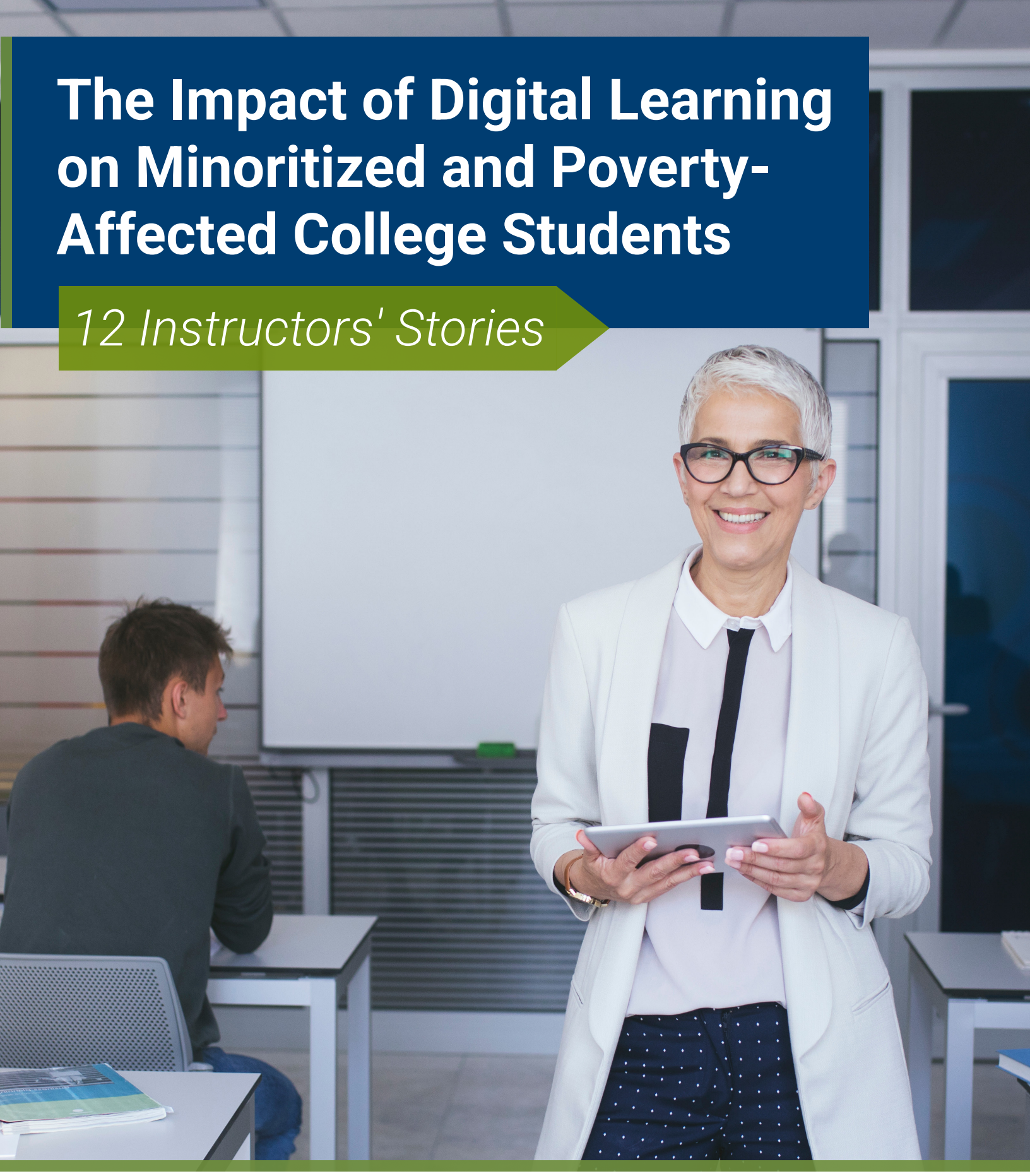
The Impact of Digital Learning on Minoritized and Poverty-Affected College Students

12 Instructors' Stories



everylearner everywhere

ACKNOWLEDGMENTS

Thank you to the following instructors for contributing their stories and expertise:

Stephanie Baxter
Lisa Dierker
April Crenshaw
Mary Robinson
Nicholas Panasik Jr.
Camila Alvarez
Stacy Ybarra Evans
Anne Prucha
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ABOUT EVERY LEARNER EVERYWHERE

Every Learner Everywhere is a network of partner organizations with expertise in evaluating, implementing, scaling, and measuring the efficacy of education technologies, curriculum and course design strategies, teaching practices, and support services that personalize instruction for students in blended and online learning environments. Our mission is to help institutions use new technology to innovate teaching and learning, with the ultimate goal of improving learning outcomes for Black, Latino, and Indigenous students, poverty-affected students, and first-generation students. Our collaborative work aims to advance equity in higher education centered on the transformation of postsecondary teaching and learning. We build capacity in colleges and universities to improve student outcomes with digital learning through direct technical assistance, timely resources and toolkits, and ongoing analysis of institutional practices and market trends. For more information about Every Learner Everywhere and its collaborative approach to equitizing higher education through digital learning, visit everylearnereverywhere.org.

