Research in Learning Technology*, 29. <https://doi.org/10.25304/rlt.v29.2405>
13. Maslin, A., Frankfort, J., Jaques-Leslie, M. (2014). Mobile supports for community college students: Fostering persistence through behavioral nudges. *League for Innovation in the Community College*.
14. Roback, P., Legler, J. (2021). *Beyond multiple linear regression: Applied generalized linear models and multilevel models in R*. Chapman & Hall. <https://bookdown.org/robback/bookdown-BeyondMLR/>
15. Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55. <https://doi.org/10.1093/biomet/70.1.41>
16. Sherr, G. L., Akkaraju, S., Atamturktur, S. (2019). Nudging students to succeed in a flipped format gateway biology course. *Journal of Effective Teaching in Higher Education*, 2(2), 57-69. <https://doi.org/10.36021/jethe.v2i2.51>
17. Trautwein, U. (2007). The homework-achievement relation reconsidered: Differentiating homework time, homework frequency, and homework effort. *Learning and Instruction*, 17(3), 372-388. <https://doi.org/10.1016/j.learninstruc.2007.02.009>.
18. Winitzky-Stephens, J. R., & Pickavance, J. (2017). Open educational resources and student course outcomes: a multilevel analysis. *International Review of Research in Open and Distributed Learning*, 18(4), 1-15. <https://doi.org/10.19173/irrodl.v18i4.3118>
19. Zhao, Q., Luo, J., Su, Y., Zhang, Y., Tu, G., & Luo, Z. (2021). Propensity score matching with R: conventional methods and new features. *Annals of Translational Medicine*, 9(9), 812. <https://atm.amegroups.com/article/view/61857>

// Research Article //

A Community College Case Study on Curricular Maps
and Student Retention

Amy M. Ertwine, EdD, MSN, RN
aertwine@ccbcmd.edu

From the Nursing Department, School of Health Professions, Community
College of Baltimore County, Baltimore, Maryland.

CURRICULAR MAPS & STUDENT RETENTION

To understand retention, evaluation of GP implementation is an important tool. In an effort to help students succeed, colleges often give students a specified set of core courses and a specific or even prescribed pathway to complete their general education requirements.

ABSTRACT

To understand retention, evaluation of guided pathways implementation is an important tool. In an effort to help students succeed, colleges often give students a specified set of core courses and a specific or even prescribed pathway to complete their general education requirements. Retention efforts are always a topic with administrators at community colleges across the United States. The Community College of Baltimore County (CCBC) incorporated GP into retention efforts in the fall of 2015. Over the past 4 years, CCBC has incorporated more activities focusing on increasing knowledge about GP. The pathways are Arts; Business, Law and Education; General Studies; Humanities and Social Sciences; Science and Health Careers; and Technology, Engineering

and Mathematics. Vincent Tinto's framework is often presumed to be inappropriate to the study of student persistence at community colleges because social integration is considered unlikely to occur for students at these institutions. Community college students are thought to not have the time to participate in activities like attending concerts, joining clubs, or exploring art galleries that would facilitate social integration. This study examines student and faculty perceptions of GP at CCBC and whether they help with retention of the students for sequential semesters. I interviewed students who were enrolled in English 101 for the first time starting in the fall of 2015 through 2018. I also interviewed full-time faculty who taught English 101 on the same campus.

INTRO — DUCTION

Student retention at community colleges is a problem in the United States. This study looks at the Community College of Baltimore County (CCBC), a large multicampus suburban community college in the Mid-Atlantic.

As community colleges look for ways to increase student retention, studying why students do not continue education was also important to focus on. There are many reasons why students do not stay in school, whether it be financial or even lack of desire. This study focuses on student and faculty perceptions of the implementation of curriculum mapping at CCBC. Curriculum mapping provides students with clear, educationally coherent program maps that include specific course sequences, progress milestones, and program learning outcomes (Bailey, Jaggars,

& Jenkins, 2015). Building upon the results of this study, practitioners may more easily identify barriers to student retention, which in turn would create positive social change. It is important to retain students in higher education because it can have a positive impact in increasing human capital and governmental revenue (Pluhta & Penny, 2013). According to the National Center for Education Statistics, the average student unfortunately does not complete an associate degree within the first 2 years (NCES, 2011a).

METHODS

One important problem at CCBC is low student retention (CCBC Fact Book, 2022). CCBC has approximately 28,000 credit students enrolled per year, and the retention rate for students returning is approximately 50% (Public website for CCBC, 2020). Nationwide, 2-year community colleges and for-profit 4-year schools have average completion rates below 40% (Nadworny, 2019).

This study only looked at students who entered English 101 between fall 2015 and fall 2018. I selected participants on a first come first serve basis. I did not quantify male versus female participants as I was just looking for the students' perceptions of retention strategies. CCBC has a larger population of females who attend (Public website for CCBC, 2020). Participants were first-generation students on one of the main campuses.

Semi-structured interviews took place either by phone, Skype, Zoom or face to face. The face-to-face interviews were conducted by me and took place in my office with the door closed for privacy.

To assess one student retention initiative, I conducted semi-structured interviews with students and faculty to gain their perception of guided pathways (GP) in regard to retention at CCBC. The examination of perceptions, feelings, and experiences are commonly established from qualitative studies and reflect a constructivist perspective, meaning that reality is subjective and based on the perspective and experience of the individual (Burkholder et al., 2016). Quantitative researchers examine numerical data, but because this study does not quantify the variables, the goal is to gain perspectives of students and faculty regarding low student retention.

Research Design and Rationale

I used a basic qualitative methodology to enable me to examine CCBC's data. Researchers use case studies to explore, explain, or describe in research and examine current events in context (Yin, 2014). Case studies are versatile, and researchers can examine different variables, but a variety of different sources are required for data triangulation (Yin, 2014). The researcher determines the case which may be an individual student or faculty member (Sinha & Hanuscin, 2017), an organization, or a school (Parylo & Zepeda, 2015). This case study was conducted at CCBC at one of the main campuses.

Role of the Researcher

I am a full-time associate professor at CCBC, and I teach on a different campus in a different department. I interviewed students and faculty while maintaining the data in a secure fashion. A password protected device was used solely for the research, and I was the only person with the password. Documents were secured in a locked drawer in my office. I did not have any type of relationship with the students as I do not teach general education courses. I also did not have any type of relationship with any of the faculty that were interviewed. This avoided researcher bias.

Methodology

According to Rubin and Rubin (2012), by using qualitative interviews, researchers can explore important personal issues. The use of qualitative methodology allows the researcher to gather the type of data most appropriate to the study's purpose and research questions. Qualitative research is a form of in-depth study that utilizes data collected in person and through observation from individuals in their natural environment (Creswell, 2003 and 2012). Unlike quantitative methods that present results as numerical data, qualitative research produces narrative responses in the form of words (Creswell, 2012). The researcher analyzes the data to determine trends associated with the study's variables (Saldaña, 2015). The characteristics of the case study were compatible with the scope and features of the study. The implementation of GP is a contemporary event situated in a unique community college environment that has multiple campuses.

Participant Selection

I asked for participants from CCBC since it has implemented the GP model. A qualitative researcher must ensure they can access their participants and that the participants have experience with the phenomenon under study (Ravitch & Mittenfelner, 2016). I reached out to the Planning, Research and Evaluation (PRE) director at CCBC to identify relevant participants for the study. From the list of names, I drafted an e-mail to possible participants asking for volunteers to participate in the study. From the participants that responded, I selected on a first-come, first-serve basis, so there was no bias or conflict of interest. I initially contacted potential participants via email. The email included informed consent and an explanation of the study along with a request to participate. Reaching out with an email that offers an introduction and explains the purposes of the study, with a request for help, is the first part of establishing

We began at the outset with a larger dataset of potential covariates that might explain student performance in courses, including the cumulative GPA of the student which we collapsed into GPA ranges to simplify our model (the GPA ranges were 0.5 steps of GPA, such that GPAs between 3.75 and 4.0 were rounded to 4, 3.25 to 3.74 were rounded to 3.5, 2.75 to 3.24 were rounded to 3, and so forth).

contact. A follow up e-mail may be necessary for students who have already transferred or graduated. Sample email and informed consent material is available upon request to the author.

I sent an email to all full-time faculty who teach English 101 at one main CCBC campus, requesting volunteers. Selecting the faculty who taught in the English department was important since this is one course that is required for almost all of the degree programs at CCBC. The faculty would possibly have a better understanding of GP. These faculty members may have also taught some of the students participating in the study, but the faculty would not know the identities of the students in the study. I accepted the first 5 respondents to my request from each semester (fall 2015–2018) to participate in the survey. I also asked for 3–5 full-time English faculty on the same campus to volunteer to participate. From the selected pool of participants, I contacted the volunteer participants to set up the interview. Interviews took place via phone, skype, zoom, or face-to-face meetings.

Procedures for Student Recruitment, Participation, and Data Collection

Student participants were identified with the help of Planning, Research and Evaluation (PRE) at CCBC. Participants were selected among the population exposed to GP from 2015–2018. I asked PRE to supply names and email address from all students that were enrolled in English 101 at one main campus in the fall semesters from 2015–2018. Participation in research was voluntary, and each participant received an introductory letter explaining the purpose of the research. Prior to the interview, each participant received an informed consent form to allow the participants to state whether they are willing to participate in the interview

and alerts them that the interview can be stopped at any time. Informed consent also notified the participants that they do not need to answer any questions that they do not feel comfortable answering. I will maintain a copy of the signed informed consent with all other research documents locked in a secure drawer in my office for 5 years. After weeks of recruiting participants, I had 15 students and four faculty that agreed to participate in this study.

Because it was important to consider the comfort of the participant, holding the one-time, one-hour, semi-structured interviews via phone, Zoom, or in person allowed for flexibility, comfort, and privacy. To ensure privacy for the phone or Zoom interviews, I conducted interviews in my office with the door closed. To ensure suitable space for the in-person interview, it was important to coordinate with the participants to determine an available room that was most conducive to gathering information.

I audio recorded and transcribed each interview. In order to provide anonymity, each participant received a number. Confirmation of contact information at the end of the interview was necessary to send a transcript of the interview to them for their review. Having participants examine transcripts of the interview ensured the precision of the data collected, contributing to the credibility of the study (Devault, 2018). The storage and protection of all research materials is vital. Transfer of all electronic files of transcripts, recordings, and informed consents to a flash drive for storage are part of the process of keeping track of the data. I will keep the flash drive combined with all memos, journals, and research notes, for 5 years under lock and key to protect confidentiality.

INSTRUMENTATION

Interviews from students and faculty were the primary data collected. Each interview included a standard set of questions and the interviewer used additional questions to clarify information or encourage participants to expand their answers. I created the following interview protocol and questions related to my research question that focus on the participant's perception of GP:

Start interview protocol with quick explanation of what GP is: "GP is a student retention initiative that CCBC implemented in the Fall of 2015. It's a student-centered approach that can increase the number of students earning community college credentials. Creating a curricular map for students using GP helps students know exactly what courses they need and prevents them from taking unnecessary coursework."

For student participants, ask the following questions related to RQ1: "How do students perceive the relationship between student retention and implementation of GP?"

- Can you tell me how you first came to the decision to attend CCBC?
- What classes did you take your first semester at CCBC?
- Describe your understanding of GP.
- Do you know what pathway you were placed in and why?
- Describe any activities that were directly related to GP and the pathway you were placed in.
- How do you manage your time commitments outside of school? (Work, family, or other activities)
- Do you feel your faculty encourage you to participate in the events?
- What do you feel CCBC is doing well in regard to student retention?
- What do you feel the value of GP is?
- What do you feel could be improved?
- What would you like to see done in terms of student retention at CCBC?
- Do you participate in any clubs and/or organizations on campus?
- If yes: Which ones interest you?
- If no: Why not?
- Is there anything else that you would like to tell me about barriers or successes with student retention at CCBC?
- Is there anything else you would like to tell me?

METHODS

For faculty participants, ask the following questions related to RQ2: “How do faculty perceive the relationship between student retention and implementation of GP?”

- How long have you been a full-time faculty member at CCBC?
- Why did you choose CCBC?
- Describe your understanding of GP.
- Where you part of the implementation of GP at CCBC?
- How do you feel the process of implementing GP has helped CCBC?
- What do you perceive is working well in regard to student retention?
- What do you perceive are barriers to implementation of GP in higher education?
- How would you recommend overcoming those barriers?
- What kind of impediments have you experienced or witnessed to career advancement in higher education?
- What do you feel CCBC is doing well in regard to student retention?
- What do you feel could be improved?
- What would you like to see done in terms of student retention at CCBC?
- Is there anything else that you would like to tell me about barriers or successes with student retention at CCBC?
- Is there anything else you would like to tell me?

Data Analysis Plan

I collected data for analysis from semi-structured interviews and verified or refute the interview information with a document review of the activities related to GP. During the interview, I took note of how the interviewee was answering questions including body language. When conducting qualitative research, it is important to maintain reflective journals, and to write memos, to allow for immersion with the data. I kept a reflective journal throughout the process and wrote memos as I analyzed the data. The writing of a researcher journal and analytic memos during the process assisted with reflection on my own feelings, biases, and beliefs as I sorted and reviewed the data. I logged all data according to location and by participant in a numbered system that provides for confidentiality, but keeps the information organized.

METHODS

By asking the interview questions, data was gathered to determine if the retention strategy did in fact increase retention.

After the participants approve the transcripts, I reviewed and interpreted the data from the interviews using open coding and thematic analysis (Saldaña, 2015). Following a thorough review of the transcribed material, I organized the data using the qualitative data analysis software NVivo. Then, I coded quotes into categories, and developed emerging themes. Coding is an iterative process and requires examination and reexamination of the data, followed by a development of emerging themes (Ravitch & Mittenfelner, 2016).

Ethical Procedures

Using a qualitative procedure allowed the research to be more naturalistic and depend on personal observations in a real-world setting (Ravitch & Mittenfelner, 2016). All instruments were created by the same research. I also implemented, analyzed, and coded all of the data. This process could possibly contain errors due to the researcher's bias or subjectivity (Leung, 2015).

Elaborating on a respondent's answer puts words in their mouth and, while leading questions and wording aren't types of bias themselves, they can lead to bias or are a result of bias (Ravitch &

Mittenfelner, 2016). To avoid this bias, I only asked the questions created and did not ask leading questions. Some participants required additional prompting. I anticipated interviews would last no more than one hour, which was the case. Interview questions were not personal, and no one appeared to be upset over any questions.

By asking quality questions at the right time and remaining aware and focused on sources of bias, researchers can enable the truest respondent perspectives and ensure that the resulting research lives up to the highest qualitative standards (Ravitch & Mittenfelner, 2016).

Using reflective journaling, the researcher kept track of biases and personal assumptions (Cope, 2014). I had the participants review the data for accuracy. I also had the option reach out to PRE at CCBC to determine my next course of action if I was unable to deal with the bias alone. Institutional review board approval was obtained through Walden University and CCBC before any interviews took place.

All documentation being used was examined by both entities and approved. Site permission for the interviews was also obtained before data collection.

RESULTS

This study focused on student and faculty perceptions of the implementation of curriculum mapping at the CCBC. The first research question considered in this study was: How do students perceive the relationship between student retention and implementation of GP? If students felt that GP was the reason they continued to take coursework, that would show that the implementation of this strategy was an effective tool for retention (Mann Levesque, 2018).

The second research question used for this study was: How do faculty perceive the relationship between student retention and implementation of GP? This question would focus on the faculty knowledge of GP. This question also considered how faculty may be implementing strategies to aid in student retention. (Mann Levesque, 2018). Themes that developed from student participants differed from those of faculty participants and appear in separate sections.

Students were identified by “S” and the number they were assigned. For example, the first student I interviewed was S1. Based on responses from students in the early phase of implementation (fall 2015), they did not clearly understand what GP are. Students in the later years (fall 2017 and fall 2018) had a better understanding of why GP were implemented. Students did not always know they were placed in a specific pathway and even why they were placed in a specific pathway.

The first question asked of the students was “Can you tell me how you first came to the decision to attend CCBC?” Students were able to answer right away.

Statements related to why they attended include:

- S1: "Family wanted me to do better, I started in 2015 and graduated in 2018 with an associate in Associate of Applied Science: Air Traffic Control."
- S2: "Family wanted me to do better, I started in 2016 and transferred to another university in 2018 to obtain a bachelor's degree in accounting."
- S3: "CCBC was the most affordable alternative in my decision to begin my career in Mathematics. I am currently at a university finishing classes to be a math teacher."
- S4: "I was not ready for SAT exam for a 4-year college since I only did 3 years of high school in this country therefore, I decided to start from community college."
- S5: "Single mom, tired of working two and three jobs at a time. No previous college and it was a good starting point for me."
- S6: "I chose CCBC as it was the local community college and just made sense."
- S7: "I was a Senior in high school, and I do not know how, but I was placed to go on a field trip to CCBC to do a placement test. I ended up doing the "Parallel Enrollment Program". Took my high school classes in the morning and went to CCBC in the afternoons."
- S8: "My cousin was in her last semester of nursing school at CCBC and talked about how much she enjoyed the program, professors, and staff. Also, after seeing how much money I would save attending a community college as opposed to the private university, I was in. I was completely convinced. I am glad I made the switch and can see a huge difference in my happiness."
- S9: "I first started attending CCBC because I was eligible for dual enrollment my senior year of high school (2015/2016) and while still being a high school student the college classes were much less expensive. I ended up staying after high school because it was the better financial option for college."
- S10: "It was my Aunt who suggested that CCBC is a good school. Her son went to CCBC for his 1st 2 years and finished a bachelor's degree in another University and is now very successful. And it is only 4 miles away where I live."
- S11: "I didn't want to take out student loans, so I chose community college as the cheaper route."
- S12: "It was my local community college and close to home."
- S13: "I wanted to start some prerequisites in my senior year of high school."
- S14: "While I was in high school, I was enrolled in a dual enrollment program."
- S15: "I ended up at CCBC 2017, 23 years old, single mother of a 7-year-old, no guidance, no support system, an idea of going into computer science but no idea of how to reach that goal."

THEMES

Throughout data analysis on student responses, 92 codes emerged. Those codes merged into 5 categories which were then condensed into 3 main themes. Those themes were cost (theme 1), support (theme 2), and time constraints (theme 3).

Theme 1: The average cost of attending a community college varies based on location (Feldman & Romano, 2019). There are more states that are trying to offer free college to students who meet certain criteria. The cost per credit at CCBC is approximately \$110 per credit, plus fees (Public website for CCBC, 2020). Students indicated CCBC had lower costs than universities and that was the main reason for choosing the community college. According to Nadworny (2019), students who are working part-time or full-time are often struggling financially, with college affordability as a major factor in their success. Students tend to drop out because of financial pressures they are facing. Student participants used terms like cost, affordability, convenience, and fair tuition and fees. Statements demonstrating participants' understanding of cost include:

S1: "I am attending CCBC due to cost and affordability."

S2: "Free college would be easier. I am thankful my parents paid for my college but not everyone has that."

S11: "I am happy with how CCBC offers an affordable and fair tuition/fee schedule."

Tuition and fees, as a percentage of public 4-year institution tuition and fees, increased approximately 2 % from 49.7% to 51.7%. CCBC is currently above the benchmark of less than 50% of the average tuition and fees at a 4-year public institution in the eastern part of the United States (Public website for CCBC, 2020).

With the economy today, it is harder for students to attend school without having to work. The College Promise Scholarship was implemented for students who do not meet requirements for the Pell Grant. According to the Maryland Higher Education Council, "The Community College Promise Scholarship is a last dollar award, available to students that plan to enroll in credit-bearing coursework leading to a vocational certificate, certificate, or an Associate's Degree; or in a sequence of credit or non-credit courses that leads to licensure or certification; or in a registered apprenticeship program at a Maryland community college for the 2020-2021 academic year" (MHEC.org, 2020).

Since this is a new program, making sure advisors are aware of all the resources for students is important. This can help students prepare for their education knowing that cost is not going to prevent them from starting classes.

Understanding what students want regarding support is important as well. When students were asked “What do you feel CCBC is doing well in regard to student retention?”

The responses were:

- S1: "Making it affordable for students and convenient. It's nice to know we have support when making choices for classes."
- S2: "Having advisors help me choose classes based on my major is convenient."
- S3: "The cost is one great reason it's very affordable versus a university and Student Life always has something going on giving students a reason to hang around on campus staying interested in actually being there also it's plenty of resources where you shouldn't fail."
- S4: "Faculty and instructors are very encouraging and helpful to make students successful. Furthermore, CCBC has smaller size classes compared to a four-year college which benefits students and instructors to ask questions and provide extra support if needed."
- S5: "I think the majority of people that go to community college are often trying to get the first few years done at a cheaper cost OR ones that have been out of school for a long time and looking to finish a degree or change of careers, so I feel the retention in those ones is automatic because they are there for a specific reason. As for the students who are fresh out of high school that chose CCBC as their total college experience ... things like on campus activities, sports, or free things is probably very appealing to them and might help with retention."
- S6: "Convenient and affordable."
- S7: "I have no idea what CCBC is doing regarding anything, I am just trying to take the classes I need. I don't pay attention to anything other than registration."
- S8: "Having other programs besides degree programs is really good for CCBC. If it was not for the certificate program I am in, I would not have returned to this school for any degree."
- S9: "I think it is helpful that CCBC sends out emails and text alerts geared towards student success and will include some of the resources available to students."
- S10: "Not sure about student retention. I think really good, encouraging professors encouraged me to stay and finished what I started."
- S11: "For me, CCBC offers an affordable and fair tuition/fee schedule. CCBC is also very flexible regarding availability of class times, program options, etc."
- S12: "They are really welcoming to students and are very affordable. I was assigned an advisor who helped me select classes that I needed."
- S13: "I think so, most people I know either started their classes at CCBC or got a degree from CCBC and return to continue to further their education in their current area or to start with a new degree."
- S14: "Pretty well, they always have someone you can speak to help you along the way."
- S15: "They offer a variety of support services to help students become successful. I was assigned an advisor, discussed my goals, helps plan my schedule, given a list of services available if needed, and signed a contract. This alone encourages me to do well because what excuse can I give if I'm not successful? Also, the advisor evaluates my grades and has to sign off on next semesters schedule."

Students who understood what GP' purpose was indicated that student retention strategies were working. According to Prystowsky et al., (2015) colleges need to increase meaningful connections across the campus community.

Students who understood what GP' purpose was indicated that student retention strategies were working. According to Prystowsky et al., (2015) colleges need to increase meaningful connections across the campus community. GP encourages students to connect through the pathways. To assist students better, advisors need to be trained to have those difficult conversations with students to determine if they are prepared for college courses. During this process, difficult conversations advisors should discuss include time management, commitment, and ways to overcome obstacles (Ferdousi, 2016). There should also be an online advising support icon beside the instructional lab provided on the campus. Students should be able to have access to online tutoring, library, counseling, and financial aid icons (Ferdousi, 2016). Students who participated in the scheduled pathway events indicated they were more supported. The pathway events were scheduled throughout the year and were promoted through social media. The pathway events included get involved fairs offering student success support and activities that were geared toward successful degree and certificate completion, transfer, and career suc-

cess. The students that I interviewed all returned for multiple semesters. They either graduated with a certificate or degree, or they transferred their credits to a university.

CCBC is always looking for ways to improve student retention. As of today, students who enter the General Studies pathways are assigned a mentor. This mentor is expected to assist them in selecting classes while utilizing the curriculum map. The "General Studies pathway" was selected as the group that received mentors to help guide students if they chose to switch pathways as they were taking classes. An estimated 20% to 50% of students enter college as undecided, and an estimated 75% of students change their major at least once before graduation (Horn & Moesta, 2019).

Students also benefit from getting to know one another. Even if the students are in a cohort and already familiar with most of their classmates, use classroom exercises to force them to occasionally interact with classmates they don't normally hang out with (Steinhauer, 2017). Offering the activities with the pathways will continue to help the students feel like they belong.

Theme 3: Students shared they would often avoid extracurricular activities related to GP due to their busy personal schedules. Most students verbalized they still had to work, or they were dually enrolled. The dually enrolled students were either junior or seniors in high school while taking college level courses.

Participants answered the question “How do you manage your time commitments outside of school? (Work, family or other activities)”

- S1: "I was fortunate enough that since my parents wanted me to go to school that I did not have to work. My job was school. I tried to attend all the activities."
- S2: "I did not have to work. My job was school."
- S3: "One thing at a time.... I'm happy that my tenure at work allows me the freedom to study and complete assignments for class and I don't have any children, yet which is also a bonus as far as any other activities if it doesn't involve studying, I can't make it."
- S4: "First two years of college were not as challenging but later on I had to cut down my work hours and personal pleasure activities such as video gaming. I have always lived with my parent since it is our culture, and it has been a big help as a student."
- S5: "I struggle finding good balance; but basically, family comes first and then I try juggle everything else. I think once I finish school, I can better manage commitments properly."
- S6: "I sacrifice sleep most days. I am a single mom of two toddlers, and I also help take care of my elderly parents. I am the first person in my family to go to college, which also puts more stress on me to do well. I do my best to have my children help when they can around the house, basically I am a one woman show."
- S7: "I have a planner and write everything down. When I took my first class, I wrote down everything and tried to stay involved with all the activities that were going on."
- S8: "My planner is my bible. I keep a handheld planner on me wherever I go and keep a desk calendar in my room, therefore I plan any activities according to what I have scheduled each week. For example, if I have an exam the upcoming week my close friends and family know that it means I am not going out very much that weekend, but if I don't have important deadlines or exams then I allow myself to have some fun and go out on the weekend."
- S9: "I originally put work before school because I had too financially. I've changed that approach since being in school. I put school as the focus and priority and even left my job for the year to be able to focus on school as much as possible. My second priority would definitely be family and I try to spend as much time as possible with them."
- S10: "It is hard to manage time outside of school. I had to send my only daughter to my parents in another state so they could look after her and help her study. I am the first person in my family to go to college and I want to make my parents and children proud. I worked the night shift, and it is hard to stay awake during the day. Sleeping less but trying to compensate with good nutrition."
- S11: "I've learned to say no if I cannot do something (attend a family event, stay over at work)-I have a self-schedule option at my job, which is a great help in balancing school and work. -I use a calendar to keep track of everything in both my academic and personal life."
- S12: "When I first started school, it was easy, I was single and was able to go to school full-time. Fast forward to today, I am married and have a daughter. My husband helps a lot with my daughter, I do school-work when my daughter sleeps, and I work two days a week. Everything else I planned. I thought I would finish school in two years, but life happens."
- S13: "I try to prepare myself as much as possible prior to starting a course then while I am in the course I try to focus as much time as possible on the course while my family is busy at work during the days, and I dedicate my weekends to working and my weekdays to schoolwork."
- S14: "Planning, I am a huge planner, I sit down once a week and make sure everything is as organized as it can be. When I took my first class, I thought it would be easy to do but I know that my education needs to be priority."
- S15: "I had to save and financially plan. Now I'm only working on weekends, which allows me ample time for studying without having to stress about bills and any additional school cost."

Students in the early implementation of GP did not always know what pathway they were in, or even what GP were. Participant S11 stated “I do not have enough knowledge of GP or any type of pathway to answer this question.”

As the years passed after CCBC first implemented GP, faculty and staff did a better job of explaining to students and offering more information to advisors. Participant S4 had a better understanding of GP by stating: “I kept in touch with the advisor who initially helped me to register for the classes. I also used CCBC website to explore different majors and careers.” Students want to do well and want support. Participant S9 stated “I feel that the faculty are way more involved in the students and the campus. In one semester, I have already participated in more campus events and activities than I did in when I first started in 2018. GP has increased support for me. I know that I have support from faculty and staff.” According to Aljohani, (2016a) higher retention comes from administrative support. Faculty advisers’ job is to help students plan their schedules, be successful in their course work, and prepare for their careers (Ferdousi, 2016). By having faculty and staff encourage students, students will more than likely return for subsequent semesters.

Students were from the same college and knew that they were interviewing about the GP. There were no discrepancy cases. Students were sent an e-mail asking for participation in the study. Although they did not know the

questions I was going to ask, the e-mail described the purpose of the study. Students were selected on a first come–first-serve basis. Even though not all the students knew what Guided Pathway they were in, they knew enough to volunteer for the study. Approximately 67% of first-time students required at least one developmental education course in fall 2018 (Public website for CCBC, 2020). This study only focused on students taking English 101 as their first course. Future research could be done on a broader student population. This study only focused on students that were enrolled in English 101 as their first course. Students do not always start with English 101 and that could be why there was no discrepancy cases.

Results from Faculty

I was able to formally interview 4 faculty members that teach in the English department on the same campus the students I interviewed attended. I conducted one-on-one interviews with faculty. I reminded them their answers were confidential, and I wanted honest answers. During data collection, faculty were identified with an “F” then numbered in order as F1, F2, etc. This helped to maintain confidentiality. I did not personally know the faculty who were interviewed as I do not teach on the same campus.

THEMES:

Throughout the data analysis of the faculty interviews, 52 codes emerged. After reviewing the data, 2 main themes emerged during the interviews: community and advising.