Recommended Citation

O'Sullivan, P. and Forgette, C. (2024). The Impact of Digital Learning on Minoritized and Poverty-Affected Students: 12 Instructors' Stories. Every Learner Everywhere. https://www.everylearnereverywhere.org/resources/the-impact-of-digital-learning-on-minoritized-and-poverty-affected-college-students-case-studies

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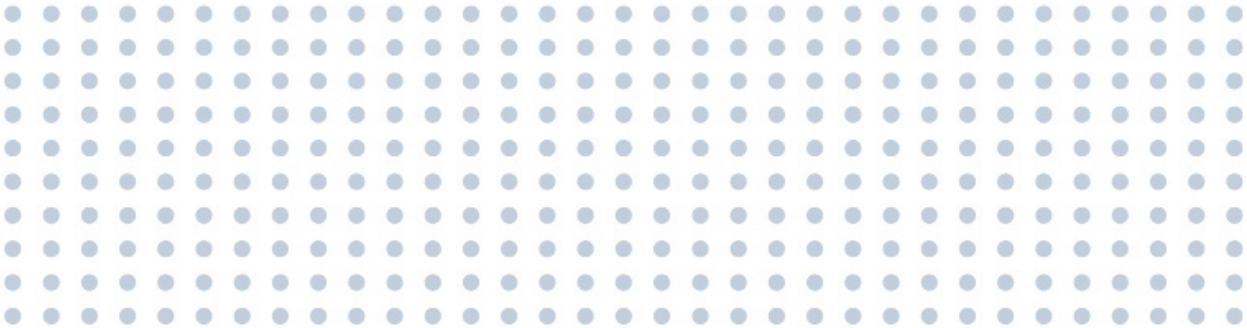
INTRODUCTION

Equity in higher education is a cornerstone for student success, but its benefits extend far beyond the campus walls. Essentially, initiatives that center around equity aim to increase access, affordability, and degree completion for minoritized college students. Equity practices help establish a level playing field so all students can excel. Additionally, equity has been linked to increased student engagement, motivation, and academic success. The 2022 Student Experience Project reports that college learning environments and teaching practices intentionally aimed at equity helped all students achieve increased motivation, trust, identity, and sense of belonging, and were particularly advantageous for students from structurally-disadvantaged backgrounds. Equity practices in higher education continue to pay dividends post-college, as graduates have more opportunities for economic mobility. The U.S. Department of Education's Raise the Bar initiative notes that most higher-paying jobs in the U.S. require successful completion of some form of higher education. A diverse college graduate population contributes to a more diverse workplace and strengthens democratic institutions by growing an engaged and active citizenry.

Every Learner Everywhere's online resource, "The Impact of Digital Learning on Minoritized and Poverty-Affected College Students: A Literature Review," examines the effectiveness of digital learning in decreasing equity gaps and the impact of digital learning on specific student populations, particularly those who identify as Black, Latino, and Indigenous as well as first-generation students and those affected by poverty. The resource offers a meta-analysis of research into the impact of learning practices on marginalized groups.

Data is key to designing quality learning practices in higher education. Data provides the means for personalizing learning, identifying learning gaps, assessing curriculum effectiveness, and improving feedback. For equity considerations, disaggregated data is essential. Disaggregated data can reveal hidden inequities that are obscured in aggregate sets and challenge assumptions about learning by revealing particular hurdles faced by minoritized students. Disaggregated data can also highlight intersectionality, the complex webs of identity that have an impact on how students learn. Because disaggregated data provides nuanced information, it can effectively guide resource allocation and identify those practices that are most effective for specific student groups.



12 INSTRUCTOR STORIES

In this new resource, 12 instructors from a variety of two-year and four-year institutions share their experiences adopting digital learning tools to promote equity and improve learning outcomes for historically marginalized and under-resourced students. These instructors detail the problems they were trying to address, their reasons for choosing specific tools, and students' response to those tools. Their narratives highlight successes as well as bumps in the road as they implemented digital learning tools into their teaching. Whenever possible, they provide data on student retention, pass rates, and engagement, as well as insights into student confidence and connection, particularly for students from historically marginalized populations.

Additionally, the first three instructors (Stephanie Baxter, Lisa Dierker, and April Crenshaw) composed their own first-person narratives, with light edits from Every Learner Everywhere to maintain continuity. Every Learner Everywhere adapted the remaining narratives from interviews with all 12 instructors completed in May 2024. Please note that characterizations of racial and ethnic groups vary throughout the case studies, as the contributors cite data collected by their individual institutions.

CASE STUDY A

Stephanie Baxter

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Jackson State University	Jackson, Mississippi	4-year public HBCU	Poll Everywhere

I have taught Quantitative Reasoning for three terms at JSU after helping create the course for the Fall 2022 semester. I adopted the digital learning tool Poll Everywhere during the Fall 2023 semester.

This tool is free for students to use, and I also used the free Higher Ed plan. This free plan limits responses to activities to 40, and fortunately my class size was under this limit. The students do not have to create an account, but simply enter their first and last name after scanning a QR code to access the activity. I chose Poll Everywhere over other digital quiz tools since it is timer optional and allows me to control exactly when to stop accepting responses and reveal answers. It also allows a wide variety of formats such as quizzes, informal polls, and surveys.

I adopted Poll Everywhere as an alternative to paper/pencil exit tickets. It allowed me to quickly assess what students successfully learned in a class meeting and what I may need to review in more depth in a later class. It also served to engage students and immediately apply the skills covered during the class. Students enjoyed the convenience of scanning a QR code and many commented that answering the questions helped cement their understanding of new material. Additionally, receiving immediate results gave me the opportunity to instantly correct misconceptions as needed. Another added benefit was the attendance tracking feature of the tool.

Not only did I see a significant decrease in failure rates for Quantitative Reasoning, I also observed an increased sense of community. Students were very likely to discuss the questions with a partner and took pride in getting a large overall class “correct” percentage for the Poll Everywhere activities. In previous semesters, the percentage of students failing this course were 31% (Fall 2022) and 50% (Spring 2023). This rate fell to 8% for the Fall 2023 semester after implementing Poll Everywhere (see Figure A.1). All three groups of students were 100% African American and non-STEM majors.

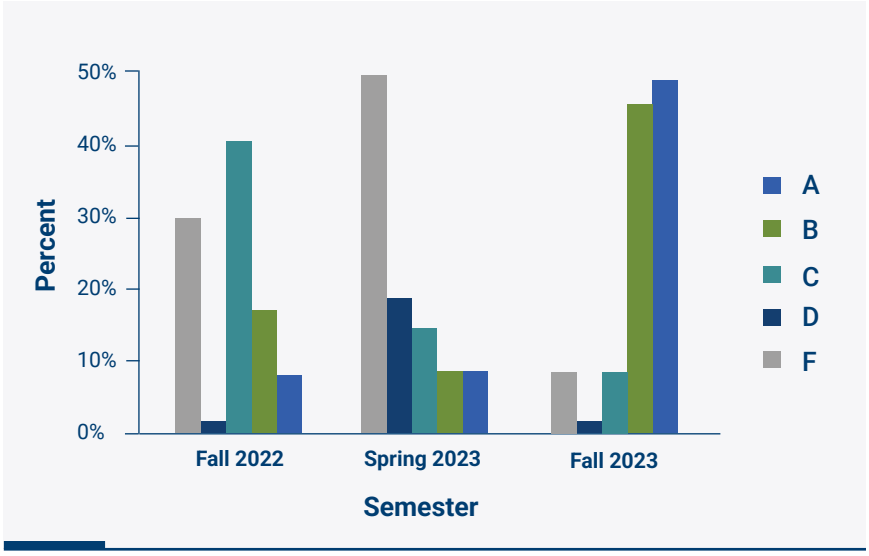


Figure A.1 Student grade percentage distribution in three semesters of Quantitative Reasoning

CASE STUDY B

Lisa Dierker

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Wesleyan University	Middletown, Connecticut	4-year private	SAS On Demand for Academics

SAS On Demand for Academics is a freely accessible version of a powerful statistical software suite used in a wide range of industries and careers. The SAS Studio interface provides students and instructors with completely free online access to this cloud-based platform. The tool helps instructors expose students to data-driven inquiry through frequency tables, crosstabs, means, graphs, and other descriptive statistical methods. We have used this for short data-driven projects in an introductory psychology course delivered to undergraduates at Wesleyan University and to dual enrollment Title 1 high school students through the National Education Equity Labs. In a full semester project-based statistics or research methods course, SAS Studio has been used at Wesleyan University and by our many academic partners in both secondary and post-secondary educational settings.

SAS was the ideal choice not only because it is a freely accessible, cloud-based software, but also because it is usable from a Mac, PC, ChromeBook, or any computer with a web browser. Nothing needs to be downloaded onto a local machine. As a code-based tool it provides students with the opportunity to develop fundamental programming skills. Even more empowering, because SAS is used heavily across industries, it gives students an introduction to this important skill set, providing them with an advantage upon entering the job market.

Our goal in integrating SAS into our curriculum was to enable students to develop applied data analysis skills both in courses that traditionally focus on data (e.g., statistics and research methods courses) and in introductory general education courses that rarely offer students an opportunity to develop this important skill set (e.g., introduction to psychology). We believed that providing exposure to a software platform that is widely used in industry and allowing students to explore questions that they are most interested in would better engage women and underrepresented students. We wanted to not only attract and retain a diverse student body, but also inspire students to pursue additional opportunities in the kind of advanced coursework that would further develop their applied statistical skills.

We have studied the use of SAS Studio and similar statistical software platforms extensively (in a software-based course) and compared its use to a traditional course curriculum covering similar concepts but in a traditional lecture-based format that excludes the use of software.[1] When examining demographic characteristics, both formats were similarly successful in enrolling White, Asian, and Hispanic students, students from public high schools, and those receiving financial aid. However, the software-based course attracted higher rates of Black students (12.7%) compared to the traditional course (8.7%); when this analysis was stratified by college class status, we found that the software-based course specifically attracted significantly higher rates of Black freshmen and sophomores (16.9%) compared to a traditional course (8.5%), but not higher rates of Black juniors and seniors. Further, the software-based course attracted students with lower average SAT scores in math compared to the traditional course.

When analyses were conducted based on under-represented (URM) student status (i.e., Black and/or Hispanic), URM students were found to be significantly more likely to enroll in the software-based course (24.0%) compared to the traditional course (15.7%). This finding remained significant after controlling for class status, gender, financial aid, public school attendance, and writing and critical reading SAT scores in logistic regression analyses. A significant interaction between URM and math SAT showed that the difference in math SAT scores for those enrolled in the software-based vs. traditional course was only found within the URM group (see Figure B.1). That is, the software-based course attracted URM students with significantly lower math SAT scores than the traditional course, but no differences were found in math SAT scores among non-URM students.