Faculty I interviewed all had vested interests in the college. Most of them mentioned they attended CCBC for their undergraduate work and wanted to give back to the community. Just like student responses, faculty all mentioned that CCBC needs more advisors for the GP to be a strong retention strategy. I only interviewed 4 faculty members, so there was less variety in faculty interview data than there was among students.

Theme 1: Working at a community college has lots of benefits. Faculty are usually from the area, which can increase retention rates with knowing that faculty return to the school they attended for their undergraduate studies. In a study completed by Pons et al., (2017), faculty were asked why they chose community college over a university. Approximately 68% of the faculty stated they preferred to work at a local college that they were familiar with and 54% of the faculty stated they chose to work at the community college for the students.

When asked "Why did you choose CCBC?" the responses were clear:

F1: "I chose the community college because they offered me the opportunity to teach English to students at all ability levels and to help students realize their dreams, as well as to grow professionally and personally in a non-restrictive non-threatening environment. I live in the area, and it just made sense to work here, and I have been here for a long time."

F2: "I was born and raised in the county and feel like I know the area well and its student population. I also enjoy teaching at CCBC because of the plethora of professional development opportunities that are offered

and also my wonderful students and generous, collaborative, and like-minded colleagues. Plus, CCBC is one of the only local colleges/universities still hiring full-time faculty members! (Every other school where I've taught has moved exclusively to an adjunct model.)"

F3: "I have always lived in the area; I went to school here before the campuses were combined. I felt that I wanted to give back to my community. CCBC also has tons of professional development for me as well as new faculty. I like how the college puts us in front like they put the students first. Keeps most of us here. That's why I stay, our administration is very supportive."

F4: "It's my alma mater. I grew up in the area and knew I wanted to teach here when I finished school."

Having faculty invested in their students is a great attribute to CCBC. Faculty that live in the area can also help with guiding students to obtain jobs. The faculty that I interviewed all had strong ties to the community. They enjoy working for the community college.

Theme 2: Faculty indicated CCBC needs more advisers to help guide students. There are times when students just come to the college to take classes, but do not really know what they want to do. For students that do not have a declared major, at the time of registration, they are placed in the General Studies pathway. After taking some classes, students have a hard time switching to another pathway, as they do not know how or who to talk to. Faculty responses for the question "What do you perceive are barriers to implementation of GP in higher education?" were:

Faculty responses for the question “What do you perceive are barriers to implementation of GP in higher education?” were:

F1: “Students placed in pathways do not have as many opportunities to explore fields outside of their designated track. So, once they are placed in a pathway, they may feel stuck or not know what else is out there that they would be interested in or excel in if given the opportunity to explore other pathways. Also, they might feel as though they cannot be interested in different majors/areas outside their own pathway. For example, drawing and biology are housed in two different pathways, but someone might want to be a medical illustrator. They would have to have both a science degree and an art degree; but those two areas are in very different pathways with little overlap.”

F2: “It’s always baffled me that students are not required to meet with an academic advisor, who could help them navigate their chosen pathway or even identify one if they’re not sure which might be the right fit. I assume this is not a requirement because we have so many students and only so many advisors, but it’s never made any sense to me why every student isn’t automatically set up with an advisor who regularly checks in and helps them manage their course load at CCBC.”

F3: “Advising. I think we need more advisors. The advisors are stretched so thin that some students don’t get the opportunity to meet with them. There are students who just don’t know what to do and they spend way too much money on trying to figure it out. I like that we have implemented more strategies to help students but advising needs to be beefed up to be more effective.”

F4: “Students not understanding the pathway process, and how to navigate through the college for help. We need more advisors to help support the students.”

Faculty need to have a better understanding of what the advisors deal with on a day-to-day basis. The faculty interviewed all suggested that CCBC was increasing strategies to improve student retention and they all knew the purpose behind the initiative of GP.

F3 stated “I think with all the incentives that CCBC has implemented it’s hard to determine which one is working better than others. We have initiatives like College Promise will also help with retention, but that remains to be seen.” Again, with all the initiatives that are implemented, it is hard to determine if one strategy works better than others in a short amount of time. Each year, CCBC learns more of how GP can increase student retention. To help students stay on track, the college strengthened its advising and degree-planning processes—2 critical elements of the GP model (Public website for CCBC, 2020). According to data from retention rates at CCBC, retention increased from 36% to 43% after implementation of GP (Public website for CCBC, 2020). Although there is no true data to show GP was the only reason for the increase, more research is needed.

Evidence of Trustworthiness

After I completed data analysis, I had a peer reviewer from PRE at CCBC review all my documentation to make sure it is credible and dependable. The reviewer did not work directly with any participants and their anonymity was assured with the removal of all personal identifiers. With the data collected, I can show transferability as student retention did increase. According to retention rates at CCBC, retention increased from 36% to 43% after implementation of GP (Public website for CCBC, 2020).

DISCUSSION & CONCLUSION

A main concern for CCBC is low student retention. Retention from fall to spring was 36% in 2015 and has increased to 43% since the implementation of GP (Public website of CCBC, 2020). In 2015, CCBC initiated a new retention model to help increase student retention. Data is currently being collected to assess the overall effectiveness of this initiative. Future plans can include disaggregating outcomes by ethnicity.

After completing a 1:1 participant interview, the data suggests that GP has improved retention over the years. In the beginning years of implementation, students did not even know what GP was. In the later years, students had a better understanding of the pathway they were placed in and why.

DISCUSSION & CONCLUSION

According to data, faculty that were not involved in the implementation did not fully understand how GP helped with student retention.

In the later years, students had a better understanding of the retention strategy. Faculty were more vested as the retention strategies improved. Both students and faculty indicated that advisors need to be more knowledgeable of the retention module. Both students and faculty expressed positive and negative experiences related to GP.

The first common theme that emerged from the data was the cost of going to school. The cost of college is a main issue when assessing why students attend or do not attend college (Feldman & Romano, 2019). According to Watson and Chen (2019), offering more educational resources to students can increase student retention. The federal government provides grants for students attending community college. Most types of grants, unlike loans, are sources of free money that generally do not have to be repaid (Grants, 2020). Not all students are eligible for these types of grants. CCBC now offers additional governmental funding like the College Promise Scholarship. These additional benefits can open up opportunities for students who may not have been

eligible for grants and scholarships like the Pell Grant. One of the challenges of offering these additional governmental benefits is that the college has to increase student retention. Another area that colleges are looking at are partnerships and apprenticeship programs. CCBC has entered into partnerships with local business to help students afford to pay for college.

Another common theme that emerged from the data was advising. Referring back to Tinto's (1975) theory of retention, students want to feel part of a community. Providing student support service programs is relevant to Tinto's integration model as it can provide intrusive student support to students which can contribute to academic integration. Tinto's model can also be an attribute to the social integration through making students feel a sense of belonging by alleviating the sense of alienation and isolation and ultimately meet the needs of those who are first generation during the early years of the college experience (Nall, 2017). Community colleges do not have the same amenities as universities.

DISCUSSION & CONCLUSION

Students who seek out academic advising support are more likely to continue in the program

(Glew et al., 2019).

Offering more support is key to keeping students on campus, enrolled, and returning. Participant students who were interviewed did return for multiple semesters. Some student participants graduated with a degree or certificate where others transferred to a university to complete their graduate degree. CCBC has partnerships with some local universities to make it easier for transfer students.

Limitations of the Study

One limitation of the study was that only 1 community college was used to gain perceptions of students and faculty. I only interviewed students from 1 of the campuses that took English 101 as their first course. Future research could also be done with a variety of faculty. Some students need to take remediation coursework first. With only interviewing 5 students from each year, the data did not come from the full population of first-semester students.

Recommendations

The first recommendation is to increase the knowledge of the advisors and faculty. Having more advisors available to students at all times, not just at the beginning of the semester, can help keep students on track. Students need support year-round. According to Burge-Hall et al., (2019) identifying the need for adequate

and proactive advising programs to foster student success is important. As the evidence shows, more advisors are important. Academic advising offers a path to promote student retention and persistence to graduation (Kulls, 2016). Most of the students stated they did not have the needed support, or their advisors were overwhelmed.

The use of videoconferencing tools, such as GoToMeeting, Skype, or Zoom, provide real-time support services to distance learners. Videoconferencing replicates an in-person advising session. Virtual advisors and students have the opportunity to familiarize themselves with each other and review documents more efficiently with the use of this tool (Ohrablo, 2016). Implementing videoconferencing sessions helps virtual learners feel connected and engaged with their program of study and college. Consequently, another benefit is the ability to record the session for future reference.

In today's world we are learning that we have to support our students. Further research could be done with students on other course work. I selected English 101 because most of the majors at CCBC require English 101. There have been a lot of improvements in the GP model since its implementation in 2015.

DISCUSSION & CONCLUSION

This study presents clear evidence that student retention remains an issue. One retention strategy does not fix all the issues

Faculty and staff have a better understanding of the GP, and they are more involved in the pathway events. CCBC has also added more advisors to assist students and increased the pathway events each semester.

Today, CCBC students are placed in a pathway upon admission to the college. To refer back to Tinto, (1975) theories of retention are that students will be much more likely to continue in school when they feel part of the college community, both socially and academically. By placing students in similar classes, this can increase social engagement (Soria & Taylor Jr., 2016). Students feel more connected to the college if they are in similar coursework. In a study on retention in first-year college students completed by Connolly et al. (2017), students had higher retention rates when students were enrolled in the same classes. This increased the student support system as students as a first-year student can be stressed, encouraging students to enroll in the same courses helps them stay motivated. The results of their study showed increased retention rates. At CCBC, students are encouraged to take the same classes to build friendships.

In addition to what CCBC is already doing with student retention, increasing activities

like high-impact practices (HIPs) into curricula will increase student engagement. HIPs are a relatively new concept in the classroom. HIPs are tools for teaching and learning which have proved to have positive effects on student retention (Hall & O'Neal, 2016; White, 2018).

HIPs are being used in some courses, but could be added to more courses to increase retention. The more we can support our students, the higher retention we should see. Future researchers should look at these student experiences and how the experiences shaped a student's decision to leave their educational pursuit. Future research could also investigate the programs or services offered at the community college to retain students and their effectiveness.

Implications

This study presents clear evidence that student retention remains an issue. One retention strategy does not fix all the issues. Educators need to do a better job of supporting their students to keep them returning. Literature suggests that students want a clear map of what they need to take. Taking unnecessary coursework puts a strain on students emotionally and financially, and GP may be one mechanism to reduce this stress.

REFERENCES

1. Aljohani, O. (2016a). A review of contemporary international literature on student retention in higher education. *International Journal of Education and Literacy Studies*, 4(1), 40-52.
2. Aljohani, O. (2016b). A comprehensive review of the major studies and theoretical of student retention in higher education. *Higher Education Studies*, 6(2), 1-18.
3. Bailey, T., Jaggars, S., & Jenkins, D. (2015). *Redesigning America's community colleges: A clearer path to student success*. Cambridge, MA: Harvard University Press.
4. Burge-Hall, V., Garrison, L., Giles-Brown, L., Lepore, D., McNall, M., Pauly, C., ... Vaughn Jordan, L. (2019). Taking the LEAP (Learner Engaged Advising Programs): VCCS Advising Practices and Recommendations. *Inquiry*, 22(1).
5. Burkholder, G. J., Cox, K. A., & Crawford, L. M. (Eds.). (2016). *The scholar-practitioner's guide to research design*. [Apple Edition]. Retrieved from <http://mbsdirect.vitalsource.com>
6. Connolly, S., Flynn, E. E., Jemmott, J., & Oestreicher, E. (2017). First year experience for at risk college students. *College Student Journal*, 51(1), 1-6.
7. Cope, D. G. (2014). Methods and meanings: Credibility and trustworthiness of qualitative research. *Oncology Nursing Forum*, 41(1), 89-91.
8. Creswell, J. (2003). *Research design: Qualitative, quantitative, and mixed methods approach*. Thousand Oaks, CA: Sage.
9. Creswell, J. (2012). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). Thousand Oaks, CA: Sage.
10. Devault, G. (2018). Establishing trustworthiness in qualitative research: What are qualitative research processes? The Balance; Small Business. Retrieved from <https://www.thebalancesmb.com/establishing-trustworthiness-in-qualitative-research-2297042>
11. Feldman, D. H., & Romano, R. M. (2019). Drivers of community college costs and prices. *Change: The Magazine of Higher Learning*, 51(3), 21-27.
12. Ferdousi, B. (2016). Addressing student retention and persistence issue in online classes. In Proceedings of the 2016 American Society for Engineering Education North Central Section Conference, Mt. Pleasant, MI.

13. Glew, P. J., Ramjan, L. M., Salas, M., Raper, K., Creed, H., & Salamonson, Y. (2019). Relationships between academic literacy support, student retention and academic performance. *Nurse Education in Practice*, 39, 61-66.
14. Grants. (2020). Retrieved from <https://studentaid.gov/understand-aid/types/grants>
15. Hall, B. H., & O'Neal, T. J. (2016). The residential learning community as a platform for high-impact educational practices aimed at at-risk student success. *Journal of the Scholarship of Teaching & Learning*, 16(6), 42-55. <https://doi.org/10.14434/josotl.v16i6.19585>
16. Kulls, J. (2016). An alternative approach for advising online students. Retrieved from https://www.naspa.org/images/uploads/events/An_Alternative_Approach_for_Advising_Online_Students.docx
17. Leung, L. (2015). Validity, reliability, and generalizability in qualitative research. *Journal of Family Medicine & Primary Care*, 4(3), 324-327.
18. Mann Levesque, E. (2018). Improving community college completion rates by addressing structural and motivational barriers. Retrieved from <https://www.brookings.edu/research/community-college-completion-rates-structural-and-motivational-barriers/>
19. Maryland Higher Education Commission, (2020). Community College Promise Scholarship. https://mhec.state.md.us/preparing/Pages/FinancialAid/ProgramDescriptions/prog_MDCCommunityCollegePromiseScholarship.aspx
20. Nadworny, E. (2019). College completion rates are up, but the numbers will still surprise you. Retrieved from <https://www.npr.org/2019/03/13/681621047/college-completion-rates-are-up-but-the-numbers-will-still-surprise-you>
21. Nall, B. Q. (2017). The effects of a student support services program on first-generation and low-income student retention (dissertation). Trevecca Nazarene University.
22. National Center for Education Statistics (2011a). Undergraduate graduation rates. Retrieved from <https://nces.ed.gov/fastfacts/display.asp?id=40>
23. National Center for Education Statistics (2011b). Web tables: Community college student outcomes: 1994-2009. Retrieved from <https://nces.ed.gov/pubs2012/2012253.pdf>

24. Ohrablo, S. (2016). Advising online students: Replicating best practices of face-to-face advising. Retrieved from <http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/Advising-Online-StudentsReplicating-Best-Practices-of-Face-to-FaceAdvising.aspx>
25. Parylo, O., & Zepeda, S. J. (2015). Connecting principal succession and professional learning. *Journal of School Leadership*, 25, 940–968. <https://doi.org/10.1177/105268461502500506>
26. Pluhta, E., & Penny, G. (2013). The effect of a community college promise scholarship on access and success. *Community College Journal of Research and Practice*, 37(10), 723–734. <https://doi.org/10.1080/10668926.2011.592412>
27. Pons, P. E., Burnett, D. D., Williams, M. R., & Paredes, T. M. (2017). Why do they do it? A case study of factors influencing part-time faculty to seek employment at a community college. *Community College Enterprise*, 23(1), 43–59.
28. Prystowsky, R., Koch, A., & Baldwin, C. (2015). Operation 100%, or completion by redesign. *Peer Review*, 17(4), 19–22.
29. Public Website for CCBC. (2020). Retrieved from <https://www.ccbcmd.edu/Programs-and-Courses/Degrees-and-Certificates/Pathways.aspx>
30. Ravitch, S., & Mittenfelner, N. (2016). *Qualitative Research: Bridging the conceptual, theoretical, and methodological*. Thousand Oaks, CA: Sage.
31. Rubin, H. J., & Rubin, I. S. (2012). *Qualitative interviewing: The art of hearing data*. London: Sage.
32. Saldaña, J. (2015). *The coding manual for qualitative researchers*. Los Angeles: SAGE.TABLES.
33. Tinto, V. (1975). Dropout from higher education: a theoretical synthesis of recent research. *Review of Educational Research*, 45(1), 89–125. <https://doi.org/10.3102/00346543045001089>

// Research Article //

ChatGPT in the English Classroom: 18 Students Test it and Share their Insights

Nancy J. Murray, MFA
nmurray@ccbcmd.edu

From the English Department, School of Writing, Literacy and Languages,
Community College of Baltimore County, Baltimore, Maryland.

ChatGPT IN THE CLASSROOM

18 students engaged in learning about artificial intelligence, specifically ChatGPT 3 (CHAT), to respond to the question of whether it is ethical or practical for students to use CHAT in college-level classrooms to complete assignments.

ABSTRACT

18 students engaged in learning about artificial intelligence, specifically ChatGPT 3 (CHAT), to respond to the question of whether it is ethical or practical for students to use CHAT in college-level classrooms to complete assignments. A thematic unit was created and taught in 2 face-to-face English 101 classes to explore the topic of CHAT. The unit was created with and designed to be completed by CHAT. After reflecting on 3 readings, 2 videos, and completing various related assignments, students were expected to write a 5-page essay about CHAT using CHAT in whatever way they wanted to complete the work while still maintaining the specific requirements of the English 101 objectives.

The essays were examined by the students using the same peer review process that we used for 2 essays written without using CHAT before the thematic unit, with the addition of 2 instructions: to check the veracity of the sources, and to evaluate the essays for consistency of tone, accuracy of information, and originality. Data collection for this qualitative study was based on hand-written

reflections by 18 of the students in the classroom, quick polls at the end of each lesson, and semi-structured, recorded interviews with 9 of the participating students who volunteered to be recorded.

The students were charged with the dual roles of tester and consultant, and it gave them the opportunity to understand and test CHAT in a classroom and to share their insights with faculty. Reflections and interviews were transcribed, coded, analyzed, and categorized into the 3 strongest recommendations for faculty considering using CHAT in their curriculum: (1) faculty should be open-minded and well trained in what CHAT is and how to use it safely before attempting to allow their students to use it in class; (2) students should be given specific instructions for how to use CHAT for specific tasks that will help them reach their potential and then allowed to decide for themselves how to proceed; (3) students should be tested to demonstrate comprehension of the material and classroom objectives both before and after the use of CHAT.

INTRO — DUCTION

Cheating is defined as “acting dishonestly or unfairly in order to gain advantage”

We were at the tail end of the fall 2021 semester in an English 101 class when my student confessed to writing his essay using artificial intelligence (AI) and asked if I thought it was cheating.

Now, there is no way I would have known he used AI to write his paper, so his telling me was simply to engage me in the conversation. Cheating is defined as “acting dishonestly or unfairly in order to gain advantage” (<https://www.dictionary.com/>). His grade was far from set, and he took a considerable risk in sharing this information with me, so no, I did not think he was cheating but trying to learn where the boundaries are. When he explained to me how he used ChatGPT 3 (CHAT, <https://chat.openai.com/>) to write his essay, I was fascinated. I had never heard of this technology before. I had to ask myself some hard questions before I could answer his. It felt like it was one of those pivotal teaching moments where my answer would be

weighed heavily so I hedged my answer with a class discussion on the topic that I hoped might give us all a chance to think it through.

The rest of the class was just as interested as I was, but most of them insisted that the student was cheating. They also thought that his actions would rob him of real learning. To prove that he did learn during the process of writing with CHAT, he flawlessly recited the points made in his essay.

Another point the class insisted upon was that work done by artificial intelligence was “not you,” and so not honest. Even though the offending student had a well-thought-out counterpoint to every point they made against it, many held on to their belief that one had to do all the hard work all the time in order to learn, and that anything shy of that was unethical. Many of my colleagues agree. “We have to prepare them for the real world.” I hear them say, but I wonder to which “real”

INTRO — DUCTION

world are they referring? In the real world there are people with divergent communication abilities who are perfectly competent critical thinkers.

Using CHAT could remove barriers for those people and enable them to thrive in business. In the article "Stumbling with their words, some people let AI do the talking" (Harwell et al., 2022), the authors give several examples of how CHAT can be a game changer for those who have been disadvantaged. They reference someone with dyslexia who is worried his words will come out wrong. He fires out a response and then lets AI review it. They say, "AI instantly rewords grammar, deploys the right niceties, and transforms it into a response that is unfailingly professional and polite." The "real world" is also rife with biases that can easily be worked around using a language model bot. The use of this technology could be an equalizing process for those of us who deal with a world that one could argue is more "real" than it is for others.

The question of intention must come into any consideration of ethics. Not all students come to school because they want to become

scholars. Some come because they want to learn tricks of a trade, or to check a to-do box that will improve their chances of employment, or to keep themselves busy and out of trouble while they figure out what they want to do with their lives. English 101 is mandatory for any degree or certificate program but doing the grueling and time-consuming work of unpacking and creating scholarly articles to fully understand the nuances of a topic selected by their instructor may not always be necessary. Getting the gist of a topic through video, quick skims of articles or reading CliffsNotes, can get the job done in a passable way, and I think it's ok for grown students to choose this. Similarly, using tools like Google, Grammarly, and spell check is widely accepted during the writing process, so I wondered if AI technology is no more or less a tool than those. What is the difference about CHAT that makes it so exciting to the world of technology, and so alarming in the world of academia?

Literature on Artificial Intelligence in the Classroom

Sometimes the most difficult part of research is finding relevant and current literature that addresses the topic of interest. This is not the case with AI. The topic is so groundbreaking that nearly everyone is talking about it in some way. Governments are working out what regulations should be imposed, businesses are determining how to capitalize on AI without compromising reliability, and schools are thinking about the ethics of its uses in the classroom. The general public has already become accustomed to AI in the forms of Siri, Alexa, GPS, Bing, and other apps, but CHAT gives people more control over how and when they might use this emerging technology, and that both excites and frightens everyone involved. The articles and videos we watched and read for the AI unit designed for this study were:

"The college essay is dead" (2022) by Stephen Marche, which discusses the ethics of using AI in the classroom and the importance of the joining of cultures between humanistic and scientific communities to maintain integrity in business and academia.

"The surprising thing A.I. engineers will tell you if you let them" (2023) by Ezra Klein, which examines the proposed regulations on A.I. around the world and discusses why A.I. engineers are eager to have regulations in place to slow the pace of progress with this technology.

"Coded bias" (2021), a documentary by Shalini Kantayya for PBS, explores how technology like face recognition can have bias coded into it. This is applicable to AI in that it, too, is programmed by people who have implicit biases, and this bias can be coded into the programs we engage with.

"What is ChatGPT? OpenAI's ChatGPT Explained" (2022), from the YouTube channel How it Happened, which shows a quick history of CHAT and how it works.

Additional articles I made available to the students were:

"Future of testing in education: Artificial intelligence" (2021), by Laura Jimenez and Ulrich Boser, which examines the benefits and challenges of AI in student learning and how AI can be employed for students' different learning styles.

"There is no A.I." (2023), by Jaron Lanier, which warns that the way to misunderstand and misuse the technology is to mythologize it. AI is a generative mathematical calculation, not a sentient being.

"When AI chatbots hallucinate" (2023), by Karen Weise and Cade Metz, which explores and explains how and why CHAT so often gets things completely wrong.

METHODS

After logging into CHAT, I entered a series of prompts to obtain a list of media headlines about the developer OpenAI and their software, CHAT. CHAT instantly offered up a list of titles expressing the positive attributes of the technology and how it will better the teaching and learning experience.

This surprised me because I had been seeing headlines expressing fear and concerns about the perpetuation of biases, losing our ability to think, and of course, cheating. I asked chat to give me article titles that warn against CHAT and it did so, but its list did not include articles written in the last 2 years, when all the scary information was becoming known.

This, I learned, was the first problem with using CHAT in the classroom. It was not up-to-date on the most current information. More than half of the article titles that CHAT provided were not connected to actual articles. Some were close to titles that were published but were not accurate or complete.

With the help of a colleague and a good, old-fashioned library search, I chose 3 of the most current articles available to initiate critical thinking about the topic and used those as the foundation of the 4-week teaching unit I devised for my spring 2023 English 101 classes. I have designed many units in the past, but for this one, I relied heavily on letting CHAT generate the lessons and assignments. I found that creating this teaching unit took a fraction of the time it usually takes, but I also found that the unit created was not terribly interesting, so there was considerable rethinking and tweaking to do before the unit was acceptable.

Even still, it did save me a fair amount of time to have CHAT get me started. I found that throughout the process my critical thinking was engaged, my innovative thinking was activated, and the usually grueling process of creating a unit was surprisingly fun to accomplish. In other words, using CHAT to help me do my work was an exciting, thought-provoking, and productive learning experience.

I then presented an introduction to the topic and followed with the video "What is ChatGPT? OpenAI's ChatGPT Explained" (How it Happened, 2022). Students were asked to complete skeletal notes (partially written notes for students to complete as they read or watch), and then they were given time to discuss their notes with their classmates.

Then students were asked if learning about this emerging technology made them curious, anxious, or something else. Students expressed feeling both, with dominant feelings equally

divided between curiosity and anxiety. The only variations were that one student said they were "excited," and one student said they felt "neither."

The students' assignments were designed to answer the following questions:

- What exactly is AI?
- How does CHAT work?
- What are the benefits of using CHAT?
- What are the concerns about using CHAT?
- How might academic integrity be affected by CHAT?
- Can students learn while using CHAT, or is it just a task completion exercise?

There were a number of ways I might have approached a unit about AI, but after reading the Stephen Marche (2022) article "The college essay is dead," I determined that the best approach would be to focus the unit on learning how CHAT is designed to work and what the components of the technology are trained to do. Specifically, I created lessons around what is an algorithm and what are the components of natural-language processing. Marche stated that "The philosophy of language, sociology, history, and ethics are not amusing questions of theoretical speculation anymore." He suggests that the humanities need to understand natural language processing technology not just "because it is the future of language, but because natural-language processing can throw light on a huge number of scholarly problems." I wanted to see, and I wanted my students to see that light and understand where the potential problems could be.

I discovered that the components of natural language processing were closely related to the English 101 discussions around syntax, semantics, tone, context, and organization, so there are many opportunities to use one for learning the other.

All of the assignments were either designed solely by CHAT after a simple prompt from the instructor, or they were designed by the instructor with some CHAT component to it. An example of an assignment generated entirely by CHAT was a lesson about what an algorithm is. CHAT suggested using a deck of cards to be sorted and categorized into specific steps. An example of an assignment devised by a combination of CHAT and instructor input was the class debate about the benefits and concerns of using AI in a college-level English class. CHAT suggested a classroom debate. The instructor provided the prompt. Students used CHAT to generate debate points, compared responses between groups, and then debated the topic using those responses.

Students were polled at the end of each assignment to determine their satisfaction with the experience. They were also asked to write reflections to answer questions like "What did you learn from that assignment?" and "How clear were the instructions?" or, "How interesting was this assignment to you?" Assignments generated solely by CHAT were rated much less interesting and less clear than those designed by the instructor or by a combination of chat/instructor design. I also obtained written permission by email from 7 students to include their real names and direct quotes throughout this article.

To ensure that students were completing the background assignments, I created skeletal notes for each assigned reading and video. Students completed the skeletal notes before class discussions and used the information to formulate questions to post on the discussion boards. This approach to the readings felt like a CHAT-proof exercise, but students reported that they used CHAT to help them word their questions in a more "academic" way. "I posted my own idea," said Macy Winfield, a first-year student in general studies, "but I'm not good at grammar, so I let CHAT reword what I wrote

to make it sound more professional." This quote was reiterated in only slightly different words several times over by other students in the 2 classrooms who claimed that they don't speak in "a college voice."

This generated an interesting classroom debate about the importance of a unique and authentic voice in writing. In the past, I have tried to have conversations on this topic, but rarely have I observed students being so invested in the discussion as I observed when we were working with the concrete example of CHAT-generated material.

I thought adding a personal anecdote would force the student to encounter discordant voices within the text, but students worked around it by having CHAT rewrite their anecdote so that it sounded the same as the rest of the essay. Tamar Connely, a first-year student majoring in legal studies, said that he asked CHAT to make up a personal experience for him to write about and that he was fine with that fiction because it was all just an exercise. "If the article mattered to me," he said, "I would have put my own story in it."

The students reviewed the completed essays using the same peer review questionnaire that we used for the 2 previous essays with just a few minor adjustments; they were to check the source material for accuracy in context of the quotes, and they were to compare the overall tone of the essay with that of their partner's essay. The students then revised their essays according to feedback and submitted them for a grade. The consensus was that the drafts generated solely by CHAT were conveyed by Evangeline Tannenbaum as "inaccurate, repetitive, and really boring."

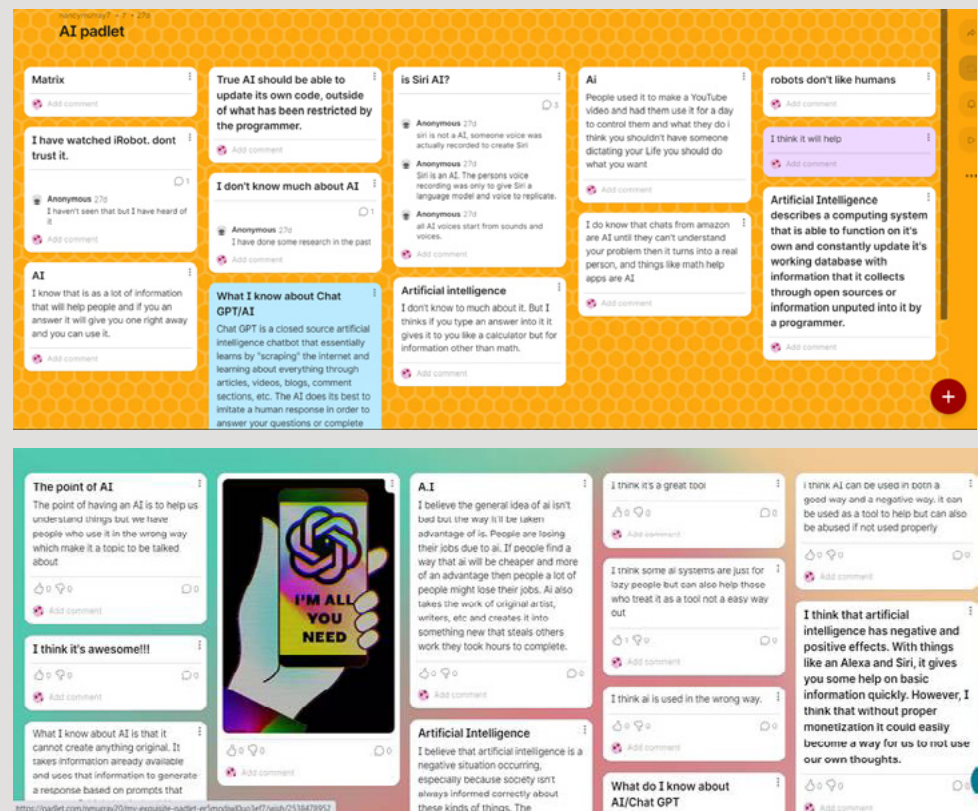
The unit's final assignment was for students to share their insights for the faculty of CCBC to reflect on when trying to create a policy around the use of CHAT in a humanities classroom.

RESULTS

At the start of the unit, I polled the students for their prior understanding about AI. [Click here](#) for a screenshot of the students' responses before and after completing the the unit. The responses students gave before we completed the AI unit are on top. Only 2 students reported hearing of it, with 1 saying he had used it. Most of what the students understood about AI they had learned in science fiction films and social media.

At the end of the unit, I polled the students again and the screenshot of those responses are below. By the end of the unit, they understood algorithms, natural-language processing, how bias can be coded into technology, and how to use CHAT to draft an essay.

RESULTS



At the end of the unit, I polled the students again and the screenshot of those responses are below. By the end of the unit, they understood algorithms, natural-language processing, how bias can be coded into technology, and how to use CHAT to draft an essay.

STUDENT REFLECTIONS ON CHAT

All 18 students from the 2 English 101 classes were asked to reflect in writing about their experiences and perceptions about CHAT after the unit was completed. Their responses are presented in Table 1.

Table 1. Pros and Cons of Using AI from written reflections.

Pros of AI	Number of reflections that mentioned this	Cons of AI	Number of reflections that mentioned this
Students can practice when the teacher is busy.	11	Not reliably accurate.	18
Using outlines/helps organize material.	13	Repetitive.	18
Helps with anxiety about getting started.	9	Takes a lot of work to get it to do what you want it to do.	7
Helps sound more professional.	17	Lose your authentic voice.	5
Learning-divergent students can follow their own thought process in class.	4	Can be biased	14
Assists to understand complex ideas.	8	The work is less creative/enjoyable.	5

I decided to put the contents of Table 1 into a prompt in CHAT and ask it to analyze this survey data for me. Here is the response CHAT gave:

Based on the provided data, here is an analysis of the pros and cons of using AI based on the mentioned reflections:

Pros of AI:

- Students can practice when the teacher is busy. (11 reflections)
- Using outlines helps organize material. (13 reflections)
- Helps with anxiety about getting started. (9 reflections)
- Helps sound more professional. (17 reflections)
- Assists in understanding complex ideas. (8 reflections)
- Learning-divergent students can follow their own thought process in class. (4 reflections)

Cons of AI:

- Not reliably accurate. (18 reflections)
- Repetitive. (18 reflections)
- Takes a lot of work to get it to do what you want it to do. (7 reflections)
- Lose your authentic voice. (5 reflections)
- Can be biased. (14 reflections)
- The work is less creative/enjoyable. (5 reflections)

It's important to note that the numbers associated with each reflection represent the frequency of mention in the given survey. These numbers suggest the relative importance or prevalence of each point raised in the reflections. Overall, the reflections highlight several benefits of using AI, including providing practice opportunities, aiding organization, alleviating anxiety, enhancing professionalism, assisting with understanding complex ideas, and catering to diverse learning styles. However, they also raise concerns regarding accuracy, repetitiveness, effort required to customize AI, potential loss of authenticity, bias, and potential impact on creativity and enjoyment. Keep in mind that this analysis is based solely on the provided data, and the specific context and perspectives of the reflections are not considered.

Using CHAT to analyze the data I collected and presented saved me a lot of time. Data analysis is not my strength because the numbers cause me a low-level anxiety that makes processing information more difficult than it should be. Using the technology to process the numbers helped clear the nervousness and gave me a chance to consider the survey results' meaning. My experience of relief supports the students' claim that this technology could help students be more successful learners by clearing away the non-cognitive barriers many students face.

STUDENT REFLECTIONS ON CLASS ASSIGNMENTS

The students were asked to indicate their impressions on clarity and satisfaction of assignments generated by CHAT and those generated by the instructor, and the results are presented in Table 2. These polls were taken via thumbs up, thumbs down, or thumbs sideways at the end of class. All students were asked to respond, but due to due to respective class attendance the numbers of students reporting for each question vary.

Table 2. Student Impressions of the Class Assignments.			
Assignment / who generated it	Thumbs up (we got a lot out of it and enjoyed it)	Thumbs down (it was confusing and unpleasant)	Thumbs sideways (it was tolerable but not great)
Algorithm / CHAT	0	12	6
Predictive model / Instructor	14	0	2
Debate/both instructor and CHAT	14	0	2

These results reflect what I personally experienced, which was that CHAT did not generate complete or completely clear instructions. The lessons generated solely by CHAT left the students confused and frustrated. Most CHAT-generated material requires the prompter to think critically and creatively to fill in the gaps to make the assignment satisfactory and successful.

Surprisingly, both classes concluded that CHAT should be allowed as a tool for classwork with only 1 student still unsure. Even those who were adamant in the beginning

of the unit that it should be banned from the classroom came to agree that using the technology could make the struggling student's life much less stressful.

"It takes away that anxiety of getting started," said Aniah Bruce, a first-year student studying nursing and initially one of the strongest opponents of using CHAT. "I wouldn't recommend any student use it for the whole thing, but if you are stuck getting started, it really helps a lot with that."

RESULTS

Tamar said "Writing with [CHAT], I took it upon myself to try to remove myself as much as I could from the equation, to say if I wanted to do nothing for this essay at all, I don't want to do anything, how could I do that effectively and how would that work realistically? What ended up happening was that I had to use [CHAT], and I had to word my questions in the way I wanted it to be written, and I had to engage with my topic by doing that. So, I ended up critically thinking about my topic. I had to engage CHAT to write it properly in a way that I would want it to be written to satisfy my standards. I worked harder on this essay than I did on the others."

When Aniah was asked what she would tell teachers now that she has engaged with CHAT, she said "Teachers were concerned about students using [CHAT] because they feel like this will take away from students doing the work, but when using AI, I had to think with CHAT. I still had to use my critical thinking to fully complete the essay, and I had to do my own research, too." Sha'bria Butler, a sophomore in general studies, also felt there was a considerable amount of work that went into using CHAT but that it was helpful to have CHAT get her started. "When we initially had the rough draft in class," she said, "I used CHAT to create an outline and then from the outline whatever it generated like the topic sentences, I used that to make new questions to continually build the paragraphs. Then in the final draft, I put my opinion into it, which was something we talked about in class. [CHAT] is not opinion-based. It gives you, I'm not going to say evidence because some of the work that it displays could be non-fiction. CHAT doesn't have an opinion, so I had to put my opinion into it. That's when I created my own topic sentences and built on the paragraphs after I trained AI to do what I wanted it to do." The students in this study used innovative and critical thought

processes to get the job done. The essays did sound different than their natural speaking voices might have, but the material presented was informed by their own thinking.

Christopher Grobe (2023) authored an article for The Chronicle of Higher Education called "Why I'm not scared of ChatGPT" in which he discusses how CHAT has "inspired dark fantasies in the minds of some humanities teachers." I will admit that it sent a small shudder through my thinking as well, but then I looked at how some universities are welcoming it as a tool for innovation and decided that I would do the same. Grobe suggests that "if we treat learning (not distinction) as the goal of education, then generative AI looks more like an opportunity than a threat." He acknowledges that, "As software that can simulate human thinking, it may indeed create some thoughtless students who rely on it too heavily. But it might also create students who are ready to think twice, to push beyond statistically likely ways of thinking." This was certainly my experience. The students who engaged in this experiment with me were not looking for the shortest route to a positive judgement from their instructor, but to really dig in and learn what this emerging technology is all about and what it has to offer. They did not determine that everyone should use it all the time without restriction, but that it should be used as a helpful tool to clarify the ideas that they themselves generate and want to advance.

Even though the students in both classes saw value in using CHAT for tasks to help them get started, organize their thinking, elevate their vocabulary, and generate discussion points, most of them said that they would not want to use it again to draft a whole essay. "It's too hard to get it right, I'd rather just do it my own way and use my own ideas and my own voice" was how Evangeline put it.

DISCUSSION & CONCLUSION

In his article "There is no A.I.," Jaron Lanier (2023) states that "we're at the beginning of a new technological era—and the easiest way to mismanage a technology is to misunderstand it." My students have concluded, and I concur, that AI is here to stay, and the best way to make it work for us is to learn to work with it.

"Mythologizing the technology only makes it more likely that we'll fail to operate it well—and this kind of thinking limits our imaginations." Taking the time to train faculty and then students to first understand the technology and then to use it with intention and caution is the best way forward for academics.

DISCUSSION & CONCLUSION

When students were asked to advise faculty about how to proceed, the unanimous opinion was that anyone using CHAT should first make sure they and their students understand what it is and how it works.

When students were asked to advise faculty about how to proceed, the unanimous opinion was that anyone using CHAT should first make sure they and their students understand what it is and how it works. "Knowing that it is trained to fish information from all over the internet and then use that information to predict what to tell us is how we know not to really trust it," advised Guynan Harrison, a first-year student studying humanities with a focus on creative writing, "There is a lot of fake information out there." They also strongly recommend teaching about the ways a machine can be just as biased as the person who programs it. Finally, they want faculty to create ways for students to use the technology ethically. "It's a tool that can help kids with learning differences," said Abbey Wilkens, a sophomore who is studying childhood education with special education, "but they need to understand the right ways and wrong ways to take advantage of it." Macy Winfield agrees. Macy is an autistic student. She worked hard in class to get the grade, but it was not because she did not un-

derstand the readings. Her neurodiversity makes it difficult for her to put what she knows into words that will satisfy specific audiences. She said that she uses a different app similar to CHAT to help her focus her thinking after she has read and taken notes. Her hard work, she says, earns her the right to do that. Macy wants faculty to make the students earn the privilege of using the shortcut by having them demonstrate an understanding of the fundamental skills. "Once they do that," she said, "they've earned the right to use whatever tool they want to use."

The students determined that CHAT is an excellent tool that can help with specific tasks that reduce student anxiety around beginning, organizing, and polishing an essay; can support students with divergent learning abilities; can save valuable time when life is overwhelming; but that it is unreliable, repetitive, cumbersome, and unoriginal when put to the task of writing the essay entirely as revealed by the results in Table 1.

DISCUSSION & CONCLUSION

“We really can’t stop students from using it. It’s already an emerging technology.”

It was the consensus of both classes that the use of CHAT should be specific to tasks and regulated by the instructors who are fully trained in how the technology works and what the potential issues are before attempting to work with it in the classroom.

What I am taking away from this experience is a strong appreciation for all that CHAT and other natural-language processing models can do to excite, inspire, encourage, and support both faculty and students; but that appreciation is mixed with an equal amount of apprehension. I do not want to caution faculty that students will cheat with CHAT. In my experience, students want to learn. I would caution them that CHAT might cheat the students if they are not armed with a healthy understanding of what they are working with. Guynan noted that “we really can’t stop students from using it. It’s already an emerging technology. What’s probably the best course of action to do is to instead learn the technology, understand its pitfalls, where it could potentially benefit, but mostly

understanding how it works so we have a better understanding of whether it’s ethical to use. That’s really the core of this conversation.” I agree with her. If it is going to be used as a teaching and learning tool, and let’s face it, it is, then there must be ongoing professional development for faculty to understand what they are working with and how to turn the use of this technology into a productive learning experience for the students. Guynan added that “much like it said in one of the articles we read in the class, if we found a way to marry information technology with the humanities there could be a more cohesive way that is more ethical to create work with this technology.”

There are indeed many opportunities here to merge humanities with technology in a forward-thinking way, but it cannot be accomplished with limited understanding and fear-based application. Because AI is rapidly improving, faculty and students must work to be up to date with the most recent developments and work together to explore the myriad new possibilities available to them now in the classroom.

ACKNOWLEDGEMENTS

I would like to recognize the students who agreed to share their experiences and insights for this article: Tamar Connelly, Guynan Harrison, Abby Wilkens, Sha'bria Butler, Evangeline Tannenbaum, Aniah Bruce, and Macy Winfield were essential contributors to my understanding and to the information presented here.

REFERENCES

1. Grobe, C. (2023, January 18). Why I'm not scared of ChatGPT: The limits of the technology are where real writing begins. *The Chronicle of Higher Education*. <https://www.chronicle.com/article/why-im-not-scared-of-chatgpt>
2. Harwell, D., Tiku, N., & Oremus W. (2022, December 10). Stumbling with their words, some people let AI do the talking. *The Washington Post*. <https://www.washingtonpost.com/technology/2022/12/10/chatgpt-ai-helps-written-communication/>
3. How it Happened. (2022). *What is ChatGPT? OpenAI's ChatGPT explained* [Video]. YouTube. <https://www.youtube.com/watch?v=o5MutYFWsM8>
4. Jimenez, L., & Boser, U. (2021, September 16). Future of testing in education: Artificial intelligence. *Center for American Progress*. <https://www.american-progress.org/article/future-testing-education-artificial-intelligence/>
5. Kantayya, S. (Director). (2021). *Coded bias* [Documentary]. PBS; Independent Television Service [ITVS]. <https://www.pbs.org/independentlens/documentaries/coded-bias/>
6. Klein, E. (2023, April 16). The surprising thing A.I. engineers will tell you if you let them. *The New York Times*. <https://www.nytimes.com/2023/04/16/opinion/this-is-too-important-to-leave-to-microsoft-google-and-facebook.html>
7. Lanier, J. (2023, April 20). There is no A.I.: There are ways of controlling the new technology but first we have to stop mythologizing it. *The New Yorker*. <https://www.newyorker.com/science/annals-of-artificial-intelligence/there-is-no-ai>
8. Marche, S. (2022, December 6). The college essay is dead: Nobody is prepared for how AI will transform academia. *The Atlantic*. <https://www.theatlantic.com/technology/archive/2022/12/chatgpt-ai-writing-college-student-essays/672371/>
9. Weise, K., & Metz, C. (2023, May 9). When AI chatbots hallucinate. *The New York Times*. <https://www.nytimes.com/2023/05/01/business/ai-chat-bots-hallucination.html>

Open Educational Resources and Educational Outcomes at a
Community College

Timothy S. Faith, JD¹, and
Glenda Breaux, PhD²

Corresponding author:
Timothy S. Faith, JD
tfaith@ccbcmd.edu

From the ¹Legal Studies Department, School of Business, Technology and Law,
and ²Planning, Research and Evaluation, Community College of Baltimore
County, Baltimore, Maryland.

OERS & EDUCATIONAL OUTCOMES

Open educational resources (OERs) are an alternative textbook to publisher materials used by colleges and universities. While OERs likely reduce the cost of college for students, research is mixed on the impact of these textbooks on student success in college.

ABSTRACT

Open educational resources (OERs) are an alternative textbook to publisher materials used by colleges and universities. While OERs likely reduce the cost of college for students, research is mixed on the impact of these textbooks on student success in college. The present study utilizes preference score matching (PSM) methodology to compare OER and publisher textbook use to student pass and withdrawal rates from 9 high-enrollment courses taught at the Community College of Baltimore County from fall 2016 through spring 2021. We examined all enrollments in a subclass-match PSM model, and found a significant improvement of 0.153

on the final course grade received by the student, and a significant increase of about 4% for students that received an ABC in courses using the OER, along with a significant decrease of 2.6% in the rate that students withdrew from OER courses. We also examined Pell students in a subclass-match PSM model, and found a significant improvement of 0.331 on the final course grade received by the Pell student, and a significant increase of about 9% for students that received an ABC in courses using the OER, along with a significant decrease of 4.8% in the rate that Pell students withdrew from OER courses.

INTRO — DUCTION

As a follow-up on prior research, the authors undertook a more extensive review of courses at a large, Mid-Atlantic Community College (the Community College of Baltimore County), in an effort to evaluate the impact of using open educational resources (OERs) on student outcomes (Faith et al., 2021).

The following is a more comprehensive review of a wider array of independent variables across a larger number of highly enrolled courses that used a publisher textbook and subsequently used an OER text. The objective of this study is to examine whether variations in student outcomes are explained by OER use in these courses.

An instructor's key concern is guiding students to demonstrate the course's stated learning objectives. The course textbook is one of the fundamental tools used by instructors across many disciplines and institutions nationally, and therefore, the accuracy, quality, and accessibility of the textbook for students is of substantial concern to the instructor. The literature report concerns from some faculty that OERs are in some form lesser than publisher

textbooks, and as a consequence, OERs will not help students to attain the course learning objectives at the same rate as compared with traditional textbook-based courses. However, the literature also reports a substantial equity concern for students as to the cost of publisher textbooks, and the disparate impact of this cost on students of more moderate means. The literature also reports divergent student outcomes for courses and institutions adopting OER textbooks (Clinton & Khan, 2019).

This paper contributes to the growing body of literature on the impact of OERs on student learning outcomes in examining a wider scope of independent variables for a wider array of highly enrolled courses offered by a large, regional community college.

INTRO — DUCTION

The authors hypothesized that the use of OER materials would result in improved student outcomes across the courses in the study, either because the reduced cost of the materials would reduce a barrier for students to access them for the course, or because the OER materials were superior to traditional textbooks as the OER materials were tailored to the course objectives of those courses adopting them. Numerous studies have discussed the former, identifying that the growing cost of publisher materials results in students foregoing the textbook but remaining in the course and/or subsequently withdrawing, likely to the student's detriment (Clinton & Khan, 2019). Research question 1 was whether OERs had a significant impact on student

success or withdraw rates for students enrolled in one of the identified highly enrolled courses that had implemented an OER during the study period.

The authors also hypothesized that the use of OER materials would result in improved student outcomes for Pell students included in the study, because the cost of materials represented a special barrier for such students having modest means to pay for college and materials for courses. Research question 2 was whether OERs had a significant impact on student success or withdraw rates for Pell students enrolled in one of the identified highly enrolled courses that had implemented an OER textbook during the study period.

METHODS

The authors began this analysis by collecting data on students enrolled in specific courses between the fall 2016 and spring 2021 semesters. The authors targeted highly enrolled courses at the Community College of Baltimore County which had implemented an OER textbook during the period, to compare the impact on student learning outcomes before and after the OER text was adopted. Table 1 describes the courses included in the study, and the date each one adopted an OER text.

The study itself is constructed as an observational study, rather than a randomized controlled trial, of the OER textbook as the treatment, because a randomized study of this scale in an educational setting would be infeasible (Adelson, 2013).

Observational studies at their outset create a strong possibility of bias due to confounders in the observed data, where a baseline covariate within the population may be the true cause of the observed result, rather than the treatment being analyzed by the study (Austin, 2011).

Observational studies at their outset create a strong possibility of bias due to confounders in the observed data, where a baseline covariate within the population may be the true cause of the observed result, rather than the treatment being analyzed by the study (Austin, 2011). In a randomized controlled trial, an unbiased estimate of the average treatment effect can be calculated by a difference of the means of outcomes between the control and treated populations. However, an observational study's control and treatment groups may vary such that other covariates, including, for example, the age, family income, or race distribution of each group, may bias the difference between the observed means. One methodology discussed in the literature to counter this problem is the use of a propensity score.

Rosenbaum and Rubin (1983) originally developed the propensity score as expressed in the following formula: $e_i = P_r(Z_i = 1|X_i)$, where e_i is the preference score of the individual, i , X_i is a vector of features or characteristics for individual i , and Z_i is a binary variable indicating whether or not individual i is a match. The purpose of calculating a propensity score is to create a similar treatment and control group so that the distribution of known covariates is similar between the 2 groups (Austin, 2011) such that "in a set of subjects all of whom have the same propensity score, the distribution of observed baseline covariates will be the same between the treated and untreated subjects." The output from a properly matched treatment and control group is the average treatment effect on the treated (ATT). Fischer's

implementation of propensity score matching (PSM) was "to create subsets of students who were statistically similar across three important covariates: age, gender, and minority status" by regressing the bivariate treatment condition on these covariates and matching using "nearest neighbor matching with calipers" to create homogenous treatment and control groups (Fischer, 2015).

Concerns, however, remain in implementing PSM in the educational setting because there are so many variables that may significantly impact a student's performance in a course. An accurate ATT depends on careful consideration of all relevant variables that may impact student course outcomes. Otherwise, the study may present an analysis where an undiscovered bias may better explain differences between treatment and control groups than the treatment applied to the study, such as the use of an OER textbook. Alyahyan and Düştegör (2020) identified numerous factors that may correlate with student success, including (a) past student performance such as high school grade point average (GPA) and/or student grade point average in prior college courses; (b) student demographics such as gender, race, and socioeconomic status; (c) the type of class, semester duration, and program of study; (d) psychological factors of the student such as student interest, stress, anxiety, and motivation; and (e) e-learning data points such as student logins to the learning management system (LMS) and other student LMS activity.

We began at the outset with a larger dataset of potential covariates that might explain student performance in courses, including the cumulative GPA of the student which we collapsed into GPA ranges to simplify our model (the GPA ranges were 0.5 steps of GPA, such that GPAs between 3.75 and 4.0 were rounded to 4, 3.25 to 3.74 were rounded to 3.5, 2.75 to 3.24 were rounded to 3, and so forth).

We also included student demographic variables including age, gender, race, Pell status as an indicator of socioeconomic status, and whether the student was new first time, returning, or a transfer student (new first time college students also encompass high school students that began taking college courses while in high school).

Finally, we also included whether the course was taught in person, the overall hours attempted and earned by the student, and the course level of the course. We then examined median course grades across these covariates, finding that: (a) median grades for White and Asian students were generally higher than other ethnic backgrounds, (b) median grades for females students were higher than male students, (c) median grades for Pell students were higher than for non-Pell students, (d) median grades for transfer students were higher than for new first time and returning students, and (e) median grades for younger students tended to be higher than for older students, where the median age of students was 20 within the study. We also discovered that other variables, such as the cumulative credits earned by a student, were not correlated with course outcomes, and therefore excluded these variables from assigning a preference score. This initial analysis guided us in developing an appropriate preference score for each student for matching as discussed below.

Another methodology barrier is the use of datasets with duplicated students, given that students may re-enroll in a course and change their cumulative GPA during the 5-year period of the study. Some studies (Fischer, 2015; Winitzky-Stephens 2017) avoided this issue by using a PSM approach to define control and treatment groups, as noted above, while other studies utilized a multilevel modeling approach, such as in Winitzky-Stephens, which, according to the authors of that study, would ameliorate

the contamination issue. Other studies did not address the problem of duplicated students within their dataset, such as Colvard, or were limited to a single instructor's implementation of OER in a course and therefore duplicated students were probably few (Colvard, 2018; Hilton, 2019).

Given the size of the present data set and the use of a number of highly enrolled courses at the College that may be required in multiple majors, a substantial number (15,383) of enrollments are associated with duplicate students (with an individual student appearing up to 7 times in the data set as a result of taking different classes, repeating a particular course for a better grade, or both). PSM addresses this issue of duplicated students within the overall dataset.

Hilton identified an additional methodology issue of teacher bias in a meta-study of published OER research (Hilton, 2019). Variation in student grades could potentially be correlated with variances in faculty grading standards, thereby contaminating analysis of the impact of a treatment such as the use of OER textbooks on student outcomes. Hilton identified 5 studies that effectively controlled for teacher bias by having the same faculty person teach the course using traditional publisher materials, and later teaching the course using OER materials (Hilton, 2019).

To control for the possibility of teacher bias, the authors only included enrollment from individual courses that were taught by instructors that had used both a publisher textbook and OER materials during the study period. This resulted in a total of 29,821 enrollments initially included in the analysis. A total of 105 faculty were included in this analysis by meeting the criteria of (a) teaching 1 of the 9 courses included in the study, and (b) teaching the course using both a publisher and OER text during the study period.

METHODS

An institutional database source was queried for the raw data included in this analysis and exported into a MySQL database, where the data was processed to homogenize study variables, and such processed data was statistically analyzed using R version 4.2.2.

Certain independent variables were converted to a binary value for the analysis, such as gender, race (set as 1 if the student was White or Asian, and 0 for all other ethnicities), Pell eligibility, whether the course was taught in-person, and whether the student had transferred from another college or university. As noted above, GPA was simplified into categories based on rounding to a half grade point.

Three dependent variables were defined: (a) whether the student withdrew from a course, (b) whether a student earned an ABC in the course, and (c) the final grade in the course coded such that an A was coded as 4, B as 3, C as 2, D as 1, and all other final grades as 0.

The institutional data source indicated whether a student enrollment had only been exposed to publisher textbooks and was identified as belonging to the control group. The data source also indicated whether the student had only been exposed to OER textbooks and was identified as belonging to the pure group.

Students exposed to both OER and publisher textbooks were marked as belonging to the mixed group. To further refine OER exposure, an application was developed that examined each enrollment based on the course and the semester and indicated whether that particular enrollment was in a course that utilized a publisher or control textbook based on the adoption date identified from the research of one of the authors. Enrollments were subsequently coded as either a part of the treatment or not based on whether the enrollment was associated with a course that utilized the OER text.

The MatchIt function was utilized in R to develop a propensity score match of students who enrolled in an OER-based course, with similar students enrolled in a control course, using the following independent variables: (a) whether the student was female, (b) whether the student was White or Asian, (c) the student's GPA category, (e) whether the student was a transfer student, (f) whether the student received a Pell grant, and (g) whether the course was in-person.

METHODS

We next attempted several different matching algorithms with the dataset to find the best overall match of students from the treatment group to the control group.

We first attempted a nearest propensity score matching with a caliper of 0.1 with a propensity score estimated using glm regression of the treatment on the covariates, however, this achieved poor balance overall as the standard pair distance exceeded 0.1 for most of the covariates (Griefer, 2022; Ho, 2011). We also used exact and coarse exact match matching, but both of these resulted in some discarded treated observations in the study, which might limit the results to a statement of the average treatment on the matched (Griefer, 2022).

We then attempted a subclass propensity score matching which achieved a standard pair distance of less than 0.1 for all covariates, as more fully described in Figure 1a, for all students included in the study; no observations were discarded. For the Pell-only model, we also used a subclass propensity score which resulted in adequate balance of the control and treatment groups as more fully described in Figure 1b; no observations were discarded.

To estimate the treatment effect and its standard error, we fitted a linear regression model with whether the student succeeded in the course (by earning an A, B, or C) as the outcome, and the treatment, covariates, and their interactions as predictors, and then included the full matching weights in the estimation. The lm function was used to fit the outcome, and the comparisons function in the marginaffects library was used to perform a g-computation in the matched sample to estimate the ATT. A similar linear regression model was created to evaluate whether the student withdrew from the course and the overall course grade earned by the student (Griefer, 2022). Matching was performed using the MatchIt package (Ho, 2011) in R, which calls functions from the Matching package (Diamond & Sekhon, 2013; Sekhon, 2011). Figures were generated within R using the ggplot2 library.