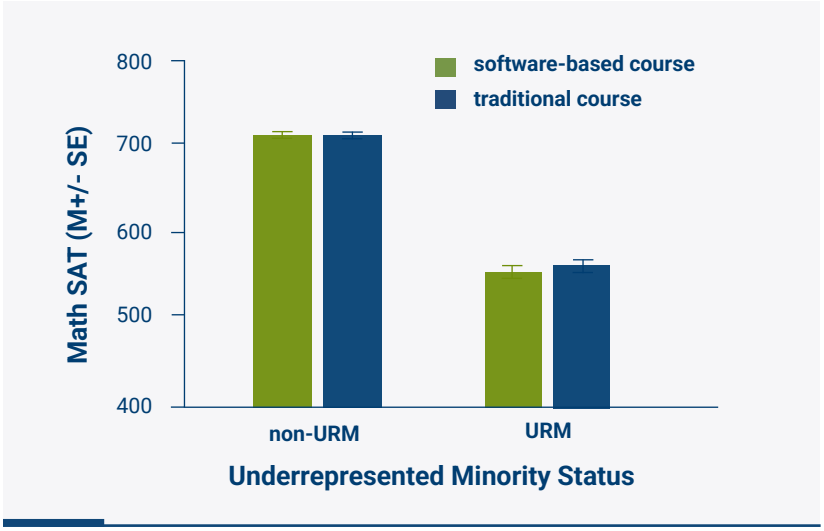


Figure B.1 Mean math SAT scores among students enrolled in the multidisciplinary, project-based course vs. the traditional introductory statistics course, by underrepresented student (URM) status

Once we established that a curriculum integrating SAS Studio and similar statistical platforms could attract a more diverse student body, we turned our attention to outcomes assessment and found that students enrolled in the software-based course had more positive course experiences and showed a greater likelihood of increases in confidence in managing data, choosing the correct statistical test, and writing syntax or code to run statistical analyses. They also showed greater interest in pursuing additional coursework in statistics and related topics.[2] When evaluating outcomes among those enrolled in the software-based course, we found that while URM students considered the material more difficult than non-URM students, URM students demonstrated similar levels of increased confidence in applied skills and interest in follow-up courses as non-URM students. URM students were also found to be twice as likely as non-URM students to report that their interest in conducting research increased.[3]

Finally, the software-based curriculum also promoted further training in statistics for both URM and non-URM students. Using causal inference techniques to achieve matched comparisons, we found that students originally enrolled in the software-based course were significantly more likely to take at least one additional undergraduate course focused on statistical concepts, applied data analysis, and/or use of statistical software (34.0%) compared to students taking a traditional course (25.5%).[4]

Within the software-based classroom, students respond well to SAS Studio when given the appropriate support, structure, and encouragement. It has been important that teachers feel confident and comfortable with the tool and share that comfort and confidence with their students. Once students overcome their initial fear of numbers and coding, many have found the experience with SAS to be very empowering.

Comments from past students as part of an anonymous course evaluation are shown below.

STUDENT COMMENTS ABOUT COURSE

"I have never felt so excited and motivated to be part of an academic environment as I have in this class. I am so proud of my work."

"Allowing students to pick from a study and data set to answer their own research question was effective because we became attached to our own projects, understood exactly why we were learning what we were learning, and wanted to know more."

"I really appreciated the fact that the material was accessible to students regardless of their major."

"Great class. I was expecting to hate it (and kind of did at a few points along the way) but ultimately thought it was really informative."

"I absolutely loved this class. Even though statistics is not necessarily exciting to learn, it is incredibly useful and the uniqueness of the project that I was doing kept me interested. I am not sure I have ever taken such a useful class, nor been so proud of my work."

"Though the structure of the class is unorthodox, the resulting education is priceless. Aside from teaching me the valuable process and application of statistical inquiry, this course taught me how to take initiative and start a scientific project that I can call my own."

In addition to teacher training and student support in the form of drop-in sessions, we have occasionally worked with the technology departments in some of our partner high schools to remove the SAS Studio web address from their firewall. This is easily resolved by simply adding the web address to the school's White List.

SAS provides extensive resources for instructors. Through funding from the National Science Foundation, we have also created freely available resources to support instructors in using SAS Studio and other statistical platforms that allow students to ask and answer the kind of data-driven questions that they are most interested in. Resources are available at Passion-Driven Statistics. We have developed a community of instructors who share additional ideas and resources through a devoted Canvas space. For access to this community, you may contact Lisa Dierker (ldierker@wesleyan.edu).

[1] Dierker, L., Cooper, J., Selya, A., Alexander, J., & Rose, J. (2015). Evaluating access: Comparing enrollment patterns in traditional versus multidisciplinary, project-based introductory statistics courses. Journal of Interdisciplinary Studies in Education, 4(1), 22–37. Retrieved from https://www.ojed.org/index.php/jise/article/view/1599

[2] Dierker, L., Flaming, K., Cooper, J., Singer-Freeman, K., Germano, K., & Rose, J. (2018). Evaluation impact: A comparison of learning experiences and outcomes of students completing a traditional versus multidisciplinary, project-based introductory statistics course. International Journal of Education, Training and Learning, 2(1), 16-28. DOI: 10.33094/6.2017.2018.21.16.28

[3] Dierker, L., Alexander, J., Cooper, J., Selya, A., Rose, J., & Dasgupta, N. (2016). Engaging diverse students in statistical inquiry: A comparison of learning experiences and outcomes of under-represented and non-underrepresented students enrolled in a multidisciplinary project-based statistics course, International Journal for the Scholarship of Teaching and Learning, 10(1), 1-9. https://doi.org/10.20429/ijsotl.2016.100102