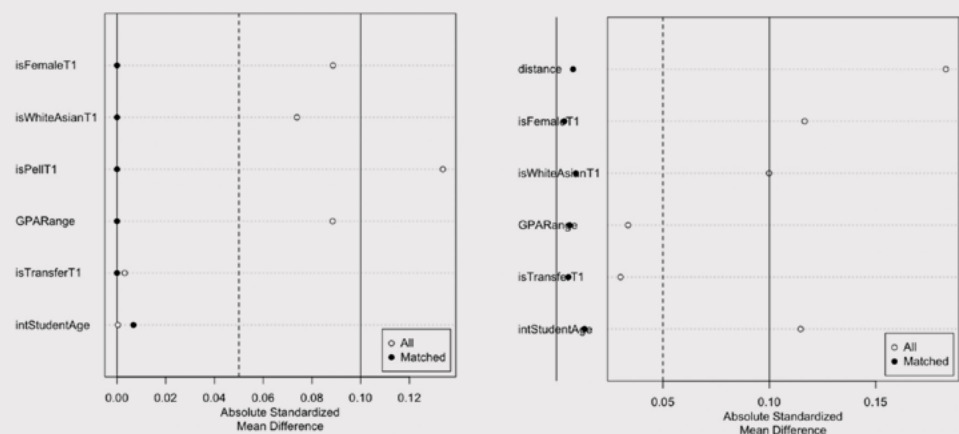


Figure 1. Love plot of unmatched and matched control and treatment groups using MatchIt and "Subclass" methodology for the (a, left panel) all students and (b, right panel) Pell-only students.

RESULTS

Table 1 summarizes the enrollment by course that was included in this analysis of OER use. The reader will note the duplicated students are included in this dataset. A total of 20,935 unduplicated students were included in the study, with students taking between 1 and 7 courses included in the study (median enrollment was 1 course per student with a standard deviation of 0.73; a total of 1,799 students were enrolled in 3 or more courses in the study).

Courses were selected based on high enrollment during the review period of fall 2016 through spring 2021, and implementation of an OER text at some point during the 5-year period. Individual sections were excluded where instructors did not teach the course using both a publisher text and an OER text later. All courses included in this study are 100-level courses or lower

RESULTS

A total of 29,821 enrollments across these 9 highly enrolled courses were included in the study, with 9,590 enrollments in the control (publisher) textbook group, 11,649 enrollments in OER-only textbook group, and 8,566 enrollments that took classes that used both publisher textbooks and OER textbooks during the study period. At the course level, 14,985 enrollments were associated with courses that had implemented an OER during the study period, with the balance associated with those same courses while utilizing a publisher textbook.

Tables 2–4 summarize student success based on their OER exposure during the study period. Table 2 shows the overall percentage of students that received an ABC grade in each of the 3 groups in the study. Enrollments only exposed to OER courses had a success rate of 59%, whereas enrollments in the control and mixed groups had an overall success rate of 63%. The decline in success rates by course is generally consistent with the overall decline in comparing the control and OER-only groups as described in Table 4 (with the exception of the ESOL 054 course, where the two success rates are the same).

Table 5 shows the overall percentage of Pell students ($n = 4,143$) that received an ABC in each of the 3 groups in the study. Pell status in the study is used as a proxy for the socioeconomic status of students as students eligible for a Pell grant must have a relatively low expected family con-

tribution as calculated from the student's FAFSA submission. The authors theorized that the availability of low/no-cost OER materials would improve Pell student success, as the cost of publisher materials may pose a barrier to low-income students.

Table 5 illustrates that the success rate of Pell students in the control group was 66%, whereas the success rate in the mixed group was 69% and the success rate was 71% in the Pure OER group.

To address the issue of co-variants in the data, the authors proceeded to conduct a PSM analysis, matching treatment enrollments with control enrollments based on several independent variables that can be associated with student success, as noted above in the methodology. We then proceeded to analyze the ATT of the treatment on student success, defined as both whether the student received an ABC, whether the student withdrew from the course, and the final course grade earned.

The results of the PSM matching analyses are summarized in Table 6 for all students included in the study, and in Table 7 for Pell-eligible students. The use of OER textbooks appears to show a significant positive impact on student success rates for all students and Pell-only students, and a significant reduction in the rate at which students withdraw from classes in both models.

DISCUSSION & CONCLUSION

Student success is an important aspect of the college experience of the student. As faculty, we strive to implement improvements in our courses that support the success of students. OERs are a widely adopted intervention, boosted by the idea that reduced-cost textbooks that are otherwise of similar quality to publisher texts reduce a barrier to student learning.

On first examination, our analysis does not support this notion. A review of the data in Tables 2 & 4 suggest that almost across the board, students that are just exposed to OER textbooks are less likely to receive a passing grade in the 9 courses we included in this study, even though students who receive Pell grants (a minority of the student enrollments included in the study) seem to more frequently receive a passing grade in courses with an OER textbook.

DISCUSSION & CONCLUSION

However, there are substantial covariates that impact student performance in college courses which may be confounded with the OER textbook treatment.

To address this concern, we implemented a PSM approach to modeling the data and to estimate an ATT of the OER on student performance. Using a subclass matching method, we were able to match control and treatment units based on 6 covariates: whether the student was female, whether the student was White or Asian, the GPA range of the student, whether the student was a transfer student from another college or university, whether the student was a Pell grant recipient, and the age of the student enrolled in the course. The estimated ATT for students using OER textbooks was a significant improvement of 0.153 (on average, a 6th of a letter grade improvement) on the final course grade received by the student, and a significant increase of about 4% for students that received an ABC in courses using

the OER, along with a significant decrease of 2.6% in the rate that students withdrew from OER courses.

The impact on Pell-eligible students, however, was more substantial, when we matched using 5 covariates: whether the student was female, whether the student was White or Asian, GPA range of the student, whether the student was a transfer student, and the student's age. The estimated ATT for students using OER textbooks was a significant improvement of 0.331 (on average, about a 3rd of a letter grade improvement) on the final course grade received by the Pell student, and a significant increase of 9.2% for students that received an ABC in courses using the OER, along with a significant decrease of 4.8% in the rate that Pell students withdrew from OER courses.

DISCUSSION & CONCLUSION

“We really can’t stop students from using it. It’s already an emerging technology.”

Interpretations of impact on overall student course grades should be approached with caution. As discussed by Grimaldi (2019), OER researchers have hypothesized that student course grades would improve after implementation of OER because the cost of publisher textbooks was a barrier to accessing the textbook, yet studies of the impact of OERs on final course outcomes is mixed.

Grimaldi points out that this may be because most empirical studies of student outcomes do not assess the level at which students had access to publisher textbooks previously and therefore could not compare the level of access attained by implementing an OER, even though the level of access to textbooks may better explain changes in course grades. The other hypothesis of OER researchers has been that OER textbooks should be superior in quality to publisher books, therefore students should perform better in OER courses for this reason. This study does not attempt to evaluate whether OERs are superior in terms of their content or student comprehension of course materials,

though the superiority or inferiority of one textbook over another could very well explain variations in course outcomes. The conundrum is that any combination of these variables – access to textbooks and quality of textbooks – could explain course grade changes between publisher and OER textbooks, but neither variable was available to this study.

Second, the literature notes a number of other independent variables that may impact student performance in courses, but not all of these variables were available to this study to match control and treatment units, such as certain psychological factors and student LMS activity.

Finally, the study period includes the start of the global COVID-19 pandemic, which resulted in the sudden shift of students to online learning. We did not include this change as a study variable, though it is possible that the sudden change in instructional modality may have impacted student success and withdraw rates during that period.

REFERENCES

1. Allen, G., Guzman-Alvarez, A., Molinaro, M., & Larsen, D. (2015). Assessing the impact and efficacy of the Open-Access ChemWiki Textbook Project. EDUCASE. <https://library.educause.edu/resources/2015/1/assessing-the-impact-and-efficacy-of-the-openaccess-chemwiki-textbook-project>
2. Angelino, L.M., Williams, F. K., & Natvig, D. (2007). Strategies to engage online students and reduce attrition rates. *The Journal of Educators Online*, 4(2), 1-14. <https://eric.ed.gov/?id=EJ907749>
3. Alyahyan, E., & Düşteğör, D. (2020). Predicting academic success in higher education: Literature review and best practices. *International Journal of Educational Technology in Higher Education*, 17(3). <https://doi.org/10.1186/s41239-020-0177-7>
4. Clinton, V., & Khan, S., (2019). Efficacy of open textbook adoption on learning performance and course withdrawal rates: A meta-analysis. *AERA Open*, 5(3). <https://doi.org/10.1177/2332858419872212>
5. Colvard, N., Watson, C. E., & Park, H. (2018). The impact of open educational resources on various student success metrics. *International Journal of Teaching and Learning in Higher Education*, 30(2), 262-276. <https://eric.ed.gov/?id=EJ1184998>
6. Diamond, A., & Sekhon, J. S. (2013). Genetic matching for estimating causal effects: A general multivariate matching method for achieving balance in observational studies. *The Review of Economics and Statistics*, 95(3), 932-945. doi:10.1162/REST_a_00318
7. Faith, T. S., Mandl, D., & Burke, J. (2021). Open educational resources in business law: Notes from the field. *Teaching and Learning Excellence through Scholarship*, 1(1). <https://doi.org/10.52938/tales.v1i1.1358>
8. Fischer, L., Hilton, J., & Robinson, T. J. (2015). A multi-institutional study of the impact of open textbook adoption on the learning outcomes of post-secondary students. *Journal of Computing in Higher Education*, 27, 159-172. <https://doi.org/10.1007/s12528-015-9101-x>
9. Grimaldi, P. J., Mallick, D. B., Waters, A. E., & Baraniuk, R. G. (2019). Do open educational resources improve student learning? *Implications of the access hypothesis*. *PLOS One*, 14(3). <https://doi.org/10.1371/journal.pone.0212508>
10. Hendricks, C., Reinsberg, S. A., & Rieger, G. W. (2017). The adoption of an open textbook in a large physics course: an analysis of cost, outcomes, use and perceptions. *The International Review of Research in Open and Distributed Learning*, 18(4). <https://doi.org/10.19173/irrodl.v18i4.3006>

11. Hilton, J. L., & Laman, C. (2012). One college's use of an open psychology textbook. *Open Learning: The Journal of Open, Distance and e-Learning*, 27(3), 265-272. <https://doi.org/10.1080/02680513.2012.716657>
12. Hilton, J. L. (2014). Cost-savings achieved in two semesters through the adoption of open educational resources. *The International Review of Research in Open and Distributed Learning*, 15(2), 1-18. <https://doi.org/10.19173/irrodl.v15i2.1700>
13. Hilton, J. (2019). Open educational resources, student efficacy, and user perceptions: a synthesis of research published between 2015 and 2018. *Educational Technology Research and Development*, 68, 853-876. <https://doi.org/10.1007/s11423-019-09700-4>
14. Ho, D., Imai, K., King, G., & Stuart, E. A. (2011). MatchIt: Nonparametric preprocessing for parametric causal inference. *Journal of Statistical Software*, 42(8), 1-28. <https://doi.org/10.18637/jss.v042.i08>
15. Lovett, M., Meyer, O., & Thille, C. (2008). The open learning initiative: Measuring the effectiveness of the OLI statistics course in accelerating student learning. *Journal of Interactive Media in Education*, 2008(1), Article 13. <http://doi.org/10.5334/2008-14>
16. Patterson, B., & McFadden, C. (2009). Attrition in online and campus degree programs. *Online Journal of Distance Learning Administration*, 12(2), 1-9. <https://eric.ed.gov/?id=EJ869274>
17. Sekhon, J. S. (2011). Multivariate and propensity score matching software with automated balance optimization: The matching package for R. *Journal of Statistical Software*, 42(1), 1-52. <https://doi.org/10.18637/jss.v042.i07>
18. Senack, E. (2014). *Fixing the broken textbook market: How students respond to high textbook costs and demand alternatives*. Center for Public Interest Research, Inc. <https://uspig.org/sites/pirg/files/reports/NATIONAL%20Fixing%20Broken%20Textbooks%20Report1.pdf>
19. Winitzky-Stephens, J., & Pickavance, J. (2017). Open educational resources and student course outcomes: A multilevel analysis. *International Review of Research in Open and Distributed Learning*, 18(4), 1-15. <https://doi.org/10.19173/irrodl.v18i4.3118>
20. Zhao, Q.-Y., Luo, J.-C., Su, Y., Zhang, Y.-J., Tu, G.-W., & Luo, Z. (2021). Propensity score matching with R: conventional methods and new features. *Annals of Translational Medicine*, 9(9), 812. <https://atm.amegroups.com/article/view/61857>

TABLE 1

Table 1. Courses and Adoption Semester of OER.			
Course	Description	Adoption Semester	Study Enrollment
WMST 101	Intro to Women's Studies	Fall 2019	1,158
ESOL 054	Academic ESOL Reading	Spring 2018	1,000
FAPA 101	Intro to Fine & Performing Arts	Fall 2017	936
PSYC 101	Intro to Psychology	Fall 2017	11,643
MNGT 140	Business Law I	Fall 2017*	1,870
CHEM 107	Fundamentals of Chemistry	Fall 2018**	4,083
MATH 135	Applied Algebra & Trigonometry	Fall 2020	922
MATH 153	Intro to Statistical Methods	Fall 2015***	5,614
MATH 163	College Algebra	Fall 2016***	2,579

* = specific faculty piloted the OER in fall 2017 & spring 2018, and then all faculty began use of the OER text starting in the fall 2018 semester.

** = faculty returned to publisher textbook in the spring 2020 semester.

*** = only online sections utilize the OER text.

TABLE 2 & 3

Table 2. Overall Course Grade Outcomes.

Grouping	% ABC grades
Control	63%
Mixed exposure	63%
Pure OER	59%
Overall	61%

Table 3. Overall Course Grade Outcomes by Course.

Course	Description	% ABC grades
WMST 101	Intro to Women's Studies	65%
ESOL 054	Academic ESOL Reading	83%
FAPA 101	Intro to Fine & Performing Arts	80%
PSYC 101	Intro to Psychology	63%
MNGT 140	Business Law I	66%
CHEM 107	Fundamentals of Chemistry	59%
MATH 135	Applied Algebra & Trigonometry	68%
MATH 153	Intro to Statistical Methods	55%
MATH 163	College Algebra	50%
Overall		61%

TABLE 4 & 5

Table 4. Overall Course Grade Outcomes by Course & OER.

Course	Description	% ABC Control	% ABC Mixed	% ABC Pure
WMST 101	Intro to Women's Studies	68%	67%	58%
ESOL 054	Academic ESOL Reading	82%	85%	82%
FAPA 101	Intro to Fine & Performing Arts	81%	88%	74%
PSYC 101	Intro to Psychology	68%	68%	58%
MNGT 140	Business Law I	73%	65%	63%
CHEM 107	Fundamentals of Chemistry	61%	56%	60%
MATH 135	Applied Algebra & Trigonometry	71%	64%	67%
MATH 153	Intro to Statistical Methods	56%	57%	51%
MATH 163	College Algebra	50%	53%	43%

Table 5. Overall Course Grade Outcomes by OER and Pell Status.

Pell Status	% ABC Control	% ABC Mixed	% ABC Pure
Pell students	66%	69%	71%

TABLE 6 & 7

Table 6. Average Treatment Effects on the Treated (ATTs).

Variable	ATT	Z value	P	2.5%	97.5%
OER treatment on course grades	0.153	11.5	<0.001	0.127	0.179
OER treatment on pass (ABC grade) rate	0.0408	8.89	<0.001	0.0318	0.0498
OER treatment on withdraw rate	-0.0258	-7.57	<0.001	0.0324	-0.0191

Table 7. Average Treatment Effects on the Treated (ATTs) Pell Students.

Variable	ATT	Z value	P	2.5%	97.5%
OER treatment on course grades	0.331	8.73	<0.001	0.256	0.405
OER treatment on pass (ABC grade) rate	0.0924	7.17	<0.001	0.0671	0.118
OER treatment on withdraw rate	0.0478	-5.27	<0.001	0.0656	-0.03

// Research Article //

Assessing Selected Teaching Techniques and Their Impact on Student Success
in the Classroom

Timothy S. Faith, JD
tfaith@ccbcmd.edu

From the Legal Studies Department, School of Business, Technology and Law,
Community College of Baltimore County, Baltimore, Maryland.

TEACHING ————— TECHNIQUES & STUDENT SUCCESS

Student success in college courses is important to students and faculty, though what variables predict student success are myriad and can be difficult to collect by faculty.

ABSTRACT

Student success in college courses is important to students and faculty, though what variables predict student success are myriad and can be difficult to collect by faculty. Given the complex interaction of these variables, many of which are external to the classroom, a faculty member could be excused for thinking that the work of the faculty may not be impactful at all as to student success. However, this study considers several teaching techniques, including chunking course materials and assessments into smaller units, expanding practice homework assignments,

and automating some course feedback to students through software, and identifies that increasing the number of exams that cover smaller portions of material appears to increase the average student pass rate of exams, but expanding homework and automating course/assignment feedback to students does not significantly impact student average exam grades. However, the use of intelligent agents did appear to negatively impact the rate at which students completed all exams in the course.

INTRO — DUCTION

Business Law I is a 3-credit survey course in the management program.

As a survey course on business law, a variety of topics are included: constitutional law, the court system, torts, criminal law, contracts, uniform commercial code, intellectual property, business ethics, and agency and employment law. A variety of teaching techniques have been employed in the course. A natural question is whether any of these teaching techniques or assignments have a positive impact on student learning and success in the course.

To evaluate this question, the following observational study was developed that examines student learning outcomes in the form of average

exam scores in relation to the implementation of several teaching techniques, including: chunking homework and assessment of materials in the course into smaller portions, the use of a journaling assignment to invite students to extend their knowledge through independent research on concepts introduced in the course, and the use of automation for student follow-up on attendance, missed assignments, and success. Additionally, the study examines whether the use of intelligent agents within the learning management system (LMS) impacts the rate at which students complete all exams in the course.

METHODS

Student learning in the Business Law course has generally been assessed based on course exams.

Student success rates (defined as those students earning an ABC grade) vary in the study period with an average success rate of 53% in the course (including students that withdrew) as described in Table 1.

Table 1. Summary of Success Rates (ABC) by Calendar Year.					
	2016	2017	2021	2022	Total
Success Rate	62%	65%	44%	48%	53%
N	125	131	164	174	594

METHODS

Table 2. Summary of Success Rates by Treatment.

	Intervention	Success Rate	<i>N</i>
Problem sets	6 or fewer problem sets (control)	55%	465
	12 problem sets (treatment)	47%	129
Assessments	3 exam format (control)	58%	275
	4 exam format (treatment)	49%	319
Intelligent Agents	No intelligent agents (control)	54%	510
	Use of intelligent agents (treatment)	51%	84

The following were treatments implemented during the study period, and the success rates of each treatment are summarized in Table 2:

Assessment using 4 exams rather than 3 exams during the semester in an effort to chunk materials into smaller portions;

Expansion of homework problem sets (multiple choice questions related to course materials) from 6 sets to 12 so that student homework would also be chunked into smaller portions;

Implementation of intelligent agents within the LMS to message students automatically based on certain conditions.

METHODS

A summary of which sections of students were included in the control or treatment group for each of the above treatments is described in Table 3. Treatments (a) and (b) were originally inspired by a study by Humphries and Clark (2021), which suggested that students preferred shorter lectures and chunked course materials over longer lectures. Research by Fulkerson and Martin (1981) suggested that having shorter but more frequent quizzes may correlate with higher average scores, though such students did not do better on average on a cumulative final exam as compared to students with larger but less frequent quizzes during the semester. With regards to treatment (b), a wider educational debate exists as to the merits of homework generally and its impact on student achievement, as discussed by Trautwein (2007). Trautwein states that an increase in homework frequency was a significant predictor of achievement at the class level in study 2 of a multi-level model developed based on data collected for a larger international study.

In study 2, data were collected from 2,216 German mathematics students in 91 classes, and a positive, significant relationship was found between homework effort by students and success on mathematics exams in study 3 discussed in the same paper. Similarly, Bowman et al. (2014) reported that higher average time spent on online chemistry homework correlated with improved exam and course grades.

With regards to treatment (c), the use of automated reminders was studied in a small sample of math and economics students, and the authors found an increase in completion rates compared to a control group not exposed to the reminder software (Carmean & Frankfort, 2013). A separate study with the same software at a community college found an increase in retention rates from fall to spring when comparing students exposed to the reminder system with students that served as the control group (Maslin et al., 2014).

Table 3. Student Groupings into Control and Treatment Groups.

	Control Sections	Treatment Sections
4 unit exams	• All 2016 • All fall 2022	• All 2017, 2021 • Spring and Summer 2022
12 problem sets	• All 2016, 2017, 2021 • All spring 2022 sections	• All summer and fall 2022
Intelligent agents used	• All 2016, 2017, 2021 • Summer 2022 • One in-person and 2 online sections of fall 2022	• All spring 2022 • One in-person section of fall 2022

Other authors studied the use of email and text message reminders to students with a flipped classroom, and found that the “consistent nudging via text messages appears to be pivotal in ensuring student success” (Sherr et al., 2019). These authors concluded that text messaging was significantly related to student success and retention when such messages were sent consistently.

Other authors studied the use of email and text message reminders to students with a flipped classroom, and found that the “consistent nudging via text messages appears to be pivotal in ensuring student success” (Sherr et al., 2019). These authors concluded that text messaging was significantly related to student success and retention when such messages were sent consistently.

The present study is observational rather than a randomized controlled trial because students could not be randomly assigned to courses offered as this would be impractical for college enrollment (Adelson, 2013). Observational studies create a strong possibility of bias due to confounders in the observed data, where a baseline covariate within the population may be the true cause of the observed result, rather than the treatment being analyzed by the study (Austin, 2011). In a randomized controlled trial, an unbiased estimate of the average treatment effect can be calculated by a difference of the means of outcomes between the control and treated populations. However, an observational study's control and treatment groups may vary such that other covariates, including, for example, the age, family income, or race distribution of each group, may bias the difference between the observed means. One methodology discussed in the literature to counter this problem is the use of a propensity score.

Rosenbaum and Rubin (1983) originally developed the propensity score as expressed in the following formula: $e_i = P(r_i | Z_i)$, where e_i is the propensity score of the individual i , Z_i is a vector

of features or characteristics for individual i , and Z_i is a binary variable indicating whether or not individual i is a match.

The purpose of calculating a propensity score is to create a similar treatment and control group so that the distribution of known covariates is similar between the groups, “[T]hus, in a set of subjects all of whom have the same propensity score, the distribution of observed baseline covariates will be the same between the treated and untreated subjects” (Austin, 2011). Fischer's (2015) implementation of propensity score matching (PSM) was “to create subsets of students who were statistically similar across three important covariates: age, gender, and minority status” by regressing the bivariate treatment condition on these covariates and matching using “nearest neighbor matching with calipers” to create homogenous treatment and control groups.

Predictors of student success in college courses have been extensively studied in the literature. Alyahyan and Düşteğör (2020) identified numerous factors from prior research that may correlate with student success, including past student performance such as high school grade point average (GPA) and/or student GPA in prior college courses; student demographics such as gender, race, and socioeconomic status; the type of class, semester duration, and program of study; psychological factors of the student such as student interest, stress, anxiety, and motivation; and e-learning data points such as student logins to the LMS and other student LMS activity.

METHODS

An initial dataset of 594 enrollments was collected from students enrolled in my Business Law courses from sections taught in Spring 2016, Fall 2016, Spring 2017, Fall, 2017, Spring 2021, Fall 2021, Spring 2022, Summer 2022, and Fall 2022. Enrollments included students that completed the course, along with students that withdrew before completion. The 5 students that withdrew from the course are excluded from this analysis, as data for these students was unavailable. Data collected included average score on exams in the course, whether the class was taught in person/remote synchronously, whether the class was a full-term (14-week) course, whether the student was male, overall credit hours attempted by the student, and overall GPA of the student.

GPA's were grouped into categories to simplify the matching process.

- GPA >3.75 was grouped as 4
- GPA between 3.25 and 3.75 was grouped as 3.5
- GPA between 2.75 and 3.25 was grouped as 3
- GPA between 2.25 and 2.75 was grouped as 2.5
- GPA between 1.75 and 2.25 was grouped as 2
- GPA between 1.25 and 1.75 was grouped as 1.5
- GPA between 0.75 and 1.25 was grouped as 1
- GPA between 0.25 and 0.75 was grouped as 0.5, and below 0.25 the GPA was defined as 0.

The following dependent variables were defined: whether the student received a passing average exam grade (an average of at least 60%), the final grade in the course (A grades were coded as 4, B as 3, C as 2, D as 1, and other grades

as 0), and whether the student completed all of the exams in the course. The following treatments were defined: *isTreatmentPST1* (whether the student had a total of 12 problem sets during the course, or had 6 or fewer problem sets), *isFourExamsT1* (whether the student had 4 exams with 1 for each of the 4 units, or whether the student had 3 exams where the unit exams on contracts were combined), and *isTreatmentAAT1* (whether intelligent agents were used in the course).

A subset of data was defined for students who had at least 12 attempted credit hours and attempted all of the exams in the course of 395 student enrollments. The purpose of this subset was to identify the student's prior performance at the college by the student's cumulative GPA, which prior research identifies as an important covariate related to student success (Alyahyan & Düşteğör, 2020).

A linear regression model was defined, looking for a relationship between average exam grades and the treatments above, along with several independent variables. The result of each of these models is described in Tables 4, 5, and 6, below. Several covariates discussed below seem to confound whether the treatments studied in these models were the cause of the variation in student performance or completion.

To control for confounding covariates, PSM was implemented for this subset of students using the *MatchIt* library within R. PSM was used to estimate the Average Treatment Effect on the Treated (ATT) for 3 treatments noted above on average student exam scores by using the *comparisons* function within the *MarginalEffects* library. This function takes as input each preference score-matched model, and compares that with a subset of the treated observations to provide an estimated ATT. A total of 3 models were defined (4 Exams, 12 Problem Sets, and Intelligent Agents) to evaluate the ATT.

METHODS

Table 4. Effects of Select Variables on Exam Scores.		
	Estimated effect on average exam score	p value
4 exams	+0.05	0.02*
12 problem sets	-0.02	0.26
Online students	-0.03	0.02*
Full term students	-0.05	0.02*
Remote synchronous students	-0.04	0.08
Male students	+0.03	0.0003***
Intelligent agents used	-0.05	0.004**
Overall GPA	+0.09	>0.001***
Overall hours attempted	0	0.46

Significance: * 0.05, ** 0.001, *** 0.0001. | F = 19.16, adjusted R-squared = 0.3154.

METHODS

Table 5. Effects of Select Variables on Pass Rates.		
	Estimated effect on overall pass rate	p value
4 exams	+0.04	0.640
12 problem sets	-0.003	0.961
Online students	-0.07	0.446
Full term students	-0.09	0.261
Remote synchronous students	+0.07	0.445
Male students	+0.07	0.057
Intelligent agents used	+0.05	0.489
Overall GPA	+0.32	>000.1***
Overall hours attempted	0	0.667

Significance: *** 0.0001. | F = 14, adjusted R-squared = 0.2433.

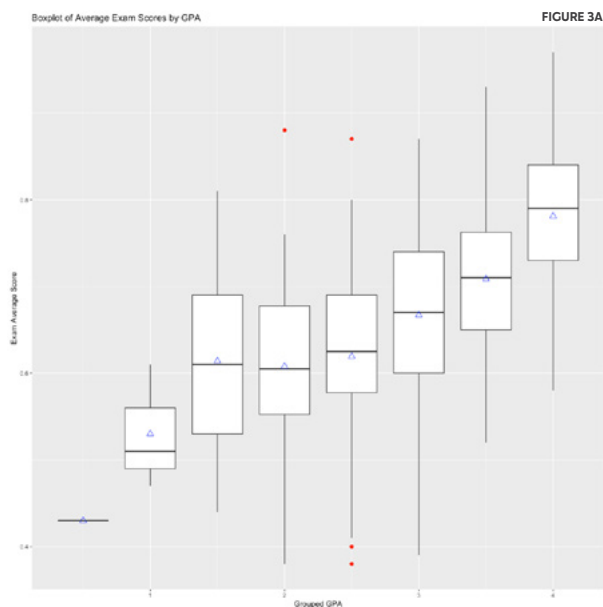
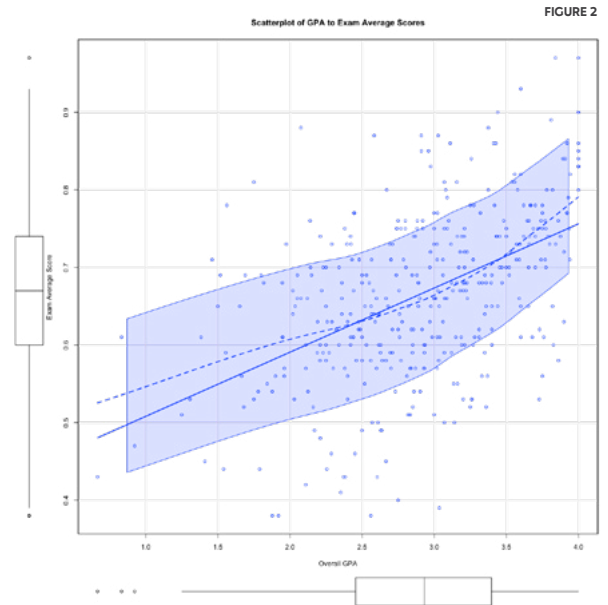
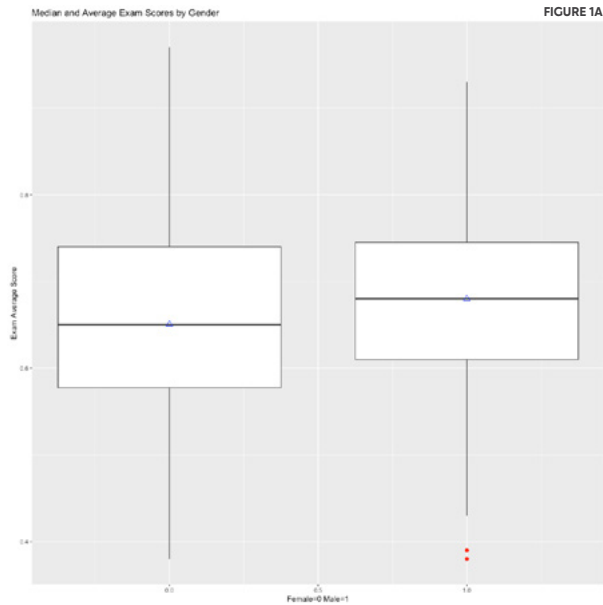
METHODS

Table 6. Effects of Select Variables on Grades.		
	Estimated effect on overall pass rate	p value
4 exams	+0.21	0.200
12 problem sets	+0.10	0.517
Online students	-0.25	0.026*
Full term students	-0.08	0.576
Remote synchronous students	+0.12	0.502
Male students	+0.16	0.028*
Intelligent agents used	-0.11	0.376
Overall GPA	1.10	>0.0001***
Overall hours attempted	0	0.414

Significance: * 0.05, *** 0.0001. | F = 42, adjusted R-squared = 0.510

METHODS

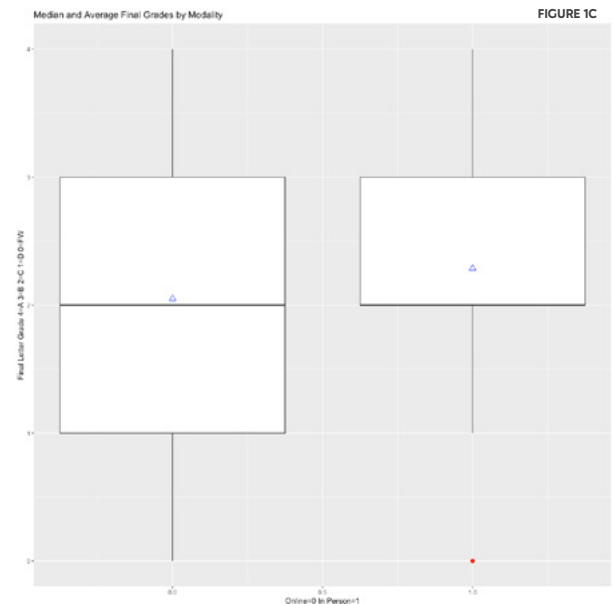
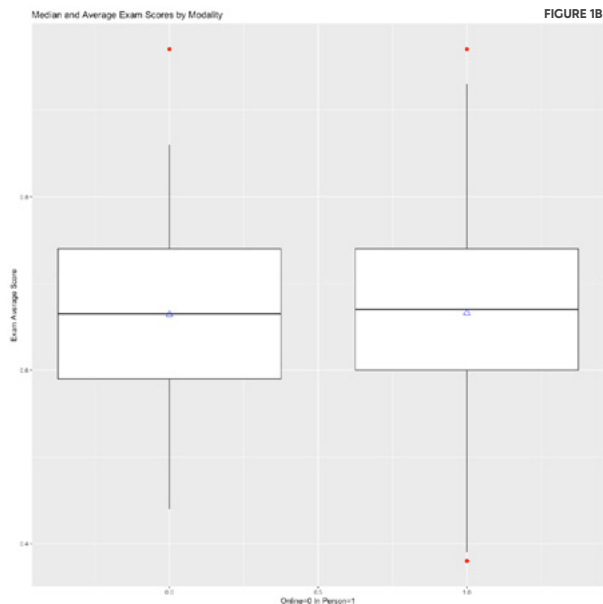
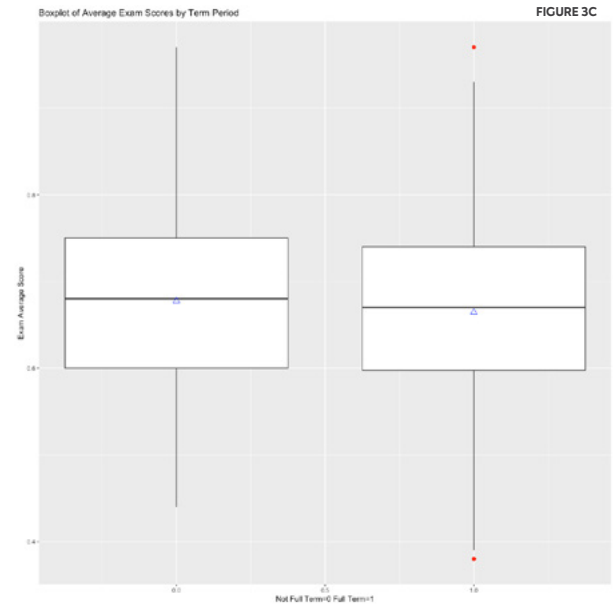
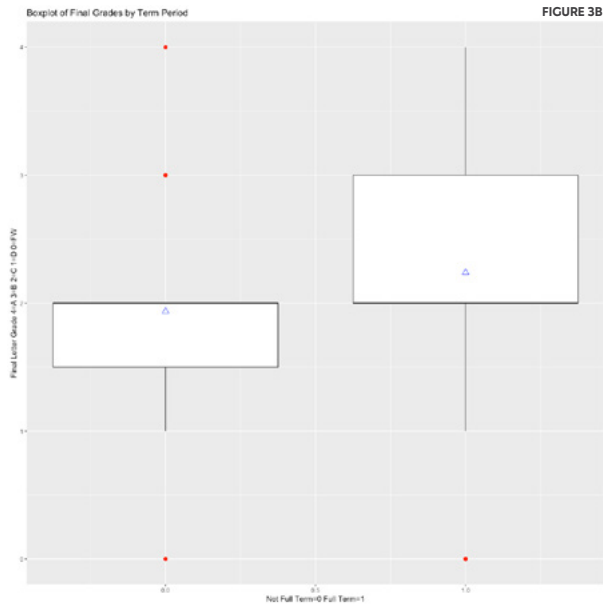
FIGURE 1A, 2 AND 3A



In defining the PSM models, I investigated variations in student outcomes based on available independent variables, noting that male students tended to have a higher average exam score than female students (Figure 1A), and that a correlation of higher exam scores and higher cumulative grouped GPA was present in the data (Figures 2 & 3A). These correlations persisted when examining the overall final grade in the course.

METHODS

FIGURE 3B, 3C, 1B AND 1C



In addition, I noted that full-term students, which are those students that completed the course in a traditional 14-week period, had a higher mean and median final grade in the course compared to students that took the course in a compressed period (Figure 3B), though this was reversed when examining average exam grades (Figure 3C).

I also investigated whether average exam scores might be related to whether the course was taught in person, and found that there was a small variation on the mean

or median for this independent variable (Figure 1B), however a substantial difference was found for overall student grades based on modality (Figure 1C). Independent variables that showed variation on the mean of a dependent variable were used in matching for each of the PSM models on the premise that balancing students between control and treatment groups would improve the overall reliability of the models for further analysis.

All of the models described below used whether the class was in person, the grouped GPA of the student, whether the student was male, and whether the class was a regular, 14-week term to match treatment with control enrollments.

I first attempted 1:1 nearest neighbor PSM without replacement with a propensity score estimated using logistic regression of the treatment on the covariates and also genetic PSM with a population size of 1,000 (Griefer, 2022), but both of these methods resulted in poor balance. Instead, I implemented a “full” PSM, which had an adequate balancing for the 4 Exams, 12 Problem Sets, and Intelligent Agent models, as more fully described in Figures 6, and 7A and 7B for these models (Austin, 2010; Ho, 2011).

One additional model was defined to examine whether the use of intelligent agents had an impact on students taking all the exams in the course for students who had attempted at least 12 credit hours at the college using 537 enrollments. Figure 7C illustrates the resulting balance obtained using exact matching for this model. The matching for the Intelligent Agent model resulted in discarding 86 control and 3 treatment observations from the model.

After matching, all standardized mean differences for the covariates were below 0.1 and all standardized mean differences for squares and 2-way interactions were below 0.15. Full matching meant that all treated enrollments were matched with a control enrollment, so no enrollments were discarded by the matching procedure for the first 3 models. Exact matching resulted in discarding 3 control units, though this loss was acceptable as the overall balance of the model was achieved (Austin, 2011).

To estimate the treatment effect and its standard error for each model, I fit a linear regression model with whether the student passed the exams (an average score on the exams of at least 60%) as the outcome, and the treatment, covariates, and their interactions as predictors, and then included the full matching weights in the estimation. The “lm” function was used to fit the outcome, and the comparisons function in the marginaleffects library was used to perform a g-computation in the matched sample to estimate the ATT (Griefer, 2022).

The source data for the study was collected from instructor grade books for each of the semesters noted above and was imported into a MySQL database. Data on students that withdrew was collected separately from institutional data sources.

Certain variables, such as student gender, overall credit hours attempted, and cumulative GPA were collected from institutional data sources. The open source statistical package, R version 4.2.2, was used for multivariable linear regressions, preference score matching analysis, and Love, Scatterplots, and density plots were created using the libraries RMySQL, MatchIt, Cobalt, ggplot2, and MarginalEffects.

RESULTS

Table 2 summarizes student success rates in the course for certain variables, without any regression or PSM applied to the dataset. The reader will note that at first blush, the treatments applied within the course do not appear to yield a higher success rate when compared to a control group to which the treatment was not applied.

However, this result could simply be by chance. Therefore, an initial multivariable model was developed, to which a linear regression was applied in an effort to determine which independent variables, including both fixed effects (such as the student's gender, class modality, class term) and random effects (such as the treatments applied, student overall credit hours attempted and student cumulative GPA).

RESULTS

Table 4 summarizes this initial regression. This regression suggests that some of these variables are significantly related to average student exam results, including having 4 exams rather than 3 ($p = 0.02$), and using intelligent agents ($p = 0.005$), while other treatments like more homework problem sets are not significantly related. The regression also strongly suggests that there is a significant relationship between cumulative GPA of students and average student exam results. The scatterplot in Figure 1A illustrates that higher GPAs tend to cluster with higher average exam scores, consistent with Tables 4, 5, and 6.

In contrast, no pattern emerges in the scatterplot in Figures 1A and B when plotting cumulative credits attempted by the student and average student exam scores, also consistent with the analysis presented in Tables 4, 5, and 6. The inference of this data is that just exposure to college courses does not correlate with performance in college courses, though prior success in college courses may correlate with future student success.

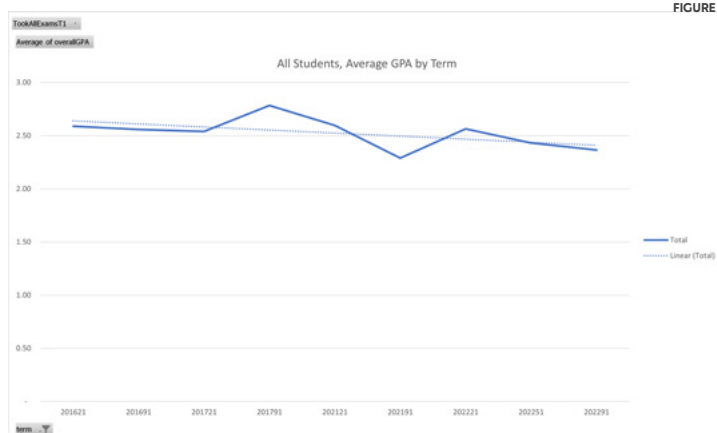
A regression was also constructed to compare the overall success rate (students earning an ABC) in the course with same variables as above, the results of which are reported in Table 5. Of note is the fact that no variables are significantly related to the overall course pass rate, except the student's cumulative GPA ($p > 0.0001$). Drilling a bit deeper, a final

regression was constructed to examine individual letter grades received in the course with the same variables, the results of which are reported in Table 6, where the final letter grade was assigned a number from 0 to 4, with A=4, B=3, C=2, D=1, and all other grades, 0.

This analysis suggests that online students had a significantly lower letter grade compared to non-online students ($p = 0.03$), though the analysis also suggested that cumulative GPA is significantly correlated with a higher letter grade in the course ($p > 0.001$).

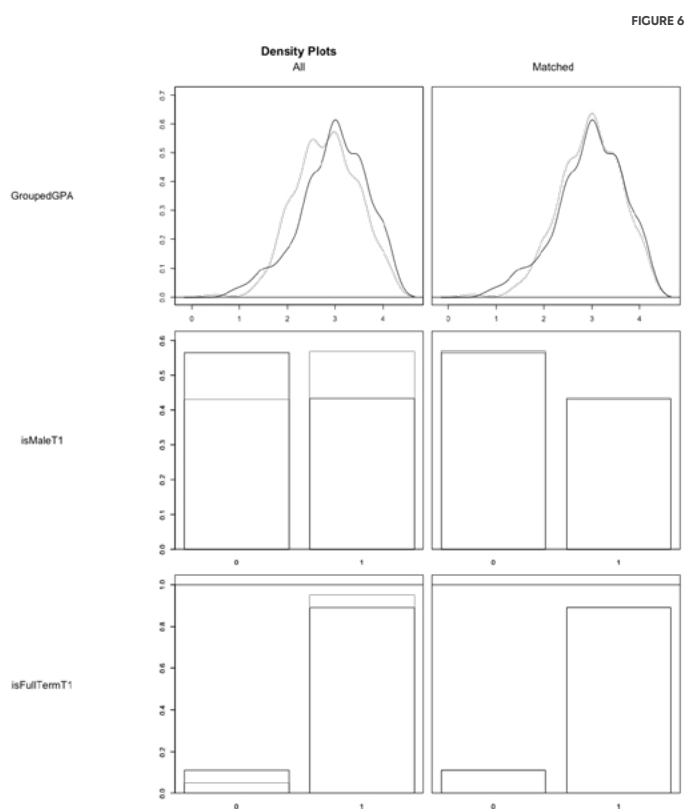
However, as noted above, observational studies may be biased by baseline characteristics of persons included in the study, such that certain characteristics in the population better predict the dependent variable than the treatments studied. As noted above in the literature and the above regression models, prior GPA is a strong predictor of student success in subsequent courses and likely is an important covariate that would improve the clarity of the analysis if properly controlled for through an alternate statistical method (Austin, 2011). Austin notes several other educational researchers that have used PSM to address this concern. Fischer (2015) also uses PSM in a study of the use of open educational resources in an observational study of the impact of such resources on student performance to better control for the uneven distribution of certain student characteristics that tend to predict student success.

RESULTS



A question arises as to whether there is an uneven distribution of students based on cumulative GPAs among the control and treatment groups included in this data subset.

There appears to be a declining trend in the average GPA of students taking the course as described in Figure 5. This trend may be an important confounding covariate that may better explain student performance rather than the treatments implemented in the course, given that many of the control enrollments are sourced from when student average cumulative GPA was higher. To try to balance control and treatment groups with similar students, I implemented PSM using the R "matchit" function, for the purpose of calculating an estimated ATT for each of the 4 treatments in the study.



The 4-Exams Model was used to evaluate the ATT associated with using 4 exams to assess student learning, rather than 3. Figure 6 is a density plot illustrating the balance of the model after matching compared with the unbalanced starting data. The estimated effect was 0.162 (SE = 0.0413, $p > 0.001$), indicating that students who completed 4 unit exams on average were more likely to earn a passing average exam grade compared to students who were assessed using 3 unit exams.

The 12 Problem Sets model was used to evaluate the ATT associated with the use of additional homework and its impact on the average student exam pass rates.

FIGURE 7A

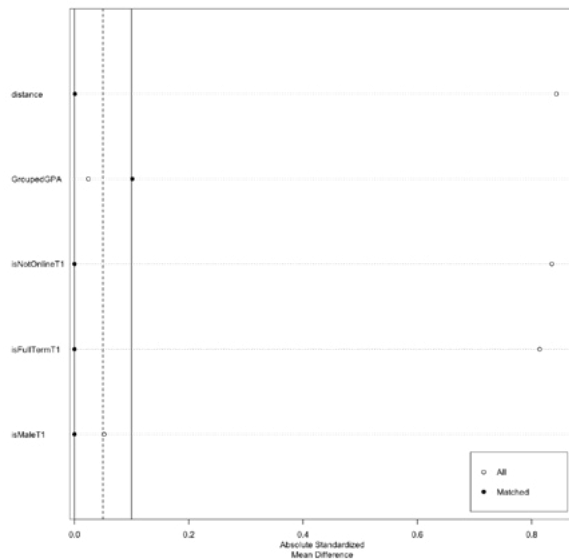


FIGURE 7B

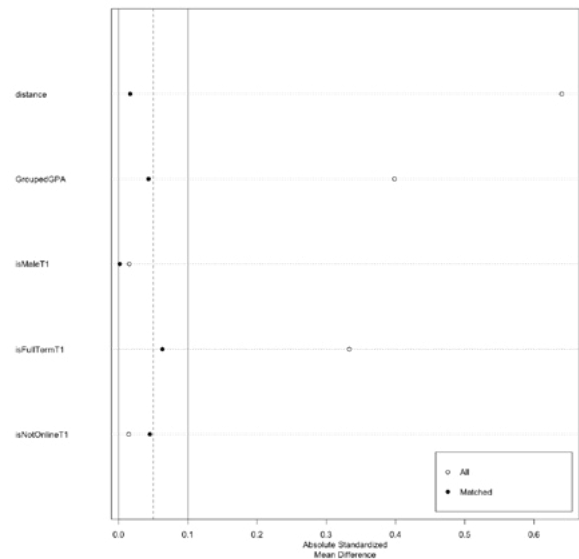


Figure 7A is a Love plot illustrating the balance of the model after exact matching between the treatment and control observations. The estimated effect was -0.0036 ($SE = 0.0616$, $p = 0.95$), indicating that having more problem sets as homework assignments probably had no impact on the frequency at which students passed the exams on average in the course.

The Intelligent Agents model was used to evaluate the ATT associated with sending automated reminders to students concerning attending to the course, advising students when they missed an assignment, and encouraging students to reach out when they did poorly on one or more assignments during the semester, and the impact of this messaging on average student

exam pass rates. Figure 7B is a Love plot illustrating the balance of the model after using subclass matching between treatment and control observations.

The estimated effect was 0.0303 ($SE = 0.0587$, $p = 0.61$), indicating that the use of automated agents did not have any significant impact on the average student pass rate of the exams. The careful reader will note that the initial pool of students ($n = 594$) is substantially larger than those included in the above analysis ($n = 395$) of the 3 treatments on average exam pass rates for those that took all the exams.

A substantial subset of students (51) withdrew from the course as summarized below in Table 7 and a substantial subset of students (177) did not complete

all exams in the course. For students (56) with less than 12 attempted credit hours, less than half (21/56) completed all exams, and the majority (38) failed or withdrew from the course.

These raw numbers indicate a substantial student loss rate across the study period of approximately 47% (students that earned a DFW as a percent of all students enrolled), with a notable increase in the withdrawal rate starting in 2021 compared with the 2016 and 2017 semesters included in the study as indicated in Table 7.

Superficially, one might conclude that the treatments implemented in 2021–2022 may be exacerbating withdraw and/or failure rates in the course.

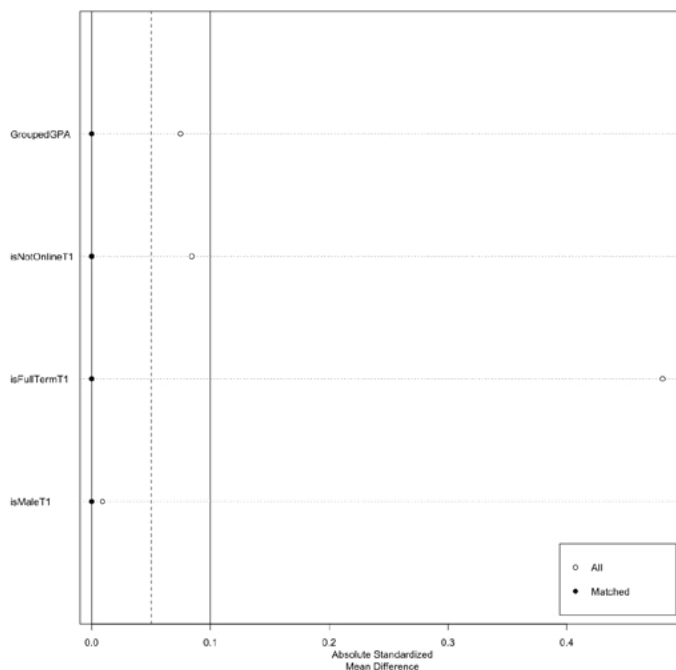
Table 7. Withdrawal Rates by Semester.

	SP 16	FA 16	SP 17	FA 17	SP 21	FA 21	SP 22	SU 22	FA 22	Total
Withdrawals	3	4	5	3	4	12	7	0	13	51
Did not take all exams	7	6	15	4	22	26	23	6	18	127
Took all exams	44	61	61	44	78	32	43	15	49	417
Withdrawal Rate	5.6%	5.6%	6.2%	5.9%	3.8%	17.1%	9.6%	0%	16.3%	8.9%

I therefore studied whether a treatment that increased teacher-student interactions might increase the rate at which students completed all exams in the course.

(Cifuentes & Lents, 2010).

FIGURE 7C



Several other researchers studied the use of automated reminders and found that these resulted in improved student outcomes and retention (Carmean & Frankfort, 2013; Maslin et al., 2014; Sherr et al., 2019). The Intelligent Agents model involves messaging students who are not logging into the course weekly, and also sending students automated feedback on certain homework assignments during the semester, resulting in increased teacher-student interactions through course messaging beyond course announcements and automated calendar reminders within the LMS. I studied the effect of intelligent agents on students completing all exams in the course.

After matching, the Love plot in Figure 7C illustrates balancing of the matched model. The estimated effect was -0.12 ($SE = 0.0448$, $p = 0.008$), indicating that the use of automated agents significantly reduced by 12% the frequency at which students completed all the exams.

DISCUSSION & CONCLUSION

Breaking up assessments in the course into 4 units from 3 seems to increase exam pass rates by approximately 16%, while the other 2 treatments did not seem to have a significant effect on the average exam pass rate of students who took all the exams during the course and attempted at least 12 credit hours at the college.

However, the use of intelligent agents appears to have significantly reduced the rate at which students completed all the exams in the course by 12%, suggesting that the additional reminders may have been discouraging.

DISCUSSION & CONCLUSION

This may be the result of messaging-overload for students that were struggling to keep up with the class, discouraging them from attempting all of the exams.

As noted above, there are myriad variables that may have some statistical significance to student success, though not all of these variables could reasonably be included in the present study. A follow-up study on these preliminary findings may expand the control and treatment groups to include additional observations to improve the overall matching using larger pools, and also to include additional independent variables from institutional research sources for these students which may contribute to student performance. For example, collecting data on student performance in 2014-2015 and 2018-2020 may help to expand both control and treatment groups to improve matching performance and reliability.

Also, collecting data on race/ethnicity, student age, student poverty status, student motivation, and student LMS usage may better explain variations in student outcomes and may result in better matches between control and treatment groups, and a better estimate of the ATT of any particular treatment considered in the study.

The bulk of this study is focused on students with sufficient credit hours at the college to establish a base cumulative GPA; the remaining sample of students was not studied as student GPA prior to work at the college was not available for this study. Such students that are new to college courses may be an important population to study in a separate analysis with additional data, including student high school GPA and other variables that are strongly correlated with student performance. Conclusions reached here may not be more generalizable outside of the context of a business law course when the course subject matter does not lend itself to a combination of lecture and student discussion of scenarios applying law concepts.

Finally, some of the students in the treatment groups were exposed to more than one treatment concurrently and the combinations of treatments may impact average student exam scores and/or the rate at which students complete all exams in the course, however, this was not studied.

REFERENCES

1. Alyahyan, E., & Düşteğör, D. (2020). Predicting academic success in higher education: literature review and best practices. *International Journal of Educational Technology in Higher Education*, 17, Article 3. <https://doi.org/10.1186/s41239-020-0177-7>
2. Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioral Research*, 46(3), 399–424. <https://doi.org/10.1080/00273171.2011.568786>.
3. Bean, J. C. (2001). Engaging ideas: *The professor's guide to integrating writing, critical thinking, and active learning in the classroom* (1st ed.). Jossey-Bass/Wiley.
4. Bowman, C. R., Gulacar, O., & King, D. B. (2014). Predicting student success via online homework usage. *Journal of Learning Design*, 7(2), 47–61. <http://dx.doi.org/10.5204/jld.v7i2.201>
5. Barkley, E. F. (2010). *Student engagement techniques: A handbook for college faculty*. Wiley.
6. Carmean, C., & Frankfort, J. (2013). *Mobility, connection, support: Nudging learners to better results*. EDUCAUSE Review. <http://www.educause.edu/ero/article/mobility-connection-support-nudging-learners-better-results>
7. Cifuentes, O. E., & Lents, N. H. (2010). Increasing student-teacher interactions at an urban commuter campus through instant messaging and online office hours. *Electronic Journal of Science Education*, 14(1), 1–13.
8. Fulkerson, F. E., & Martin, G. (1981). Effects of exam frequency on student performance, evaluation of instructor, and test anxiety. *Teaching of Psychology*, 8(2), 90–93. https://doi.org/10.1207/s15328023top0802_7
9. Goacher, R. E., Kline, C. M., Targus, A., & Vermette, P. J. (2017). Using a practical instructional development process to show that integrating lab and active learning benefits undergraduate analytical chemistry. *Journal of College Science Teaching*, 46(3), 65–73.
10. Grier, N. (2023, June 13). *MatchIt: Getting started*. <https://cran.r-project.org/web/packages/MatchIt/vignettes/MatchIt.html#assessing-the-quality-of-matches>

11. Ho, Daniel, Imai, Kosuke, King, Gary, Stuart, Elizabeth A. (2011) *MatchIt: Nonparametric Preprocessing for Parametric Causal Inference*. <https://r.iq.harvard.edu/docs/matchit/2.4-20/matchit.pdf>
12. Humphries, B., & Clark, D. (2021). An examination of student preference for traditional didactic or chunking teaching strategies in an online learning environment. *Research in Learning Technology*, 29. <https://doi.org/10.25304/rlt.v29.2405>
13. Maslin, A., Frankfort, J., Jaques-Leslie, M. (2014). Mobile supports for community college students: Fostering persistence through behavioral nudges. *League for Innovation in the Community College*.
14. Roback, P., Legler, J. (2021). *Beyond multiple linear regression: Applied generalized linear models and multilevel models in R*. Chapman & Hall. <https://bookdown.org/robback/bookdown-BeyondMLR/>
15. Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55. <https://doi.org/10.1093/biomet/70.1.41>
16. Sherr, G. L., Akkaraju, S., Atamturktur, S. (2019). Nudging students to succeed in a flipped format gateway biology course. *Journal of Effective Teaching in Higher Education*, 2(2), 57-69. <https://doi.org/10.36021/jethe.v2i2.51>
17. Trautwein, U. (2007). The homework-achievement relation reconsidered: Differentiating homework time, homework frequency, and homework effort. *Learning and Instruction*, 17(3), 372-388. <https://doi.org/10.1016/j.learninstruc.2007.02.009>.
18. Winitzky-Stephens, J. R., & Pickavance, J. (2017). Open educational resources and student course outcomes: a multilevel analysis. *International Review of Research in Open and Distributed Learning*, 18(4), 1-15. <https://doi.org/10.19173/irrodl.v18i4.3118>
19. Zhao, Q., Luo, J., Su, Y., Zhang, Y., Tu, G., & Luo, Z. (2021). Propensity score matching with R: conventional methods and new features. *Annals of Translational Medicine*, 9(9), 812. <https://atm.amegroups.com/article/view/61857>

Quantitative Measure of Student Retention of Information in
Human Anatomy and Physiology: A Case Study

Jewel A. Daniel, PhD
jdaniel@ndm.edu

From the Biology Department, School of Arts, Sciences & Business, Notre
Dame of Maryland University, Baltimore, Maryland.

QUANTIFYING INFORMATION RETENTION

Retention of information is essential for transfer of knowledge from one course to another. Human anatomy and physiology (A&P), offered as a 2-semester course at Notre Dame of Maryland University, is a foundational prerequisite for many health-related programs.