[4] Nazzaro, V., Rose, J., & Dierker, L. (2020). A comparison of future course enrollment among students completing one of four different introductory statistics courses. Statistics Education Research Journal. 19(3), 6–17. https://doi.org/10.52041/serj.v19i3.53

CASE STUDY C

April Crenshaw

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Chattanooga State Community College	Chattanooga, Tennessee	2-year public	Microsoft Excel and Teams D2L Learning Management System MyOpenMath Online Homework System Lumen One Chat-GPT 3.5

Like many other institutions, students at Chattanooga State were struggling in Introductory Statistics courses, our highest enrollment general education mathematics course. Institutional data revealed that the average pass rate was roughly 60%, with rates significantly lower for historically marginalized, Pell-eligible, and first-generation students. To address this issue, two colleagues and I applied for a grant through the Tennessee Board of Regents to redesign the course using Open Educational Resources (OER).

Two of the four primary goals of our OER project were to improve student success rates in Introductory Statistics by fostering a greater sense of belonging for students and to improve student engagement. Defining school belonging as the degree to which students feel included, respected, and supported in our classrooms (Arslan, 2021), I am confident we have made significant progress towards achieving our goals with our course.

In an independent survey conducted by Digital Promise, 100% of participating students report feeling a sense of belonging in my Spring 2024 Introductory Statistics Course (see Figure C.1). Digital Promise uses a consistent definition of belonging, asking students about respect, encouragement, and the level of comfort in asking for support.

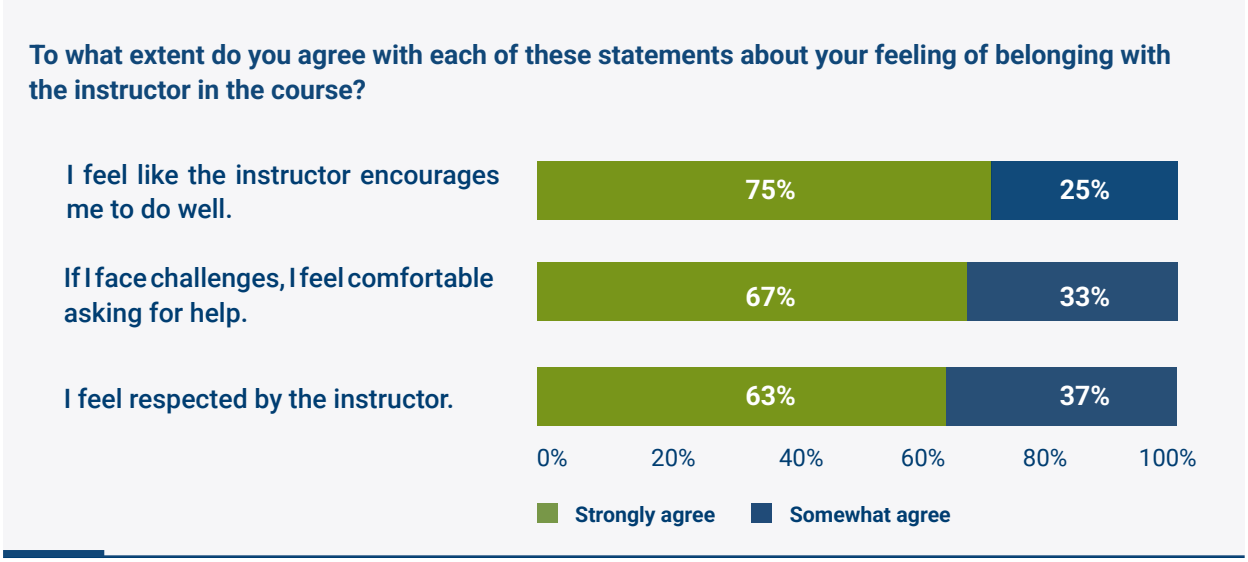


Figure C.1 Feeling of belonging in Spring 2024 Introductory Statistics

In my 18 years with the Mathematics Department at Chattanooga State, I have never seen attendance as strong and consistent as in my OER sections. This high participation indicates that students find value in our live meetings.

Students participate by answering questions and asking thoughtful follow-ups that go beyond the material presented. Their engagement with the content and willingness to think critically indicates that students find relevance in the information they are presented (see Figure C.2).