ABSTRACT

Retention of information is essential for transfer of knowledge from one course to another. Human anatomy and physiology (A&P), offered as a 2-semester course at Notre Dame of Maryland University, is a foundational prerequisite for many health-related programs.

For this study the researcher attempted to quantify the knowledge retention decline in the transition from human A&P I to human A&P II. Two cohorts of female traditional college students were administered a cumulative final exam immediately on completion of human A&P I.

One cohort (CS1) was given the same test 48 days later. A second cohort (CS2) was given the same test 48 days and 144 days later. There was a significant decline in retention of information in CS1, however, CS2 exhibited no significant decline at either 48 days or 144 days. Interestingly, there was no significant difference between both cohorts on the initial test, an indication that both cohorts were equivalently prepared. Further study is required to understand the disparity in retention decline between the 2 cohorts.

INTRO — DUCTION

Retention of information and skill is crucial for learning, whether the focus is kindergarten to 12th grade, or within higher education. Transfer of knowledge is critical for foundational courses whose information and skills are requisites for higher-level courses.

Retention of information and skill is crucial for learning, whether the focus is kindergarten to 12th grade, or within higher education. Transfer of knowledge is critical for foundational courses whose information and skills are requisites for higher-level courses. Many instructors anecdotally report a loss of knowledge in students transitioning from a lower-level course to a higher-level course.

A study of approximately 600 undergraduates studying biological sciences at 5 universities in the United Kingdom showed a significant decline in performance when given an A-level biology exam, a pre-university exam required for admission to biological sciences (Jones et al., 2015).

One explanation is that students learn as much as needed for the test and then forget the information after completing the test, a concept informally known as "cram and dump". Several school systems have made remedial efforts to limit this practice by placing emphasis on continuous or progressive testing, active learning, and higher-order thinking according to Bloom's taxonomy (Cuevas, 2016; Custers, 2010; Healy et al., 2017; Yelder et al., 2013). For example, Yelder et al. (2013) proposed progressive testing in Australian and New Zealand medical schools as a way to curb "cram and dump" and increase learning retention. A carefully crafted study by Healy and colleagues (2017) found that interrupting learning with carefully placed quizzes increased retention.

Efforts to quantify the learning loss have been made since the advent of institutional learning (reviewed in Semb & Ellis, 1994). Arthur Jr. et al. (1998) refer to learning loss as “skill decay” and define it as the loss of trained or acquired skills or knowledge over a period of time of non-use.

Via a meta-analysis of 189 data points from 53 articles published prior to 1998, they found that the amount of learning retention loss is proportional to the interval of non-use and is dependent on the type of information and skill (Arthur Jr. et al., 1998). In an effort to counteract the popular belief that most information gained in the classroom is forgotten immediately, Semb and Ellis (1994) conducted an analysis of 21 studies using a recognition test format and quantified learning loss or loss factor (LF) as 15% over a retention interval of 10 to 40 weeks post-instruction.

The formula $RS = OS - (OS \times LF)$, where RS is retention score, OS is original score, and LF is loss factor, can be used to predict the approximate performance on subsequent tests on the same subject matter (RS). Wisher et al. (2001) used this formula to distinguish between the RS of students using distance learning compared to in-class learning and found no significant difference.

With the advent of the COVID-19 pandemic and the subsequent global school shutdown in 2020, there has been a resurgence of studies quantifying learning loss (Donnelly & Patrinos, 2022; Hevia et al., 2022). It is important to note that in this case, learning loss is not equivalent to retention of information loss or “loss factor”. Learning loss, as defined

here, is the decline in collective student knowledge and skill and compares skill levels of current cohorts' testing to skill levels of previous cohorts at the same level of learning. Retention, as defined by Arthur Jr. et al. (1998) and in this current study, refers to the knowledge and skills retained by the same individual or cohort of students over time.

In higher education, retention of information and skills is critical in foundational courses because higher-level courses assume a level of competence based on these courses. For the biological sciences across higher education, key concepts in introductory courses such as Chemistry of Life, Evolutionary Theories, Cells and Cell Theory, and the many processes of the cell are foundational for most upper-level biology courses. Human anatomy and physiology (A&P) is a prerequisite for multiple health science programs and professions ranging from certificate courses to terminal degrees.

This includes but is not limited to respiratory technology, emergency medical technician, radiological science, nursing, physician's assistant, and occupational therapy programs. Medical schools offer anatomy in the first year. Thus, a solid foundation in human A&P is critical for the success of students pursuing health science degrees.

At many 2-year and 4-year colleges human A&P is offered either as a single semester course that samples the breadth of human organ structure and their related functions or a 2-semester course that further develops the structure and related functions.

Both the Community College of Baltimore County and Notre Dame of Maryland University (NDMU) offer a 2-semester (15 weeks/semester) human A&P course that is a prerequisite for entry into nursing programs. In both schools, enrollment in human A&P is contingent on successful completion of an introductory biology course. At NDMU, the first semester of human A&P (human A&P I) covers the foundational concepts of anatomical terminology, histology, the structural systems, and the regulatory systems and culminates in a cumulative final exam. Successful completion of human A&P I with a grade of C or higher is required for enrollment in human A&P II. Human A&P II covers the transport, exchange, and reproductive systems.

Two case studies were conducted at NDMU with human A&P pre-nursing students to assess learning retention decline in the transition between human A&P I and human A&P II. NDMU is a small private

liberal arts university in Baltimore, Maryland with an ethnically and economically diverse student body. Human A&P is offered in the School of Arts, Sciences and Business which, at the time of this the study, was a women's undergraduate college. Students were arranged in cohorts with sections separated by pre-nursing and non-nursing. Over 90% of the students taking human A&P I in the fall semester enrolled in human A&P II in the subsequent spring semester.

The 2 cohorts in the study had the same instructor for both human A&P I and human A&P II. Instructions were given face-to-face with a combination of lecture and lab. The study measured only the lecture portion of the course. At the conclusion of human A&P I, students were given a cumulative final exam. Seven weeks and 20 weeks after instruction the same exam was administered, and the learning loss was calculated.

METHODS

Two case studies were conducted at NDMU with female students enrolled in human A&P. The course fulfills a prerequisite for nursing and only pre-nursing students are enrolled. The prerequisite for this class is successful completion of Fundamentals of Biology with a grade of C or higher. The course, taught via a systemic approach, is given over 2 15-week semesters with a cumulative final exam at the end of each semester. Emphasis is placed on structure, function, and pathology of tissues, organs, and organ systems.

Each cohort of students was kept consistent with greater than 90% of students transitioning from human A&P I to human A&P II. Enrollment in human A&P II requires successful completion of human A&P I with a grade of C or higher. The same instructor and the same textbook were assigned to each cohort adding another level of consistency.

In the first case study (CS1), 11 students, aged 19 to 22 years (modal age 19 years), were given a cumulative final exam at the end of human A&P I and the average performance of the class was

recorded. Students were administered an identical exam 48 days later at the beginning of human A&P II after a 7-week break from instruction. In the second case study (CS2), 22 female students, aged of 19 to 26 years (modal age 19 years), were given the cumulative final exam at the end of human A&P I. The same exam was administered 48 days later at the beginning of human A&P II after a 7-week break from instruction, and then again 144 days later after completion of human A&P II. It is important to note that CS1 and CS2 were given the same exam questions which consisted of a combination of multiple choice, true or false, matching, short answer, and essay-type questions.

For all exams, questions that were graded subjectively, that is essay-type and short-answer questions, were removed from the exams and the average was tallied. Students who did not attempt all of the exams were also omitted from the average. Differences in average were analyzed using ANOVA and Tukey's HSD tests.

RESULTS

Case Study 1: The cohort in CS1 included 11 students who took both test 1 (T1, given day 0) and test 2 (T2, given day 48). The average score on T1 was 79.6% and ranged from 69.3% to 98% with a standard deviation (SD) of 7.94. The median score for T1 was 79.3 with a variance of 57.3. The average significantly decreased ($p < 0.005$) on T2 given 48 days post-instruction to 53.1 (SD 5.29) (Fig. 1a).

The scores ranged from 46.2% to 65.3% with a median score of 52.9 and a variance of 25.5. Individual scores for T1 and T2 are shown in Figure 1b. The difference between the T1 and T2 was determined to be statistically significant via ANOVA and Tukey's HSD ($p < 0.005$) (Table 1).

Table 1. Pairwise Comparison of Test Scores by Tukey's HSD.

Pairwise Comparison	Mean	Tukey HSD	Q	Significance
CS1 T ₁ :T ₂	M _{T1} = 79.57 M _{T2} = 53.05	26.53	Q = 7.91 (p = 0.00000)	*** p < 0.005
CS1 T ₁ :T ₃	M _{T1} = 83.97 M _{T3} = 78.24	5.74	Q = 1.71 (p = 0.74622)	* ns
CS1 T ₂ :T ₃	M _{T2} = 78.24 M _{T3} = 79.57	4.54	Q = 1.35 (p = 0.87339)	* ns
CS2:CS1 T ₁	M _{CS2} = 83.97 M _{CS1} = 79.57	4.40	Q = 1.31 (p = 0.88553)	* ns
T ₂ CS2:CS1	M _{CS2} = 78.24 M _{CS1} = 53.05	25.19	Q = 7.51 (p = 0.00001)	*** p < 0.005

T1 = Test 1 (day 0); T2 = Test 2 (day 48); T3 = Test 3 (day 144). * = no significant difference; *** = significantly different (p < 0.005).

Relative loss, described by Semb and Ellis (1994) as the amount of information remembered over a period of time, is calculated as the retention score by the equation $RS = OS - (OS \times LF)$. After evaluating over 21 studies, they determined an average LF of 15% over 10 to 40 weeks. Using this equation for CS1, the predicted average score on T2 is about 67.66%. However, the average score on T2 was actually 53.1%, less than predicted. Via simple subtraction calculation (T1 – T2), the calculated LF was 26.5%.

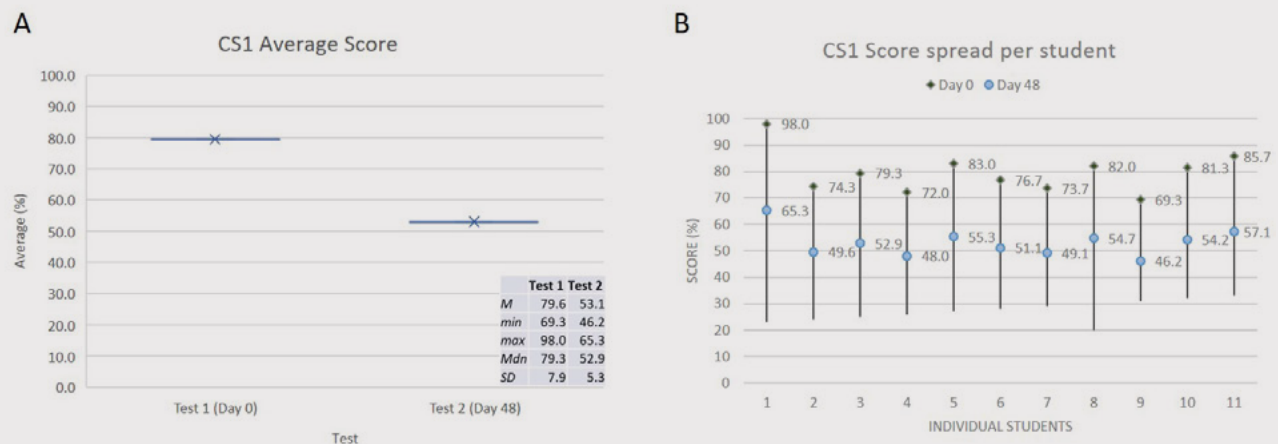


Figure 1. Comparison of tests for CS1 immediately after instruction (T1) and 48 days post-instruction (T2). Panel A, left, shows class averages for T1 and T2 (p < 0.005). Data table inset shows the mean (M), minimum score (min), maximum score (max), median (Mdn), and standard deviation (SD). Panel B, right depicts the score spread showing individual student performance on T1 (gray) and T2 (blue). Data labels show each student's scores on the tests.

CASE STUDY 2

22 students met the criteria for inclusion in the cohort for CS2. For this cohort, the retention score was measured both 48 days and 144 days post-instruction.

The students were administered the same test immediately after the completion of instruction (T1, given day 0), 48 days post-instruction (T2), and 144 days post-instruction (T3). Note that T3 was administered at the conclusion of human A&P II. Students only received instruction on topics covered in human A&P II.

Students in this cohort scored an average of 84.0% on T1 (SD 6.4), 78.2% on T2 (SD 16.9), and 79.4% on T3 (SD 18.2) (Fig. 2a). ANOVA and Tukey's HSD suggest there was no significant difference between T1 and T2 ($p = 0.74622$), between T1 and T3 ($p = 0.87339$), or between T2 and T3 ($p = 0.99909$) (Table 1).

Using the average LF of 15% as defined by Semb & Ellis (1994), one would predict a score

of about 71.4% on T2 and T3, with T3 being lower than T2. Instead, the averages were 78.2% and 79.4%, giving a LF of 5.8% and 4.6% respectively, neither of which were significant. In fact, the LF between T2 and T3 was -1.4%, suggesting a gain of retention (not significant). Differences between individual student performance showed widespread variation (Fig. 2b).

Both case studies were given the same test and had the same instructor allowing for a direct comparison of both cohorts. Table 1 shows there was no significant difference between T1 between the cohorts, however, the average performance on T2 was significantly different between the 2 cohorts as was the average score for T1 of cohort 1 and T2 of cohort 2 ($p < 0.005$)

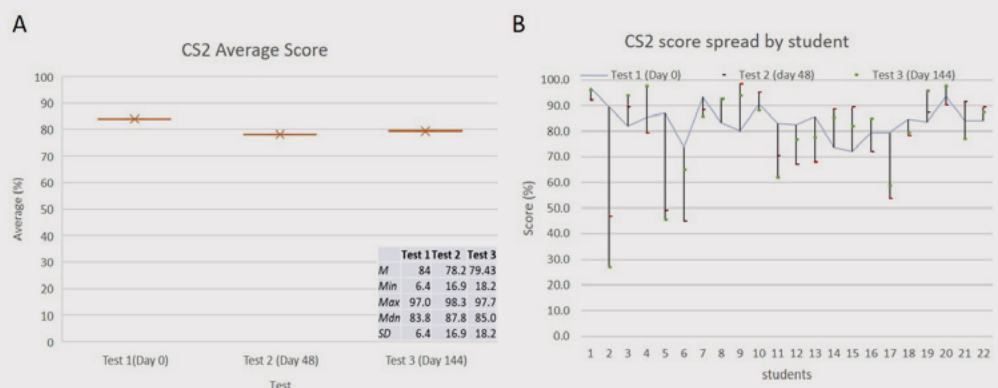
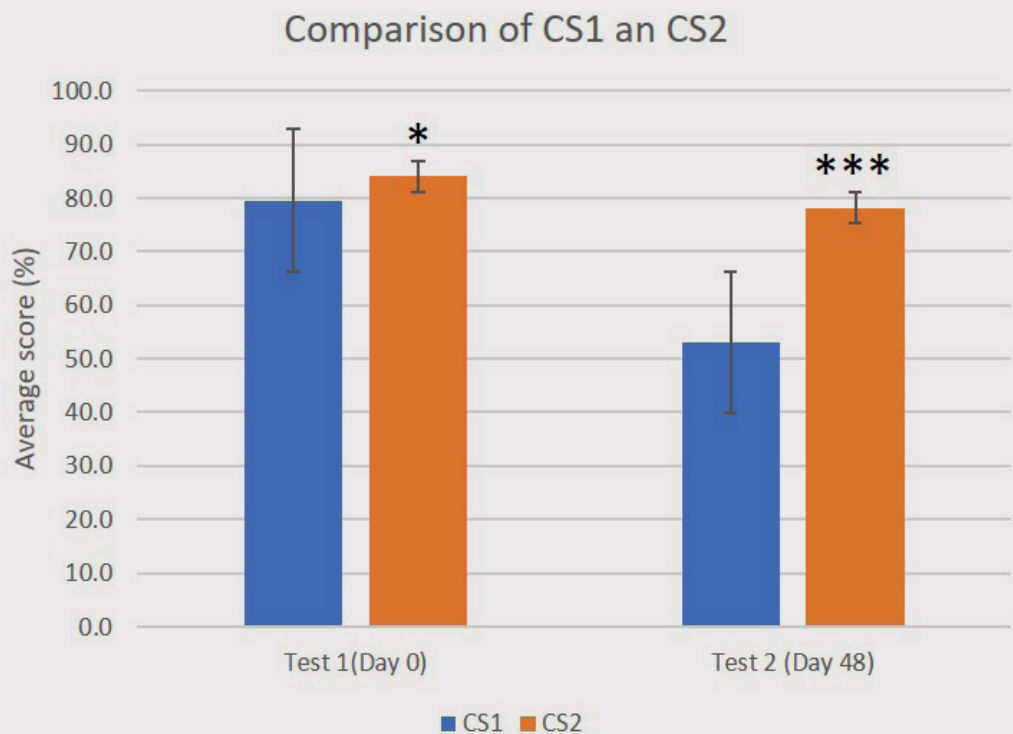


Figure 2. Comparison of test scores for CS2 immediately after instruction (T1) and 48 days post-instruction (T2) and 144 days post-instruction (T3). Panel A, left, shows calculated class averages on T1, T2, and T3.

Inset data table shows mean (M), minimum score (min) maximum score (max), median (Mdn), and standard deviation (SD). No significant difference exists between each data point. Panel B, right, depicts individual scores for each student on the 3 different tests. Blue line indicates scores on T1, brown dash indicates T2, and green dash indicates T3.

FIGURE 3.



	Mean	Tukey HSD	Q	Significance
Pairwise Comparison		HSD _{.05} = 13.2317 HSD _{.05} = 15.9598	Q _{.05} = 3.9437 Q _{.05} = 4.7568	
Test 1 CS2:CS1	M _{CS2} = 83.97 M _{CS1} = 79.57	4.4	Q = 1.31 (p = .88553)	* ns
Test 2 CS2:CS1	M _{CS2} = 78.24 M _{CS1} = 53.05	25.19	Q = 7.51 (p = .00001)	*** p < 0.005

Figure 3. Comparison of CS1 to CS2. Panel A, above, shows average scores of CS1 and CS2 on T1 and T2. Panel B, below, presents Tukey's HSD pairwise comparisons of CS2 to CS1 for T1 and T2. * = not significant (ns); *** = p < 0.005.

DISCUSSION & CONCLUSION

Retention decline or retention loss in students has been quantified by multiple studies (Arthur Jr. et al., 1998; Jones et al., 2015; Semb & Ellis, 1994; Wisher et al., 2001). There has been some inconsistency in the extent to which retention declines and the efficacy of corrective methods to minimize the decline.

The metadata analysis conducted by Arthur Jr. et al. (1998) and the retention loss test between distance and traditional learning performed by Wisher et al. (2001) involved recognition tests, requiring a low level of Bloom's taxonomy. Wisher and colleagues (2001) reported a retention loss of 14% to 16%, consistent with Semb and Ellis (1994), and showed no significant difference between the distance learning and traditional groups.

DISCUSSION & CONCLUSION

Many college courses, especially in the biological sciences, use a combination of recall, comprehension, application, analysis, evaluation, and synthesis, which incorporates higher levels of Bloom's taxonomy.

Consequently, a standard measure of retention decline is improbable to apply across college courses. However, the transfer of information is essential when transitioning from one course to another and that is dependent on student retention of knowledge.

The 2 case studies in this paper quantifying learning loss showed inconsistent results. Both of the cohorts in CS1 and CS2 were given identical tests. The performance on the first test, a cumulative final exam given at the end of human A&P I, was not significantly different between the cohorts. That indicates the 2 cohorts were equally matched in terms of understanding the material. Both cohorts met the same requirements for entrance into the course, that is a C or higher on the pre-requisite Fundamentals of Biology course. For both CS1 and CS2, the students were taking human A&P at the college level for the first time. Both were taught by the same instructor via a similar pedagogical approach.

What distinguishes the 2 cohorts from each other is their performance on the second test (T2) administered 7 weeks after T1. CS1 demonstrated a significant decline in retention after 7 weeks without instruction with an average of 26% lower score on T2 compared to T1. 100% of the students scored lower on T2 than on T1. However, CS2 exhibited no significant decline either in 7 weeks or 20 weeks after the initial test. Moreover, while the majority of individual students scored higher on the initial test than the second test, 8 of the 22 students (36%) scored higher on T2 than T1 and 12 (54%) scored higher on either T2 or T3 than T1.

There are several factors that were different about the cohorts that may contribute to the variation. The most obvious difference is the size of the cohorts. CS1 consisted of 11 students that took both human A&P I and II, while

CS2 consisted of 22 students. Possibly a larger cohort size in CS1 would more reflect the results in CS2.

During their studies, both cohorts received interruptions in face-to-face instruction due to the COVID-19 pandemic. This interruption would have affected them at different stages of their education. While one cannot quantify or distinguish the effects of the disruption on either cohort, it's worth noting that studies have shown disparities in learning loss across different socio-economic lines due to the pandemic (Donnelly & Patrinos, 2022; Hevia et al., 2022). For those students who may have been dispersed in disparate high schools during the pandemic, the learning loss may be different to students who were already in the same college at the time of the shutdown. However, this is an unlikely explanation as students in both cohorts performed similarly on T1.

Human A&P, as offered, has a lecture component and a lab component. Data were only generated from the lecture component in this study. A possible reason for the disparity in retention decline between the cohorts may be the lab component. In CS2, the lab component was more application based with clinical case studies in addition to the identification of anatomical structures and function. In CS1, the lab emphasized anatomical structure and function with fewer clinically applicable case studies.

While the exact impact of the lab instructions on retention loss is beyond the scope of this study, studies indicate prior knowledge and knowledge gained outside the classroom have an impact on reducing retention loss (Semb & Ellis, 1994). More controlled studies are required to examine the effect of different modes of instruction on learning and retention. However, there is a lot to be learned from these case studies.

REFERENCES

1. Arthur Jr., W., Bennett Jr., W., Stanush, P. L., & McNelly, T. L. (1998). Factors that influence skill decay and retention: A quantitative review and analysis. *Human Performance*, 11(1), 57-101. https://doi.org/10.1207/s15327043hup1101_3
2. Cuevas, J. A. (2016). Cognitive psychology's case for teaching higher order thinking. *Professional Educator*, 15(4), 4-7.
3. Custers, E. (2010). Long-term retention of basic science knowledge: A review study. *Advances in Health Science Education*, 15(1), 109-128. <https://doi.org/10.1007/s10459-008-9101-y>
4. Donnelly, R., & Patrinos, H. A. (2022). Learning loss during Covid-19: An early systematic review. *PROSPECTS*, 51(4), 601-609. <https://doi.org/10.1007/s11125-021-09582-6>
5. Healy, A. F., Jones, M., Lalchandani, L. A., & Tack, L. A. (2017). Timing of quizzes during learning: Effects on motivation and retention. *Journal of Experimental Psychology: Applied*, 23(2), 128-137. <https://doi.org/10.1037/xap0000123>
6. Hevia, F. J., Vergara-Lope, S., Velásquez-Durán, A., & Calderón, D. (2022). Estimation of the fundamental learning loss and learning poverty related to COVID-19 pandemic in Mexico. *International Journal of Educational Development*, 88, 102515. <https://doi.org/10.1016/j.ijedudev.2021.102515>
7. Jones, H., Black, B., Green, J., Langton, P., Rutherford, S., Scott, J., & Brown, S. (2015). Indications of knowledge retention in the transition to higher education. *Journal of Biological Education*, 49(3), 261-273. <https://doi.org/10.1080/00219266.2014.926960>
8. Semb, G. B., & Ellis, J. A. (1994). Knowledge taught in school: What is remembered? *Review of Educational Research*, 64(2), 253-286. JSTOR. <https://doi.org/10.2307/1170695>
9. Wisher, R. A., Curnow, C. K., & Seidel, R. J. (2001). Knowledge retention as a latent outcome measure in distance learning. *American Journal of Distance Education*, 15(3), 20-35. <https://doi.org/10.1080/08923640109527091>
10. Yelder, J., Bagg, W., & O'Connor, B. (2013). Progress testing: A potential for collaboration and benchmarking across Australian and New Zealand medical schools? *Focus on Health Professional Education*, 15(1), 81-87.

// Research Article //

The Value of Critical Self-Reflection in the
Development of Cultural Competency

Maura O. Hill, MEd, and
Jadi Z. Omowale, MA

Corresponding author:
Maura O. Hill, MEd
mhill2@ccbcmd.edu

From the Culturally Responsive Teaching and Learning Program, Center for
Excellence in Teaching and Learning, Community College of Baltimore
County, Baltimore, Maryland.

VALUABLE CRITICAL SELF-REFLECTION

The Culturally Responsive Teaching
and Learning program at the Community
College of Baltimore County collects
reflections from workshop participants
for each training module.

ABSTRACT

The Culturally Responsive Teaching and Learning program at the Community College of Baltimore County collects reflections from workshop participants for each training module. The purpose of these reflections is twofold: firstly, for participants to examine their personal connection to the theories we present and secondly, for participants to examine how they can utilize the theories and activities in their classrooms and institutions.

In this article we describe the results from analyzing reflections from participants across 3 different educational institutions since 2020.

The overall results showed that participants were at different points in their personal cultural competency journeys, and that they gained practical tools to help students along their own cultural competency journeys.

INTRO — DUCTION

The Community College of Baltimore County (CCBC) began its journey toward culturally relevant pedagogy in 1999, when the adoption of the Banner system allowed for disaggregating student data.

A group of faculty, staff, and administrators began researching interventions to increase the success rate of minoritized students. This initial inquiry group laid the foundation for what has become the Culturally Responsive Teaching and Learning (CRTL) Program within CCBC's Center for Excellence in Teaching and Learning. Since 2004, CRTL has been augmenting participants' cultural awareness, helping to change attitudes, adding to their knowledge of others, and strengthening their skills at interacting effectively with students, faculty, colleagues, and others in a college community.

CRTL trains faculty, staff, and students by engaging them in self-reflective processes that allow them to convey to others (students, in particular) the need for self-reflection, self-advocacy, and self-awareness in life's ever changing cultural contexts.

In CRTL's interactive workshops, participants examine their assumptions, gain valuable cross-cultural experiences by cooperating with diverse others, and develop specific knowledge and skills necessary to work effectively with all people. Our aim is to improve participants' cultural competency. To build on Ladson-Billings' (in Landsman & Lewis, 2011) definition, we define cultural competency as "helping [individuals] to recognize and honor their own cultural beliefs and practices" while simultaneously recognizing and honoring the cultural beliefs and practices of others.

The training program is based on the research of forerunners in cultural pedagogy such as Gloria Ladson-Billings, Geneva Gay, and Etta Hollins.

The central tenets of culturally responsive teaching are that both faculty and students will engage in critical self-reflection, develop cultural competence, experience academic success, and engage and develop a socio-political consciousness.

These goals are achieved through the beliefs that all people engaged in the teaching-learning relationship will bring their own particular cultures with them to the classroom. Culturally responsive teaching means that we recognize that each of these cultures can be leveraged to be an asset to learning, and that diverse cultural ways of knowing are valid in the academic space. The CRTL Program also draws on the work of researchers and theorists including Claude Steele, Carol Dweck, Charles Mills, Kimberle Crenshaw, Robin Di Angelo, and others.

CRTL's Modules

The CRTL Program currently includes 9 training modules. These modules are usually presented in 2-hour workshops. For this study, we reviewed the reflections from 3 of the foundational modules in the program: the meanings of culture and race, facing Whiteness, and using restorative justice practices to combat implicit bias.

The Meanings of Culture and Race

This module is considered foundational to CRTL training and is normally the first module offered in any training cycle. It explores the multiple meanings of culture and defines and explores race as a social construct. This workshop leads participants through several simple activities that illustrate the CRTL principle that educators must always reflect on how the multiple meanings of our culture influence our interactions with others, particularly students. It explores the origins of race in the United States, as well as how its social construction leads to bias within our institutions.

Facing Whiteness

This workshop offers a space for participants, particularly White people who usually make up the majority of faculty and staff at our institutions, to examine and consider how the social construction of Whiteness affects their lives and experiences. Successful implementation of culturally responsive pedagogy begins when we reflect on our own cultural background, interpret how our experiences affect our practice, and inquire into opportunities for growth.

Using Restorative Justice Practices to Combat Implicit Bias

In this workshop, we define implicit and explicit bias, focusing on the implications of bias on students of color. We then review the framework of restorative justice practices, drawn from Indigenous practices, and use role-play for participants to respond to sample case studies with restorative questions.

Critical Self-Reflection (RIQ)

An important part of our training is asking participants to engage in self-reflection. We must develop critical consciousness through what Hollins (1996) calls the RIQ process: a professional practice that is self-reflective, always interpretive, and characterized by continuous inquiry.

CRTL training uses reflection activities to encourage participants to dig deeper into their formed subjective ideas around the topics discussed and examined in each of our modules.

Through this reflection we encourage engagement with ideas and theories which will foment educators/students/staff to move forward in their own cultural competencies as they do their work. These reflective practices bring about personal and professional change (Calkins & Harris, 2017). Hollins (1996) views this as a "lifelong professional practice."

Historical Context for 2020 – 2022

As we reviewed each reflection, we found it important to discuss the historical context of these particular CRTL trainings. During the uniquely historic time starting in 2020, the country and the world faced what is frequently described as the twin pandemics of COVID-19 and racial unrest instigated by the murder of George Floyd. In these years we saw the pandemic rise and eventually wane in 2022 after a shut down that impacted the way we do training; we moved to a virtual format rather than in person, as we did in our classrooms. In the light of the ravages of COVID-19, the culture of the U.S. and the world changed dramatically and a new normal of social engagement emerged. In spring 2020 following Floyd's murder, protests spread throughout the U.S. and the world in support of police reform and in support of Black Lives Matter. This was coupled

with the often-controversial tenure of Donald Trump's presidency. The era of diversity, equity, and inclusion arrived and many institutions of higher learning embraced developing and/or improving their diversity efforts. However, a backlash of White supremacist ideology began in 2021 against critical race theory and against a new president in the form of election denial and an insurrection at the nation's capital. We were mindful of this historical and cultural context as we reviewed these reflections.

Study Intention

This study evaluated the reflections of 62 faculty/staff participants in 3 of our workshops between 2020 and 2022. We wanted to answer the following research questions:

1. What is the relationship between critical self-reflection and developing cultural competency?
2. How do these reflections show what participants are gaining through our training?
3. What does this mean for the CRTL program?

METHODS

The Reflective Tool

At the conclusion of each training module, we asked each participant to write a short reflection in response to these 2 questions:

1. What are the ways this workshop applies to your personal life?
2. How can you use the ideas shared in this workshop with your students or in your area of responsibility at the college/university?

Participants

There were 126 participants in the workshops across 3 institutions. We received a total of 62 reflective essays, which we examined for this study. While we did not collect demographic data, based on their responses to the reflections it appears that most participants were faculty, with some administrators also included. Most identified as White, and there were more women than men. Participants were from the following 3 different institutions:

College A: A predominantly White institution (PWI) university involving faculty participants from the school of social work and the school of health professions.

College B: A PWI community college involving faculty participants from several disciplines and a few administrators.

College C: A large, diverse community college involving faculty participants from many disciplines.

After each workshop, participants completed the reflections and emailed them to the CRTL facilitators. We collected the reflections for the 3 modules that were common across the trainings given to the 3 institutions. We first reviewed the reflections and wrote a reflective note for each summarizing the content and commenting on our own perceptions as a form of bracketing to acknowledge potential biases (Tufford & Newman, 2012).

These memos served as an initial analysis and helped to "develop tentative ideas about categories and relationships" (Maxwell, 2013). In the next cycle of reading, we analyzed the reflections to note specific data related to the objectives for the CRTL program. In the third cycle of reading and annotating the reflections, we noted emerging ideas within the reflections for each of the 3 modules. We then met to review and classify our annotations into themes by module.

RESULTS

This study analyzed reflections collected across 3 years from 2020 to 2022, and across 3 colleges/universities. As we reviewed, certain themes emerged from all respondents. We concluded that each fell on a continuum of cultural competency.

Participants' responses reflected their struggle to come to a greater awareness and understanding of their cultural and racial identities and their willingness to engage in critical self-reflection to foster this greater awareness. Responses also revealed the complicated negotiation of race and power dynamics in society. The usefulness of CRTL activities was another important theme.

REFLECTIONS BY MODULE

The Meanings of Culture and Race

This module first focuses on cultural identity construction. Some White participants struggled and sometimes resisted the idea of having a culture. Some said that they felt culture-less and one participant expressed it like this,

"I understand culture intellectually and can identify it in others, but I am often hard pressed to see it in my own family. It's like the absence of culture – but that too is culture. White supremacy culture. Perfections, no emotions, logic only, disembodiment."

They were moving from a White normative view of culture and recognized that in the U.S. people are socialized into the norms of Whiteness (White supremacy). Others approached their cultural identity by searching for their ancestral cultural roots, for example Italian American roots or other European heritages to find their culture. The reflection allowed the participants to go deeper beyond their initial responses and realize they do have culture. The experiences of another participant led her to reflect

"This session made me think more deeply about my own culture. I used to feel that I did not have a strong sense of my own culture, that my family didn't do anything different or special. I used to think that because my family didn't participate in any specific cultural traditions based on their national heritage that we didn't have any."

On the other hand, many participants recognized that reflecting on culture is important

for themselves and in teaching. One participant noted

"The concepts discussed in the Meanings of Culture and Race apply to my life in many ways. As an adjunct professor, I must be aware of the different cultures and backgrounds of those I teach. Learning how race, religion, ethnicity, etc., play out in one's lives is important when approaching a sensitive subject."

They felt the role-playing activity using inter-subjective dialogue allowed them to engage in perspective-taking, meaning making, and dialogue across groups as the only way to understand various points of view. These participants were moving toward cultural competency as they were willing and able to recognize that they indeed had a culture and that in our mostly "segregated society" it is difficult to engage with other cultures as well as their own.

They admitted a challenge growing up socialized into Whiteness. Referencing this, one individual shared "Another concept that resonated is "the meaning one makes of another culture is itself a cultural act. This, to me, speaks to my privilege of being White and the lens I am privileged to look through. I am at the intersection of being White and a woman, and upper middle aged, so my lens keeps shifting based on my life experiences as well as my continuous learning about myself and the world."

"While I have many cultural identities and unique experience, in relation to my role ..., a

For our few participants of color including Black, Biracial, and Asian people, they expressed understanding multiple identities and their own cultures. One faculty member shared

few of my cultural identities include millennial, heterosexual, female, and psychology faculty. These characteristics describe my past and my present in many ways, and it is important for me to reflect upon what this means for my learners."

Comments were made that included how people use culture, race, caste, and religion to otherize people. One participant relayed a story which showed she recognized her cultural norm as different because of her experience of having to move into a new, different culture. She cited the usefulness of Pellegrino Riccardi's (Riccardi, 2015) definition of culture as "A system of behavior that helps us act in an accepted or familiar way." She said, "I realized that much of my growth from that point until now has occurred almost exclusively due to bridging new social groups, engaging in dialogue with folks from diverse groups and working to develop a new consensus of meaning with these folks, all of the things required in order to make new meaning."

Race as a social construct

As part of the workshop, participants were required to complete a racial autobiography. This exercise comes from the guide *Courageous Conversations about Race* (Singleton & Linton, 2007) and is a long reflection of racial construction from childhood to adulthood. Some participants did not mention race at all, as they wrestled with the idea of racial

construction. However, most participants understood that they had been socialized into White culture in predominantly White communities. Growing to adulthood in mostly White towns, rural areas, and suburbs, one individual shared "...the autobiography helped me understand better my advantages as a White middle class boy isolated until 8 years old from contact with different races, my awakening to racism when a "Black" family moved into our all White neighborhood (and my parents and neighbors joined in the panic and the commitment to shunning the family), and my experiences after my parents divorced as our Mom-headed household became poor, moved into a neighborhood of predominantly African Americans on the wrong side of the track, and saw our advantages disappear."

Some participants acknowledged their Whiteness but did not discuss the construct. They did recognize the inequities in power due to their Whiteness. Another telling story included a first experience for a White person with the use of the "N" word, "I had never heard that word before, but I knew it was bad because my father was very angry, and I believe that this experience formed an early connection for me between race and anger. As an adult thinking back on this, I'm obviously terribly embarrassed that my father did this, and my heart breaks for the little girl I was playing with and how that might have made her feel (her father too). This exercise was powerful – and painful – for me."

RESULTS

Through the words of scholar Charles Mills (Mills, 2016), participants began to recognize race as a social construction “developed along unequal lines of power.”

Race and power

Through the words of scholar Charles Mills (Mills, 2016), participants began to recognize race as a social construction “developed along unequal lines of power.” However, some individuals still struggled with themselves as having a racial identity. “I appreciated the discussion around the fact that race is not biological but was created. Before watching the YouTube video, it never occurred to me how the concept of race came to be. It definitely made me wonder how different things would be if we had never placed number values on race and cultures. The concept of intersectionality is very applicable as well. I consider myself a White, middle-class woman where being White and middle class offer me privilege but being a woman often does not.”

Facing Whiteness

In their reflections on the facing Whiteness module, White participants exhibited a range of understanding of their own White racial identity, and Black participants shared their experiences of facing the White identity of others.

Growing awareness of racial identity

Several of the White participants expressed ideas related to an emerging consideration of their White identity. They expressed that the workshop gave them an opportunity to consider racial identity in a way they had never done before: “I’d never truly sat down and thought about facing my own Whiteness before... hearing the stories of others forced me to think about my own privileges.” Some expressed ideas associated with a color-blind mentality, sharing that they had been taught by family that “all races were the same.” In reflecting on the diversity in different areas of their lives (childhood, school, work), a participant noted “It’s telling where I saw diversity [in my life] and where I didn’t; and more importantly, what I interpreted AS diversity and what I didn’t.” The module’s focus on historical interpretation helped some participants in their growing awareness: “I do not recall ever hearing or learning anything about this until now and I find that disturbing. It has made me think about my current thinking and actions.”

Some participants were unwilling or unable to isolate their racial identity, including other social identities like socio-economic status, gender and sexual identity, or political identity as intersecting and complicating factors.

But it's complicated

Living in a mainly White, rural, conservative neighborhood, one participant recognized that "I started seeing the only Black man there as an ally (which is equally ridiculous)." A participant who is LGBTQ said "Skin tone isn't all that leads to discrimination, and it's very important to me not to oversimplify the conversation." Another participant shared that "I did not understand the term 'White privilege' because, as renting farmers, we were not considered middle class."

Getting comfortable being uncomfortable

Engaging in the workshop and the reflection prompted some White participants to grapple with difficult emotions. A participant shared that the self-reflection made them "uncomfortable... I never thought of myself as being privileged." Another participant wrote "I struggle personally with the feelings of guilt I have because of my White privilege." To cope with these difficult emotions, one participant questioned "whether I 'intellectualize' my White identity development. I understand it, and feel it, but then what do I do with the knowledge and understanding?"

Toward anti-racist allyship

Some responses showed that the participants had already spent time reflecting on the impact of Whiteness on their identity, recognizing that they had different racialized experiences from people of color. These responses reflect what Helms (1993) calls the "immersion/emersion" stage of White racial identity development, where people exhibit more "experiential and affective understanding" of their White racial identity, as well as the experiences of people of color. Participants shared that they have become

more mindful of "the many ways in which my Whiteness shows up in my life," or that they "see more clearly that [my Whiteness] is often the first thing that people see and notice when I walk into a room."

With this awareness of their racial identity comes an even greater awareness of "what Whiteness means in the world for people who are not White."

Black participants' perspectives

In their reflections on the facing Whiteness module, Black participants shared their long experiences with facing other people's Whiteness. These experiences led to feelings of shock, fatigue, frustration, and cautious optimism. One participant who grew up in a Black neighborhood but attended a PWI stated that "shock and adjustment that came with attending a PWI for college was a lot to navigate. I think that experience helped me begin to understand Whiteness in a way I didn't before." Others expressed that they are "tired" or "have grown weary" of the constant battle to remind their White colleagues that conversations and action around diversity, equity, and inclusion are necessary. One Black participant, in describing the pushback to talking about racism they received from a White person, explains it this way: "White individuals have a hard time understanding racism... because many of them just do not want to" because their "mind is not wired to care" since White people have not had to navigate anti-Black racism. For some Black participants, the existence of a workshop like facing Whiteness was a signal that their institutions were open to dialogs about race, which provided them with some hope for change.

USING RESTORATIVE JUSTICE PRACTICES TO COMBAT IMPLICIT BIAS

Critical self-reflection

Reflections from this module revealed deep, intentional, and critical self-reflection. While the other 2 modules caused participants to reflect on their own history, family, and identity, this module prompted people to reflect on their behavior towards others. Participants felt challenged to uncover their unconscious or unexamined biases. They became aware of "how... unintentional language could be misconstrued to undermine others."

The workshop also helped people to consider the complexities of how bias operates in the world, moving beyond a conception of bias that focuses only on race: "When I signed up for the workshop, I really only considered [implicit bias] in relations to race. However, I was surprised when we took a step into the LGBTQ+ and even feminist side of things." One participant succinctly described the fundamental challenge of examining implicit bias in this way: "I think that, particularly for cisgender, heterosexual] White folks, it can be very difficult to confront one's own biases and then to acknowledge the damage that this bias has done. We often feel a great deal of shame as we come into a place of self-awareness, and it can be hard to step into a place of humility and accept that we need to do some work to undo the damage that we have done, even if in negligence and ignorance."

Relationships with students

Reflecting on their own implicit biases was related to building stronger relationships with students. Especially for faculty who teach a

diverse student body, being mindful of implicit bias was integral to building a supportive community within the classroom as well as educating all students with equity. Faculty were motivated to examine and address their implicit biases because they wanted to ensure that they "treat everyone with the kindness and respect they deserve."

Hesitancy

Some participants, while they found value in the workshop for their personal and professional growth, were hesitant to bring information about implicit bias or restorative justice directly to their students. They were concerned about whether students were ready to examine their own biases, and whether, as instructors, they had the capacity to facilitate these difficult discussions. Participants shared that they were worried that broaching the topic of bias without feeling confident enough "may do more harm than good" or that they wanted "to make sure that what is said to start this process is not offensive or said in a way to harm or offend anyone." Discussions about bias can be fraught, which can lead to avoiding the topics of race, bias, and discrimination. Facing this discomfort requires intention: "When I started teaching at [this institution], I remember presenting material from the literature that made me uncomfortable. There were areas in the literature that described the differences in services to different cultures, regions in the country, our history of oppression and discrimination, etc. I found myself not wanting to go over the subject but made sure I did."

ADDITIONAL REFLECTIONS OF NOTE

"This is probably difficult to answer as I am not sure how it [the facing Whiteness module] applies to my life... From the 2 weeks that I have taken this workshop, I feel enlightened on what Blacks face in their view of the world... This exercise made me realize just how 'White' my world was and how 'White' it is to many."

"I'm tired, and I'm not interested in working with people that I need to 'convince' [that diversity, equity, and inclusion issues are important]."

"My Blackness is the reason; it's the excuse; it's the motivation; it's the source of pride. It's the 'otherness' that I am aware of without regard to others' Whiteness."

"I've grown weary of the cumulative effects of the burdens Black folks have endured to gain equality."

"The restorative justice piece was interesting to me intellectually, but I haven't quite figured out if/how those concepts apply to my life. I've done

a lot of reading on this practice (prior to the workshops) as it relates to victims and perpetrators of crimes but hearing about the context where individuals are harmed regardless of whether a crime was "truly" (as it relates to legal code) committed was a different take."

"I have taken the IAT myself (a few versions) and always find the results interesting and valuable for self-reflection. I worry about assigning them to my students just because if people don't have a good foundation before taking those tests, I think they can be less helpful. Again, I worry that I am not the appropriate person to lay that foundation for students and assigning this type of activity may do more harm than good."

"I took the course because I wanted to learn techniques or at least hear from professionals how to begin an open dialogue with those we teach but also make sure that what is said to start this process is not offensive or said in a way to harm or offend anyone."

CLASSROOM & INSTITUTIONAL APPLICATIONS

There was more coherence in the responses to the second reflection question as most participants had clear ideas about classroom and/or institutional applications. Participants related the theories, materials, tools, and activities to their fields of study and positionality at their institutions. A few felt that introducing restorative justice practices to the college community could be used to address issues at their institutions. Regarding classroom practices, intersubjective dialogue, racial autobiography, role playing activities, the sharing of theories and scholarship around the cultural and racial constructions were cited frequently as useful and specific examples are given below.

They cited working with and responding to classroom diversity. However, some continued to be hesitant to hold these dialogues about race with students, especially at PWIs, but felt with more training and time they could overcome feeling uncomfortable.

EXAMPLES OF

Cultural Pedagogy in Classrooms:

1. Faculty members in the health schools reflected on teaching students to include consideration of culture when evaluating and treating patients. They discussed sharing insights into the challenges of growing up White and how the awareness of differences is equally important for students and faculty. They recognized that students need cultural competency.
2. One person discussed exploring culture in her classrooms and introducing cultural communication norms to her students through intersubjective dialogue. The goal is to recognize that there are many "normals."
3. Another already does various critical race theory type activities in her classes. She was curious how students would react to Di Angelo's White Fragility because most of her students are White.
4. Another could use intersubjective dialogue and role playing with faculty she trains. She considered developing a series using intersubjective dialogue for faculty to combine with diversity, equity, and inclusion efforts. They recognized the power of language and use of intersubjective dialogue with students.
5. Using real-world, cultural experiences is useful in math class.
6. Those in social work felt they could find many uses for intersubjective dialogue with their students. Discussions of race and culture are an important part of what they are training these future social workers to do in the field with their clients from many diverse backgrounds.
7. The use of the racial autobiography as a useful starting point for discussion, especially in the health fields where it could be used to teach students to include consideration of culture when evaluating and treating patients.
8. The module on bias had some faculty stating they would examine their course materials for bias and make changes. Additionally, they would use self-reflection on implicit bias to improve students' communication with diverse others in classroom interactions, in health fields, and in social work classes.

DISCUSSION & CONCLUSION

Retention decline or retention loss in students has been quantified by multiple studies (Arthur Jr. et al., 1998; Jones et al., 2015; Semb & Ellis, 1994; Wisher et al., 2001). There has been some inconsistency in the extent to which retention declines and the efficacy of corrective methods to minimize the decline.

The metadata analysis conducted by Arthur Jr. et al. (1998) and the retention loss test between distance and traditional learning performed by Wisher et al. (2001) involved recognition tests, requiring a low level of Bloom's taxonomy. Wisher and colleagues (2001) reported a retention loss of 14% to 16%, consistent with Semb and Ellis (1994), and showed no significant difference between the distance learning and traditional groups.

DISCUSSION & CONCLUSION

Our examination of these 62 reflections aligns with our intentions for this study of critical self-reflection by educators and answers each of our initial questions.

What is the role of critical self-reflection in developing cultural competency?

Reviewing reflections is an authentic assessment of personal growth and development of cultural competency. Our participants were fully engaged in the process of critical self-reflection and were willing to be vulnerable and honest in sharing their experiences. They questioned their own assumptions about race, culture, and bias to interrogate their beliefs. Several expressed gratitude at the opportunity to engage in this kind of reflection, noting how rare that opportunity was.

How do these reflections show what participants are gaining through our training?

While our workshops focus mainly on the foundational theories that contribute to culturally responsive teaching and learning rather than a methodology checklist, the activities we use in the workshops are adaptable to classroom or institutional use. Our workshop model develops skills in critical self-reflection by using methods like shared stories, role-play, and case studies to develop cultural competency. These methods encourage greater understanding and knowledge of theories around cultural pedagogy by personalizing the learning for each participant. In this way, participants develop the skills in cross cultural discussion, engagement, and understanding necessary in navigating diverse populations.

What does this mean for the CRTL program?

Our impression from these reflections is that the structure of our workshops helps participants to productively engage in these complicated and often times uncomfortable topics. We

present the theories behind each workshop topic, provide activities for participants to actively apply the theories, then provide space for discussion and reflection. As Gloria Ladson-Billings (Ladson-Billings, 1995) would say, "That's just good teaching!"

There is value in collecting and reviewing participant reflections to assess the efficacy of the CRTL workshops. Through reading these reflections we have learned that we are not just lecturing to people, we are providing a communal space for personal and professional growth in cultural competency for educators. Becoming a culturally competent educator is a process that takes time, intention, and reflection. In the busy rush of college life, faculty do not always have the time for reflection on their teaching practice; our workshops provide that essential opportunity.

The results of this study help us to understand participants' initial reactions to the CRTL trainings. Future research to document on how these participants implemented the training they received would help us understand the impact CRTL training has had on teaching practice. Having examined participants' initial reflections as well as implementation, we could then take the next step and study how students perceive the CRTL teaching practices of faculty who have participated in the workshops.

ACKNOWLEDGEMENTS

Much of the development of the 3 modules centered in this study of reflections is due to the work over many years of the following scholars: Larry Coleman, Dallas Dolan, Patricia Quintero-Hall, Precious Stone, and David Truscello. This includes relevant research around culturally relevant pedagogy and the development of many of the activities we utilize in our modules.

We are grateful to our workshop participants for the honest and thoughtful sharing in their reflections, which provides guidance to us in our mission and vision to develop CRTL into an effective training program in cultural pedagogy and cross-cultural competency.

REFERENCES

1. Calkins, S., & Harris, M. (2017). Promoting critical reflection: An evaluation of the longer-term impact of a substantial faculty development program. *Journal of Faculty Development*, 31(2), 29–36.
2. Helms, J. (1993). Toward a model of white racial identity development. In J. Helms (Ed.), *Black and white racial identity: Theory, research, and practice* (pp.49–66). Praeger.
3. Hollins, E. R. (1996). *Culture and school learning: Revealing the deep meaning*. Lawrence Erlbaum Associates, Inc.
4. Ladson-Billings, G. (1995). But that's just good teaching! The case for culturally relevant pedagogy. *Theory Into Practice*, 34(3), 159–165.
5. Landsman, J., & Lewis, C. W. (Eds.). (2011). *White teachers, diverse classrooms: Creating inclusive schools, building on students' diversity, and providing true educational equity* (2nd ed.). Stylus Pub.
6. Maxwell, J. (2013). *Qualitative research design: An interactive approach* (3rd ed.). SAGE Publications, Inc.
7. Riccardi, P. (2014, October 21). *Cross cultural communication* [Video]. YouTube. <https://youtu.be/YMyofREc5Jk>
8. Roby Captain. (2015). *Dr. Charles W. Mills – Does race exist?* [Video]. Dailymotion. <https://www.dailymotion.com/video/x2vy16r>
9. Singleton, G. E., & Linton, C. (2007). *Courageous conversations about race: A field guide for achieving equity in schools*. Corwin Press.
10. Tufford, L., & Newman, P. (2012). Bracketing in qualitative research. *Qualitative Social Work*, 11(1), 80–96. <https://doi.org/10.1177/1473325010368316>

REVIEW article

Assessing Selected Teaching Techniques
and Their Impact on Student Success in
the Classroom

Stacie A. Miller, MA,
Sara N. Osman, MA,
Jessica L. Farrar, MA

Assessing Selected Teaching
Techniques and Their Impact on
Student Success in the Classroom

Stacie A. Miller, MA,
Sara N. Osman, MA,
Jessica L. Farrar, MA

From the English for Speakers of
Other Languages Program, School
of Literacy, Languages and Writing,
Community College of Baltimore
County, Baltimore, Maryland.

Integration

IN VIRTUAL CLASSROOMS

In this article, we, as 3 faculty members in the English for Speakers of Other Languages Program at the Community College of Baltimore County, reflect on our experiences of transforming online and remote classrooms into a community during the pandemic and examine the literature that underscores how classroom community and belonging contribute to student success.

We share research on 3 engaging learning activities that have successfully built this community among students in our own virtual classrooms: hall of fame, discussion boards, and jigsaw readings. Although what we share is rooted in our experiences as English for speakers of other languages faculty in the context of a large community college, we have chosen activities that can be applied in various contexts to foster community.

INTRO duction

On March 10, 2020, over coffee and muffins at our local Panera Bread, the 3 of us met to discuss building online curricula for our ESOL courses. Little did we know that this would be our last face-to-face meeting for over 2 years, or that within the next 24 hours, the need for online curricula would increase exponentially! Little did we know how desperate students would soon be for a sense of connection and belonging during the uncertainties and isolation of a pandemic. Over the next weeks and months, as we scrambled to move our courses online, we discovered the great degree of community that can grow in virtual and online classes. We researched and experimented with ways of purposefully creating conditions where students feel a sense of belonging, striving to make the online classroom a sanctuary that values students' backgrounds and encourages cross-cultural understanding. This review article highlights how community and belonging contribute to retention and student success and explores research on successfully implementing 3 specific online activities and their impact on students' educational experience.

OUR STUDENTS' BACKGROUNDS

In any community college, "community" plays an integral role; the sense of community on campus and in the classroom relates to the mission of serving the needs of the greater community. In 2022, our college—the Community College of Baltimore County (CCBC)—served a total of 48,084 students with 23,396 credit students (CCBC Quick Facts, 2022; Kelleher, 2022). Of these credit students, 61% are students of color, making our college a majority-minority institution (CCBC Quick Facts, 2022). This diversity is further increased by 340 international students on an F1 visa and 1,467 non-native speakers, (CCBC Quick Facts, 2022).

Our students, like community college students everywhere, tend to juggle many responsibilities. Nearly half (49%) of all CCBC students work 20 hours or more per week (CCBC Quick Facts, 2022), and thus have many obligations competing for their time and energy. Only 12% of our students enroll directly from high school with most students (57%) falling between the ages of 20–39, and 54% of our students need some type of remediation or preacademic work before beginning credit-level classes (CCBC Quick Facts, 2022). These challenges make a supportive classroom community, which contributes strongly to student success and retention, even more important (Kaye et. al., 2011; Kuh, 2007; Tinto, 2017).

SOCIAL AND ACADEMIC INTEGRATION: COMMUNITY, BELONGING, RETENTION

When 16 award-winning university faculty were interviewed about their concept of classroom community, many emphasized the importance of social and academic integration, or "social interactions in the classroom [that] serve to build both relationships and knowledge" (Kay et al., 2011). This emphasis on cognitive learning separates classroom community from other types of community, and yet the classroom should expand beyond the intellectual horizon, creating, as one professor said, "an emotionally rich experience" (Kay et al., 2011). Overall, these professors strove to create a "classroom community in action: students interacting with each other and the instructor about course content" (Kay et al., 2011). For the purposes of this article, we use this basic definition of classroom community as academic and social integration, as we examine ways of creating an online class community that promotes a sense of belonging. While we draw on our experiences as English for speakers of other languages (ESOL) instructors teaching virtually, the pedagogical practices we

“an emotionally rich experience”

highlight can be applied to any discipline and any modality; they are broadly useful for reducing feelings of marginalization and creating spaces where students feel they are valued members of a community and are helpful first steps toward student success.

Closely related to classroom community is the concept of belonging; reminiscent of the 16 award-winning faculties' definitions of community (Kay et al., 2011), Maestas et.al (2007) cites several articles asserting that "academic and social integration" are "key components of belonging." While both community and belonging are connected to academic and social integration, belongingness has strong roots in the pursuit of equity. Terrell Strayhorn (2018) defines belonging as "students' perceived social support on campus, a feeling or sensation of connectedness, and the experience of mattering" to their peers, teachers, and others on campus. Without this, students risk experiencing what Walton and Cohen (2007) refer to as "belonging uncertainty," a feeling that "people like me don't belong here" and that "contributes to racial disparities in achievement." Individuals from minoritized groups and first-generation college students, who have often been marginalized in society, may feel such belonging uncertainty on a college campus; creating an atmosphere of belonging has a crucial, lifelong impact on students' lives.

In fact, belonging uncertainty may impact students even before their second semester, at the inflection point of determining whether they will continue with college. Social and academic integration, the root of classroom community and belongingness, plays a significant role in persistence and retention. Tinto (2017) emphasizes that a sense of belonging is a key factor in determining student persistence, and that the chances of completion increase when "students come to see themselves as a member of a community of other students, academics, and professional staff who value their membership." Being part of this community increases the student's confidence and motivation

to engage, another significant factor related to persistence. Based on a National Survey of Student Engagement, Kuh (2007) asserts that engagement, defined as "the time and energy that students devote to their studies and other educationally purposeful activities" has a positive impact on grades, persistence, and success. Building community is a significant part of increasing student engagement, and Kuh (2007) emphasizes that the classroom should be "the locus of community" that focuses on cooperative learning and other community-building activities. For community colleges, it is particularly important that classrooms of all modalities promote engagement and belonging, as a myriad of responsibilities often prevents students from seeking additional ways of engaging with the college.

To create a community that instills a sense of belonging and ultimately leads to student success, the classroom – online and otherwise – must become a safe space where students feel a level of comfort and feel empowered to voice equity concerns (Hamilton & Reis, 2005). The ideal classroom could be a "public homepage," described as "places where people support each other's development ... members go on working to make the whole society more inclusive, nurturing, and responsive to the developmental needs of all people – but most especially to those who have been excluded and silenced" (Belenky, Bond & Winestock, 1997, cited in Hamilton & Reis, 2005). To accomplish such a homelike acceptance in an educational setting, faculty should play the role of community builders in the classroom where they "create an agenda for learning, common caring and grace; support voice, visibility, and sense of mattering; and help community members discover individual and shared possibilities" (Roper, 2020). There are several strategies and techniques that can build such a sanctuary in a virtual environment, a sanctuary where students feel seen and heard and know that they matter.