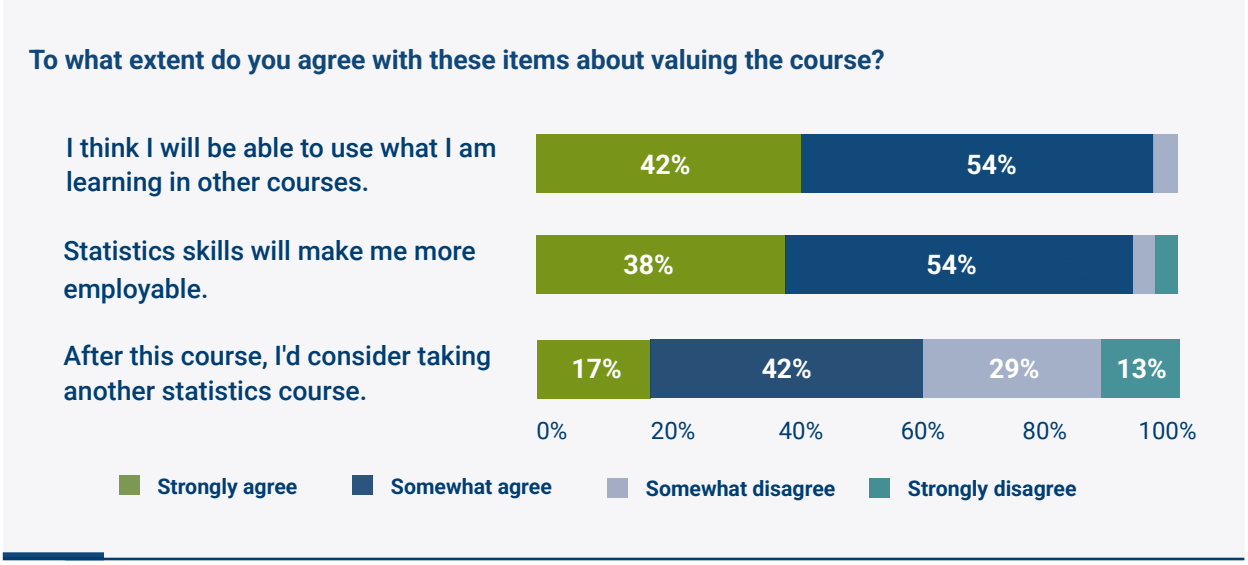


Figure C.2 Students value of course in Spring 2024 Introductory Statistics

Because students participated in daily collaborative activities, they readily formed working relationships with each other that extended outside the statistics class. This Spring 2024 class has been especially successful at building these connections. We are encouraged by this phenomenon, because peer support can be invaluable for struggling students reluctant to seek instructor help (Comfort & McMahon, 2014). Recognizing the value of peer support, we have included an embedded learning assistant in the course as well as a final group project.

Overall, the redesigned OER course has created a greater sense of community and engagement, and most responding students report feeling highly supported in the course. Professor and learning assistant level of help and support were rated an average of 4.13 out of 5 and 3.87 out of 5, respectively.

For Spring 2023, the overall success rate in my course was 86%. In Fall 2023, the success rate increased to 96%, and in Spring 2024, it was 91%. Across these semesters, regular attendance and high engagement were key contributors to the consistently high success rates..

A similar success rate was achieved by our team (with my two colleagues involved in the grant) in Fall 2023. Notably, success rate data from the Fall 2023 semester demonstrated an 83% pass rate in OER sections, significantly higher than the 69% rate in non-OER sections. Improvements in student success rates were most prominent among historically marginalized populations, first-generation students, and Pell-eligible students.

Statistics on success rates of historically marginalized populations in Fall 2023 are inclulded below.

- Black student success rate increased from **33%** to **67%**.
- Hispanic student success rate increased from **33%** to **78%**.
- Academically underprepared student success rate increased from **63%** to **77%**.
- Pell-eligible student success rate increased from **50%** to **72%**.
- First-generation student success rate increased from **45%** to **75%**.

The data from the Fall Credit Term 2023 presents an encouraging outlook for the adoption of Open Educational Resources. Despite a smaller pilot sample size, OER sections demonstrate higher success rates across nearly all categories compared to traditional sections, with the singular exception being students classified as "Other" in race/ethnicity. This particular data highlights the primary focus of the grant—historically marginalized groups, first-generation college students, low-income individuals, and those who are academically underprepared. For these groups, not only are success rates in OER sections higher, but they also show statistical significance with a two-tailed t-test at the level.

Furthermore, our intentional efforts to bolster support for our most vulnerable students do not detract from the support provided to our majority student groups. This is evidenced by the fact that the majority groups also see improved success rates, closely mirroring those of our target populations. Here, we underscore a key yet often misunderstood point about equity and inclusion: supporting students at the margins does not mean excluding, ignoring, or depriving those who are not. Inclusive teaching and equitable practices are not a zero-sum game; instead, they improve the educational experience for everyone when implemented with empathy and care. Scholars like Bowman (2013) have explored the nuanced effects of diversity in educational settings, suggesting a curvilinear relationship between college diversity interactions and first-year student outcomes. Ladson-Billings (1995) emphasizes that incorporating diversity and fostering a sense of belonging in our classrooms—to first engage our most vulnerable students and subsequently all students—is “just good teaching!” Both authors further validate the positive OER efforts as a blend of culturally responsive pedagogy and open educational practices (OEP).

This OER project was exciting because it provided a creative challenge outside my normal teaching routine. Free from a cookie-cutter course template, I could reimagine course activities, materials, and assessments. I felt empowered to build a statistics course centered on belonging, diversity, and equity along with relevant, thoughtful pedagogy that would engage students.

I integrated data from a variety of sources, including Statista, NOAA, CDC, NASA, and Times Free Press, to student interest. Along with learning basic Excel functions, students also set up free accounts on Canva and ChatGPT. While most were familiar with PowerPoint or Google Slides, only a handful had previously used Canva for presentations.

At the start of each semester, I found that nearly 90% of my students were unfamiliar with ChatGPT and did not have accounts. Recognizing this as a learning opportunity, I dedicated class time to

help students learn to navigate these platforms, which they then used for their research projects. At the end of the semester, students were proud to showcase their new skills on their resumes.

I adopted Microsoft Teams for collaboration, communication, file sharing, and virtual meetings. While I initially favored Zoom, two standout features convinced me to fully embrace Teams: 1) the efficient texting capabilities, and 2) the convenience of recording and posting lectures without having to manage email links or require students to set up separate accounts.