ONLINE

Community-Building Techniques

In his presentation on "Learning Communities in Times of Crisis," Roper (2020) stated that crises bring opportunities to "re-imagine, reinvent, and re-create." Using our experience from teaching learning communities and knowing the value of belonging to student success and retention, we worked from the start of the pandemic to "re-imagine, reinvent, and re-create" the online classroom as a refuge where students felt that they belonged and mattered as the world was in upheaval. To do so, we strove to create Garrison's "community of inquiry," which emphasizes the importance of "social presence," "cognitive presence," and "teaching presence" for a successful online learning experience (Garrison et al., 2000). We experimented with online techniques of building community, and in this section, we suggest variations on 3 practical techniques to build classroom community in the remote or online classroom of any discipline. Though these techniques are not new, we explore their usefulness in promoting community and relevance in remote and online classes after the dramatic shift in instruction during COVID-19.

STUDENT HALL OF FAME

One technique that can establish a community atmosphere between the teacher and students from the beginning of the semester is the student hall of fame. In the student hall of fame, the teacher selects examples of insightful student responses from recent assignments and compiles them in a presentation to share with students. The teacher may choose student work that illustrates a common or unique viewpoint, an exemplary solution to a problem, or any display of skill that relates to the course or assignment objectives. The presentation format could be as simple or creative as the instructor wishes. Adobe Spark and video messages have been our students' favorites. For examples, please see <https://express.adobe.com/page/ryR7dhF-WEyeSy/> (Farrar, 2022a) and <https://express.adobe.com/page/3Boc3phJx6zZv/> (Farrar, 2022b).

By highlighting examples to share with the whole class, students see a snapshot of how others are doing or feeling in the course. This helps them form a connection with their classmates and get a sense of their group that is often lacking at the outset in the online setting. Students often state that seeing peers' comments about the difficulties of an assignment validates their own feelings and makes them feel like they belong, realizing they are not the only ones overcoming challenges in the course. Likewise, when they see examples of their classmates' work, it can help them believe they are capable of doing it themselves and gives them a better understanding of the expectations for completing future assignments.

At the same time, students whose work is shared not only earn recognition for their exemplary work or ideas, but also see how their individual work contributes to a greater common goal in the class, by helping their classmates – through their academic and non-cognitive development – be more successful in the course. Thus, to help all students feel this sense of pride and community membership, it is important to include work from a variety of students and highlight contributions of those who may need some encouragement. Students who may especially get a boost from public recognition include those who are not typically praised in class, who experience stereotype threat, whose performance overall is not stellar, or who Barkley (2010) describes as "hav[ing] developed chronically low expectations and numbed acceptance of failure; [...] whose failure attributions or ability beliefs make them susceptible to learned helplessness in failure situations; [...] or] who are obsessed with self-worth protection." We assert that such students may have better outcomes with targeted and authentic praise through hall of fame acknowledgements.

Barkley (2010) mentions students from collectivist cultures, in particular, may not want to serve as models for their classmates, but we advise getting to know students as individuals over relying on cultural

However, it is necessary to observe that not all students respond to praise positively or wish to be publicly singled out for their work.

stereotypes. Instead, we recommend asking individual students their preferences about sharing their work in general and in relation to a particular assignment to avoid negative reactions or feeling pressured by the teacher-authority, as this is counter to the intention of the activity and would work against building supportive relationships and classroom community.

As alternatives, we offer 2 other methods for implementing this technique. One method is to allow students to recommend others for inclusion in the next hall of fame, which may promote a feeling of connection and active reading of classmates' work. Some professors offer small incentives, such as bonus points, for nominating classmates to increase student participation and motivation. This option could also work well in assigned groups for larger classes, where students view and recommend others from within their smaller groups instead of looking at many contributions from the whole class. Another option is to have students choose something they are proud of from their own work to share with the class, as in Barkley's gallery of achievement (Barkley, 2010). This puts students in more control of what they share and promotes reflection and evaluation of their own work.

However the hall of fame is applied – and indeed, it should be applied with student preference and comfort in mind, and the teacher should ensure that all students are acknowledged – this activity can provide students with the experience of "mattering" as Strayhorn (2018) and Roper (2020) express is necessary to create a sense of belonging. Students realize that their work is valued by the group. The online classroom becomes the "public homespace" where the teacher and students "support each other's

development" (Belenky et al., 1997) and acknowledge each other's wins. The hall of fame, like our next activity, discussion boards, can each play a role in creating an online "public homespace" by giving voice to "those who have been excluded and silenced" (Belenky et al., 1997).

ALTERNATIVE DISCUSSION BOARDS

A second technique to start building community early in the course and deepen it as the semester continues is the discussion board. This well-established online activity incorporates the 3 community of inquiry components of teaching presence, social presence, and cognitive presence (Garrison et. al, 2000) to develop the sense of community in asynchronous courses (Covelli, 2017). Early in the course, discussion boards are a useful tool to build the foundation of classroom community: an environment where "students are comfortable, feel welcome, and can connect with others" (McKenna et al., 2022). From the first post in which students introduce themselves, instructors should promote interactions that help the learners develop close relationships in the course. Later discussion boards can then build a deeper level of community that facilitate student engagement in more "rigorous discourse and dialogue, and build[ing] camaraderie through participation in casual, or nonformal, social interactions" (McKenna et al., 2022). In this way, discussion boards pose an ideal balance of social and academic integration necessary for community and belonging in the online classroom.

McKenna et al. (2022) identify the key elements of discussion board structure for instructors to consider as the prompt, expectations and guidelines, incentives for participation, instructor facilitation and guidance, and tone of the interactions and argue that "social

ONLINE COMMUNITY BUILDING TECHNIQUES

and/or personal content, internal references, and personable/casual tone" in the discussion posts are indicative of classroom community. In particular, prompts should be "thought-provoking, open-ended, and [permit] many correct answers." We recommend providing guidelines that encourage substantial responses to classmates, sharing personal experiences, problem solving, and advice.

However, with many classes shifting online or increasing the asynchronous online component, it is easy for students and faculty to experience discussion board overload. To counter this, there are several alternatives to traditional discussion boards that faculty could offer to breathe life back into this valuable course component. Some possibilities, which are addressed in more detail below, include changing the nature of the prompt and using media-based discussion.

REFLECTIVE DISCUSSIONS

The objective of traditional discussions is often to engage with the course content, with a secondary objective of class interaction. However, traditional discussions can result in superficial or formulaic interactions instead of the academic and social integration that builds classroom community. An alternative that suited us well during the pandemic was reflective discussions such as the following:

Please take a few moments to reflect on your learning and experiences this week. You may write or record your responses. Check that your answers are clear and thoroughly explained.

1. Finish the sentences. "I used to think" and "Now I think."
2. What was most interesting or helpful about this week's class?

3. What was something challenging or unclear about this week's materials/assignments and why?
4. Respond to at least 2 of your colleagues with polite, insightful, and helpful comments that further the conversation. Add new and specific ideas in each post.

Reflective discussion boards provide students the opportunity to share knowledge, offer help, and uplift one another. For example, Student G responded to a classmate, "I know that essay writing is difficult if you don't know how to organize them. It wasn't easy for me to but I scheduled and met a writing tutor. She told me how to organize my work, next time you can schedule and see one of the tutors. They will direct you on what to do." In this reply, Student G connected with her classmate by revealing her own challenges with the week's assignment, identified a specific area that her classmate may have been struggling with (essay organization), recounted a positive experience with a campus service, and encouraged her classmate to seek support. In another response, Student K posted, "I totally agree with you. I had no idea that there were various rules for citing other people's writing. Anyway, this class was very helpful for me, knowing the rules to use when citing other people's writing. I also received a lot of feedback from my teachers and thought I should review and check what I had studied so far."

He shared that he had similar insights as his classmate about the expectations for citing sources from the week's course materials, practice activities, and assignment feedback that led him to transform his thinking and revise his previous work. He also showed his appreciation for his classmate's ideas, commenting, "Thank you so much for letting me read something that resonates with me."

ONLINE COMMUNITY BUILDING TECHNIQUES

Perhaps most importantly, interactive discussion boards provide opportunities for students to become friends without ever having met in person. In one of Student S's responses, she liked that discussion boards allowed students to "share our knowledge and understand each other" and added that "it is a good area where we can make friends." Through these interactions, students see that they are not alone in their challenges and their classmates will support them, eliminating feelings of belonging uncertainty (Walton & Cohen, 2007). As evidenced above, these interactions build their social capital and sense of belonging.

Discussion boards can provide a safe space in an online class, where students can build friendships with a diversity of peers as they share information about their own cultures and backgrounds. Strayhorn (2018) suggests that sense of belonging increases when students are "socializing with peers whose backgrounds may differ from their own." As Student L commented to a classmate in one discussion board, "[I]t is really interesting to know about your country's ethnic groups and language. This is one of the best things of our class to know about each other language and culture." Kay et al. (2011) found in their interviews with award-winning professors that community encourages exposure to alternative viewpoints and exposes students to in-depth sharing that involves feeling both safe and challenged. As a result, discussion board prompts can provide impactful opportunities for students to share their background and experiences (according to their comfort level) which gives them "voice [and] visibility" (Roper, 2020).

MULTIMEDIA DISCUSSIONS

In discussions where students work on course content or assignments, alternatives to the traditional text-based fora may rely on multimedia to add richness. Covelli (2017) notes that in general, "audio and visual elements [...] add texture and personal elements to the discussion [...] and] work to humanize the classroom." Many options exist for incorporating multimedia. Students could find or create images or music and explain its connection to the course content. They could include videos or create screencasts. They could create word clouds or present work in Adobe Spark or Microsoft Sway to add visual interest. Some learning management systems (LMSs) have options for audio and video recordings directly in the discussion forums or students can upload recordings or link to other sites. Beyond the LMS, there are many easy-to-use websites where multimedia discussions can take place, such as Flipgrid, VoiceThread, Padlet, and Jamboard. Recent research from a variety of disciplines (e.g., Chen & Bogachenko, 2022; Delmas, 2017; Erickson, 2020; Isidori et al., 2021; Kirby & Hulan, 2016; Lowenthal & Moore; Stamps & Opton, 2019; Yeh et al, 2022) has shown these platforms, especially Flip and VoiceThread, to be more effective at creating classroom community and more preferred by students than text-based discussion boards within the LMS.

With this video software, students can record videos of themselves, their screen, or both; they can also view and comment on each other's video recordings. One of the major advantages of GoReact is that the instructor and classmates can make multiple comments throughout the video so that the feedback corresponds directly with a specific time in the video.

One platform that can be integrated into online courses is

GoReact

This platform can be integrated into the LMS so that students don't need to login to another site; they can record and view videos all within the LMS.

For example, students in an online ESOL course created and recorded presentations to show their learning from a module about laugh therapy. One student shared his love of the cartoon Tom & Jerry in his presentation and advised the class to watch silly cartoons like this. One of his classmates commented "I like the examples of your advice. Tom & Jerry is one of my favorite cartoons when I was a kid. It really helps in making laughter." Here the students connected on a personal level.

GoReact is especially useful for screen casting and giving multiple comments, but students can also utilize the audio or video options built into the LMS discussion board, like in this example from an online ESOL course:

In this discussion board, you will record yourself asking and answering questions using this module's vocabulary.

- Choose ONE of the module vocabulary words and create a question for your classmates using that question. For example, if I choose the word "benefit," I could create the question: "What are some benefits of taking this ESOL class online?"
- Record yourself reading your question. You can make an audio or video recording right here in the discussion board. Go to Add Attachments > Record.
- Lastly, listen and reply to at least 2 of your classmates' questions. Again, record your responses to your classmates.

In this example, students share images to connect to course content and with each other. To activate our background knowledge about our new laugh therapy module, please create a post in which you:

Beyond audio and video, students can also connect through personal pictures.

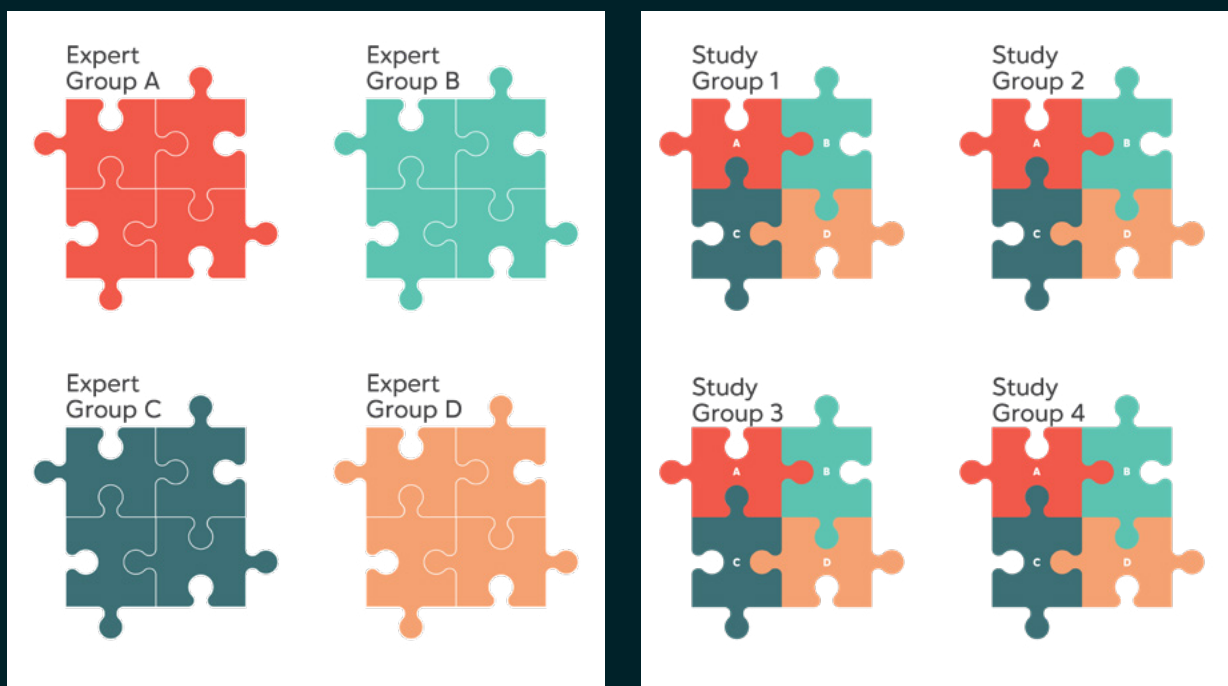
1. Share a picture of you, your family, or your friends smiling, laughing, or happy. Or share a more general picture of a happy time. Describe the picture and explain the feelings related to the event or time in the picture.
2. Discuss how you feel when you look at this picture.
3. Discuss the effects of smiling and laughing on your body and mind.
4. Reply to at least 2 classmates with meaningful responses that show you connected with their ideas or picture.

Before offering multimedia discussions, it is important to think about their impact on all learners. Accessibility should be a primary concern when choosing alternative discussion boards, so as not to inadvertently alienate/exclude any members of the class. All images should have alt text, audio clips should have transcripts, and videos should have captions. The major LMSs have built-in accessibility checkers to assist with this, although they may not check all forms of multimedia; some external platforms, such as VoiceThread, have accessible versions. In accordance with universal design for learning (CAST, 2018), we suggest offering choices for expression and communication so learners can participate in ways that best meet their preferences and needs. Ultimately, paying close attention to accessibility will contribute significantly to a sense of community and belonging through the use of multimedia.

Whether through reflective or content-focused discussions, online fora are activities that "cultivate an atmosphere in which a group of strangers will listen attentively to others with respect, and challenge and support one another to previously unimagined levels of academic performance" (Kuh, 2007). In addition to the many benefits for students, these alternative discussion forums are inspiring and rejuvenating for faculty as we watch these students develop authentic voices and achieve new academic heights.

Jigsaw

One all-time favorite collaborative technique that strengthens relations among diverse groups (Williams, 2004) and promotes deeper community in the classroom is the jigsaw. In this 2-stage activity, illustrated in Figure 1, students first work in "expert" groups and later form "jigsaw" groups.



One all-time favorite collaborative technique that strengthens relations among diverse groups (Williams, 2004) and promotes deeper community in the classroom is the jigsaw. In this 2-stage activity, illustrated in Figure 1, students first work in "expert" groups and later form "jigsaw" groups.

Figure 1. This demonstrates the basic concept behind the jigsaw activity. Students begin in "expert groups," with each group responsible for a specific section of the material. The students then move into new study groups with one student from each expert group.

STAGE 1: EXPERT GROUPS

In the first stage, each expert group is assigned different content, and students work with their expert group to help each other fully understand the material. For example, they complete a reading on a particular topic and make sure everyone in the group is comfortable explaining that topic or sharing ideas from the source with someone who has not read it, which leads to the next step of the activity.

STAGE 2: JIGSAW GROUPS

For the second stage, the expert groups disband, and one member from each expert group convenes to form a new jigsaw group. Here, they share their expert group content with students from each of the other expert groups. In this way, all the students are exposed to all the topics from the first stage of the activity.

To support motivation, there should be a task after the learning occurs in the jigsaw groups for which students need the information from all expert groups. At a minimum, students could complete a worksheet filling in information about each topic or take a quiz, but ideally students would use the information for a new and more substantial or authentic purpose either individually or with their jigsaw groups. Barkely (2019) suggested that it may also be helpful to have a class debrief or survey after the jigsaw activity to solicit student reactions and to improve future jigsaws. See Figure 2 for an example of a graphic organizer used for a reading jigsaw activity.

Jigsaws adapt well to remote and online learning. For remote synchronous instruction, breakout rooms are an ideal way to form different groups. In these rooms, students can screenshare to collaborate on the task.

Jigsaw Reading Activity

- Part 1: Work with your group to become the experts on your assigned reading. Fill in the main idea and key supporting details with your expert group for your reading only.
- Part 2: In your jigsaw group with others who worked on different readings, fill in the rest of the chart. Each person explains the main idea and key support for their assigned reading. Think individually whether you agree or disagree with the author. Together try to find connections.

Please write the name of the readings in the boxes below.	Main Idea: What is this reading mostly about? Think about the topic (general subject) and the author’s claim, or most important point, about that topic.	Key supporting details.	Your thoughts: Do you agree or disagree with the author’s claim(s)? Why?	Synthesis: Explain how the ideas in the texts are connected.
Reading 1:				
Reading 2:				
Reading 3:				

JIGSAW groups

In an asynchronous course, teachers can assign groups through a tool in the LMS or through discussion boards or wikis. For either synchronous or asynchronous modalities, expert group members can fill in a shared cloud document that they each use in their subsequent jigsaw groups.

There are several reasons why jigsaw readings are an excellent activity for both community building and learning. For one, students are well supported in their expert groups. They have opportunities to talk through the material, pose questions to their groupmates, brainstorm ways of teaching their content, and rehearse their explanations and examples before meeting their jigsaw groups. Second, teaching and interacting are effective ways to learn. Each student is responsible for teaching others in the jigsaw group which "requires an understanding of the subject matter beyond surface learning" (Barkley, 2010). Thus, each student is in a situation where the jigsaw group is relying on them to share the information and answer their questions. They are also responsible for the information shared by other jigsaw group members, so they should be encouraged to ask clarifying questions and make connections to content from other expert groups. Since everyone must share their expert group's content, success depends on no one member of the jigsaw group dominating the discussion. Through these "positive, non-superficial interactions with others" (Williams, 2004), students recategorize classmates from other backgrounds into their in-group, improving their view not only of the individual classmate but of that classmate's racial-ethnic group altogether.

Third, students remain engaged in the jigsaw group, as the information is different from what they have already worked on, but necessary to complete their final task. In the end, they have worked actively with their teams, achieving both a sense of communal success and personal contribution to the group, making jigsaws a technique that promotes an advanced level of classroom community (McKenna et al., 2022) and interdependence (Barkley, 2010; Tomaswick, 2017). In Chang and Benson's (2020) study of using jigsaws on cloud platforms, they reported positive effects on classroom community stemming from "collaboration in terms of group learning, individual learning in a group, and social connectedness." In addition to building deeper community, such an activity lends itself well to developing critical thinking skills such as communication, problem solving, analysis, and synthesis.

The techniques discussed in this review—the hall of fame, alternative discussion boards, and jigsaws—are 3 class activities that can be used to foster community, belonging, and persistence throughout a course in any discipline or modality. Such activities can and should be continued post-pandemic in the important effort to provide refuge from the ongoing challenges in students' lives.

Conclusion

"Positive interpersonal, peer interactions increase students' sense of belonging and sense of belonging to student success so those charged with increasing college student success should think just as much about campus climate and policies governing social interactions as they do about predictive analytics, intrusive advising, curricular alignment, and early alert systems. It all really matters"

(Strayhorn, 2018).

Strayhorn mentions measures to strengthen student success that many of our colleges are implementing, yet there is no single remedy for magically increasing completion and retention. Creating community and belonging is a significant step towards achieving the goals not only of institutions but, more importantly, of individual students. For community college students who face competing demands in their lives and who may encounter an unkind world, a safe, respectful, and accepting classroom—whether online or in-person, during the pandemic or after—can have a tremendous impact on their success. In this article, we have shared our research and experience with online techniques which can be applied to a variety of disciplines and contexts. Suggestions for future research include the lasting impact of the COVID-19 pandemic on community, belonging, and persistence in higher education in all modalities; the correlation between success rates and classroom community in general and in online courses in particular; and other pedagogical techniques and technologies that can be used to foster social and academic integration in synchronous and asynchronous online classrooms.

At our Panera meeting on March 10, 2020, we began discussing online curricula that ultimately extended far beyond cognitive learning, with an emphasis on community and belonging during a time of social upheaval. Three years later, while working on this article, we met at Indian Delight restaurant in Catonsville, Maryland. As we enjoyed Indian specialties and delighted in each other's company, we felt the comfort that resulted from our past interactions and shared experiences, the same feeling we wish for our students. After all, logging onto an online class should be as welcoming for our students as sitting down with friendly colleagues over a tasty treat!

ACKNOWLEDGEMENTS

We thank our colleagues in CCBC's Accelerated Learning Program, whose reflective discussion board prompt we adapted for use in ESOL and subsequently included in this publication. Additionally, we acknowledge CCBC's Faculty Scholarship Group, whose members provided valuable feedback on an early draft of this manuscript. Your suggestions helped us refocus and strengthen our work and find an appropriate outlet. We

REFERENCES

1. Barkley, E. F. (2010). *Student engagement techniques: A handbook for college faculty*. Jossey-Bass.
2. Belenky, M. F., Bond, L. A., & Weinstock, J. S. (1997). *A tradition that has no name: Nurturing the development of people, families, and communities*. Basic Books.
3. CAST (2018). *Universal Design for Learning guidelines version 2.2*. <http://udlguidelines.cast.org>
4. CCBC Quick Facts (2022). <https://www.ccbcmd.edu/About-CCBC/Administrative-Offices/Administrative-Services/Planning-Research-and-Evaluation/CCBC-Facts.aspx>
5. Chang, W. L., & Benson, V. (2020). Jigsaw teaching method for collaboration on cloud platforms. *Innovations in Education and Teaching International*, 59(2), 1-13. <https://doi.org/10.1080/14703297.2020.1792332>
6. Chen, J., & Bogachenko, T. (2022). Online community building in distance education: The case of social presence in the Blackboard discussion board versus multimodal VoiceThread interaction. *Journal of Educational Technology & Society*, 25(2), 62-75. https://www.j-ets.net/collection/published-issues/25_2#h.sltbgvz0bqgc
7. Covelli, B. J. (2017). Online discussion boards: The practice of building community for adult learners. *Journal of Continuing Higher Education*, 65(2), 139-145. <https://doi-org.ccbcmd.idm.oclc.org/10.1080/07377363.2017.1274616>
8. DeAngelo, L. (2014). Programs and practices that retain students from the first to second year: Results from a national study. *New Directions for Institutional Research*, 2013(160), 53-75. <https://doi-org.ccbcmd.idm.oclc.org/10.1002/ir.20061>
9. Delmas, P. (2017). Using VoiceThread to create community in online learning. *TechTrends: Linking Research & Practice to Improve Learning*, 61(6), 595-602. <https://doi-org.ccbcmd.idm.oclc.org/10.1007/s11528-017-0195-z>
10. Erickson, D. C. (2020). VoiceThread. *Teaching Theology & Religion*, 23(4), 299-301. <https://doi-org.ccbcmd.idm.oclc.org/10.1111/teth.12571>
11. Farrar, J. (2022a). "Great Work." <https://express.adobe.com/page/ryR7dhF-WEyeSy/>
12. Farrar, J. (2022b). "Module 1 Reflections." <https://express.adobe.com/page/3Boc3phJx6zZv/>
13. Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2), 87-105. [https://doi-org.ccbcmd.idm.oclc.org/10.1016/S1096-7516\(00\)00016-6](https://doi-org.ccbcmd.idm.oclc.org/10.1016/S1096-7516(00)00016-6).

14. Hamilton, C., & Reis, J. L. (2005). Nurturing the 'whole person': The learning community experience as a safe space. *Learning Communities and Educational Reform monograph series*, (Summer 2005), 49-59. <https://wacenter.evergreen.edu/diversity-educational-equity-and-learning-communities>
15. Isidori, E., Magnanini, A., Fazio, A., Leonova, I., De Martino, M., & Sandor, I. (2021). Developing reflective skills in e-learning: A case study based on the Flipgrid platform. *ELearning & Software for Education*, 1, 423-429. <https://doi-org.ccbcmd.idm.oclc.org/10.12753/2066-026X-21-053>
16. Kay, D., Summers, J. J., & Svinicki, M. D. (2011). Conceptualizations of classroom community in higher education: Insights from award winning professors. *Journal of Ethnographic & Qualitative Research*, 5(4), 230-245.
17. Kelleher, P. (2022). *CCBC demographic analysis* [Unpublished manuscript]. Community College of Baltimore County.
18. Kirby, E. G., & Hulan, N. (2016). Student perceptions of self and community within an online environment: The use of VoiceThread to foster community. *Journal of Teaching and Learning with Technology*, 5(1). <https://doi-org.ccbcmd.idm.oclc.org/10.14434/jotlt.v5n1.19411>
19. Kuh, G. D. (2007, June 15). How to help students achieve. *The Chronicle of Higher Education*, 53(41). <https://www.chronicle.com/article/how-to-help-students-achieve/>
20. Lowenthal, P. R., & Moore, R. L. (2020). Exploring student perceptions of Flipgrid in online courses. *Online Learning*, 24(4), 28-41. <https://doi-org.ccbcmd.idm.oclc.org/10.24059/olj.v24i4.2335>
21. Maestas, R., Vaquera, G. S., & Zehr, L. M. (2007). Factors impacting sense of belonging at a Hispanic-serving institution. *Journal of Hispanic Higher Education*, 6, 237-256. <https://journals.sagepub.com/doi/10.1177/1538192707302801>
22. McKenna, K., Altringer, L., Gebhardt, K., & Long, M. G. (2022). Promoting meaningful interaction and community development through discussion board activities in the online classroom. *Journal of Educators Online*, 19(1), 94-112.
23. Osborne, D. M., Byrne, J. H., Massey, D. L., & Johnston, A. N. B. (2018). Use of online asynchronous discussion boards to engage students, enhance critical thinking, and foster staff-student/student-student collaboration: A mixed method study. *Nurse Education Today*, 70, 40-46. <https://doi-org.10.1016/j.nedt.2018.08.014>
24. Roper, L. (2020, Oct 23). *Learning communities in times of crisis* [PowerPoint slides]. Washington Center Collaborative. <https://app.slack.com/client/T0164QTAQNS/C01BQSUR552>

25. Stamps, A., & Opton, L. L. (2019). Utilizing VoiceThread technology to foster community learning in the virtual classroom. *The Journal of Nursing Education*, 58(3), 185. <https://doi.org/10.3928/01484834-20190221-12>
26. Strayhorn, T. L. (2018). *College students' sense of belonging: A key to educational success for all students*. Routledge.
27. Tinto, V. (2017). Reflections on student persistence. *Student Success*, 8(2), 1-8. <https://doi.org/10.5204/ssj.v8i2.376>
28. Tomaswick, L. (2017). *Active learning – jigsaw*. Kent State University Center for Teaching and Learning. <https://www-s3-live.kent.edu/s3fs-root/s3fs-public/file/Teaching%20Tools%20In%20a%20Flash%20-%20Jigsaw%20-%20Final.pdf>
29. US Census Bureau. (n.d.) *QuickFacts: Baltimore County, Maryland, 2021*. <https://www.census.gov/quickfacts/baltimorecountymaryland>
30. Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology*, 92(1), 82-96. <https://psycnet.apa.org/doi/10.1037/0022-3514.92.1.82>
31. Williams, D. (2004). Improving race relations in higher education: The jigsaw classroom as a missing piece to the puzzle. *Urban Education*, 39(3), 316-344. <https://doi.org/10.1177/0042085904263063>
32. Yeh, E., Choi, G. Y., & Friesem, Y. (2022). Connecting through Flipgrid: Examining social presence of English language learners in an online course during the pandemic. *CALICO Journal*, 39(1), 26-52. <https://doi.org/10.1558/cj.19647>

TALES

AUGUST 2023 | VOLUME 3



CCBC

ccbcmd.edu