Teams proved especially beneficial for group projects. Each team could conveniently post shared documents in a shared folder, facilitating real-time collaboration. They were also able to schedule their own virtual meetings outside of class without my assistance. This independence fostered student autonomy, promoting proactive communication and collaboration. It streamlined group projects, encouraging valuable skills in teamwork and time management. Starting in Fall 2023, I switched to using Microsoft Teams for all my courses, not just the OER Introductory Statistics.

In the redesigned Introductory Statistics course, my approach to constructing assessments has evolved. Unlike the traditional tests in my other courses, here I refer to them as performance assessments. The focus is on demonstrating practical skills and critical thinking. For example, students might analyze an executive summary of a case study and respond to questions, or they could outline the steps I should take to conduct a student satisfaction survey.

My interaction with students is grounded in the concept of pedagogical partnership, as defined by Lumen Learning. Students and I work together to achieve their course goals. I support their journey by providing the specific assistance they communicate as necessary for their success within the condensed 7-week timeframe.

Though the workload has been very intense, the outcomes have been rewarding. I believe expansion of this redesign would allow those students to find success, as pilot data shows significant gains for our most vulnerable student populations.

> **“[Microsoft] Teams proved especially beneficial for group projects. ... This independence fostered student autonomy, promoting proactive communication and collaboration. It streamlined group projects, encouraging valuable skills in teamwork and time management. ”**

— April Crenshaw

CASE STUDY D

Mary Robinson

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Montgomery College	Montgomery, Alabama	2-year public	Microsoft PowerPoint Microsoft Word Blackboard LMS Discussion Post

Professor Mary Robinson wanted to improve assignment completion in her English 103 course. To address this concern, she adopted Microsoft Office tools and features in Blackboard LMS, the online platform adopted at Montgomery College. She chose these tools because they were available for students on classroom and college campus computers free of charge.

“Free access for students to complete their assignments eliminated a barrier to completion,” Robinson said. “The ability to teach the lesson in class using the same digital tool that the learners use contributed to students’ ease of understanding and development of the assignments.”

For example, in an assignment requiring them to make an audio pitch in PowerPoint, students had concerns about access to a microphone and hearing their own voice. Robinson introduced them to the voice recording capabilities of Microsoft’s PowerPoint and provided an OER resource on how to use this PowerPoint feature with student examples. That resource relieved student anxiety, and they responded positively to the PowerPoint tool, characterizing the outcome of their audio pitch assignment as “amazing” and “awesome.” They were also highly engaged with the design capabilities in PowerPoint and were able to develop high quality slides because of their access to the tool.

Robinson also found a combination of Blackboard reminders and Microsoft’s OneDrive cloud-based storage and sharing platform to be impactful for assignment completion. Robinson used the reminders feature to increase student awareness of deadlines and assignment requirements. Students used OneDrive to access their own work wherever they were and to collaborate with classmates within a shared document. Robinson found that the more expertise students developed in working in OneDrive, the fewer reminders she needed to send out. Students’ use of OneDrive enabled them to keep on task more efficiently and complete assignments more dependably.

“Although I only have observational data, my class engagement increased significantly in terms of assignment completion,” Robinson notes. “Once I introduced the lesson and students knew they had access to OneDrive and could use it anywhere, the number of reminders I had to send was reduced seven students to two students per week.”

“Students have a set amount of time to complete a lesson and free access to Microsoft Office tools helps them in completing their work,” Robinson says. “It’s a win-win for teachers and students.”

> **“The ability to teach the lesson in class using the same digital tool that the learners use contributed to students' ease of understanding and development of the assignments.”**
>
> — Mary Robinson

CASE STUDY E

Nicholas Panasik Jr.

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Claflin University	Orangeburg, South Carolina	4-year private HBCU	Flip Recorded Peer Teaching

Prior to the COVID pandemic, Dr. Nicholas Panasik Jr. used a videotaped peer teaching method to build community and increase course material retention in his biochemistry class. When Claflin University went online in response to the pandemic, Panasik began looking for a digital recording site to replace the video camera he had been using. Flip, formerly Flipgrid, fit the bill.

In Panasik's peer teaching method, the professor lectures on a topic over the course of a week. Then, students record themselves teaching that topic to the rest of the class in a 10 minute video. Next, the professor records himself watching their video, while pausing it to respond to students' comments. He then sends that feedback video to each student. If students earn an A grade in their video, he makes it visible for the rest of the class to see.

This peer teaching method has several benefits, according to Panasik. When students record themselves "teaching" the topic to others, they take time to learn the details of that week's topic and engage with the material to a greater extent. They also feel an increased sense of community in the classroom as students watch and learn from each other's videos.

Helping students engage with peer teaching is key to its success. Panasik chose Flip recording because it was user-friendly and enabled professor feedback videos to be easily uploaded. Flip is also free. Students sign into the site using their school credentials. Still, students were reluctant at first.

"Many were unsure of their speaking skills, let alone being recorded," Panasik explains, "But by doing this every week and through sharing a lot of video feedback from the professor—both on the content of the scientific answers in the course and on presentation and speaking style— students quickly gained confidence in their answers and their ability to speak about specifics in science."

The data support the success of Panasik's peer teaching method. On final exam questions with an associated peer teaching/Flip recording, students scored on average 12% higher relative to questions that had no associated peer teaching/Flip recording. In a pre- and post-class survey, students' self-identification as "science types" increased by 12%. In the post-class survey, 47% of students felt they received more one-on-one interaction with the professor through the use of peer mentoring/Flip than in an on-ground class. Furthermore, 72% of students said Flip helped them feel much more engaged..

Student comments on the survey reinforce the value of the peer teaching/Flip recording. Quotes from students as part of the anonymous course evaluation are included below.

STUDENT COMMENTS ABOUT FLIPGRID

"I think Flip was very helpful, simply because it's not just a professor lecturing and students taking notes, but students are actually applying the concepts in order to teach them to someone else. I also understood certain concepts better when my peers explained them than when the professor explained them."

"It [FlipGrid] is way more interactive, and it really helps during quizzes and exams. Most importantly, it is easier to recall and understand each topic in depth."

CASE STUDY F

Camila Alvarez

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Indian River State College	Fort Pierce, Florida	2-year public	Blackboard Collaborate

At Indian River State College, Integrated Reading and Writing Composition 1101 courses had significantly lower success rates than other English Composition 1 courses. Dr. Camila Alvarez hypothesized those rates stemmed from the larger number of under-resourced students in the Integrated Composition classes. Women make up 67% of the students in the course, even as they represent 61% of undergraduate enrollments. Fifty-seven percent of students in the course are Pell-Grant eligible, compared to 40% campus-wide. First-generation students make up about 46% of the class, compared to 37% campus-wide. Finally, Hispanic students comprise 32% of the class, compared to 17% campus-wide, and Black students make up 29% of the class versus 11% campus-wide.

Looking to diminish the disparity in success rates, Dr. Alvarez incorporated Blackboard Collaborate, a virtual classroom and recording software, into her Integrated Composition courses. This tool records the class and audio in real time. Students can join in the classroom or from home, and they can also watch the recordings asynchronously later. Students who are ill, have babysitting problems, or are experiencing other issues that don't allow them to attend class physically can attend the live sessions virtually or watch the recordings later. The recordings also give all students an additional chance to learn and retain information by rewatching the recorded sessions.

Alvarez chose Blackboard Collaborate for several reasons. First, the tool did not require students to subscribe or pay for access, as it was included in the college's Blackboard LMS. Alvarez also appreciated Blackboard Collaborate's simple setup and log-in procedures. Additionally, the tool easily tracked and shared recorded videos with students.

Alvarez found that students embraced the recordings and virtual meeting tools.

"Students were not required to use the tool. It was presented as an additional resource they could choose to use. But the students themselves encouraged the use of this tool by repeatedly requesting recordings and remote access to classes," Alvarez explains.

When Alvarez asked students how they made use of the recordings and virtual class sessions, they reported attending virtually when they were unable to participate physically, reviewing information after attending class to remind themselves of instructions, and gaining reassurance from hearing Alvarez's voice explaining assignments as they actively engaged with the work.

Success rates in the Integrated Composition classes incorporating the Blackboard Collaborate tool increased to 80%. Female, first-generation, and Pell eligibility statuses showed the greatest increases, from 59% in the overall Integrated Composition 1101 classes to 72% and 79% in Alvarez's classes that offered BlackBoard Collaborate. Female student success rates increased from 65% to 80%.

Alvarez notes that at the end of class several students (often the Hispanic, Haitian, and female students) requested access to the recorded sessions so they could rewatch the procedures she had demonstrated. "These students all performed better than their counterparts in the control courses. They also demonstrated greater confidence toward the end of the semester," Alvarez says. "They embraced a growth mindset."

CASE STUDY G

Stacy Ybarra Evans

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Our Lady of the Lake University	San Antonio, Texas	4-year private	Magic School AI

Stacy Ybarra Evans believes leveraging digital learning in college courses is vital for improving student learning outcomes. One tool Evans recently incorporated to address the concern of student engagement in her Learning Frameworks course is Magic School AI. Magic School AI is an AI-powered platform that helps teachers create personalized learning experiences for their students.

"I was particularly interested in Magic School AI's ability to generate personalized lesson plans and feedback to help me meet the needs of all of my students, regardless of their learning approach or pace," she notes.

Evans appreciates Magic School AI's ability to help her write clear, concise rubrics and guidelines for assignments, and those features prove just as useful for her students. Prior to adopting Magic School AI, Evans' students' average grade on formative assessments was 75%. Additionally, only 60% of her students completed all of the assigned homework assignments. Since she adopted the tool, her students' average grade on formative assessments has increased to 85%, and 90% of her students now complete all of the homework assignments.

"Students were particularly excited about the ability to personalize lesson plans and feedback," Evans says. "I also found that Magic School AI helped to improve student engagement and motivation, as well as their confidence in their work."

CASE STUDY H

Anne Prucha & Kacie Tartt

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
University of Central Florida	Orange County, Florida	4-year public	Realizeit

Traditional publisher content was not motivating or engaging students in the Elementary Spanish Language and Civilization courses that instructors Anne Prucha and Kacie Tartt teach at the University of Central Florida. Furthermore, although the first course in the sequence assumes no knowledge of Spanish, many students entering the course had some prior knowledge because they took Spanish in high school or were from Spanish-speaking families or neighborhoods, leading to varying levels of Spanish proficiency.

To combat those issues, Prucha and Tartt adopted Realizit, a Personalized Adaptive Learning (PAL) software application that allows Open Educational Resources (OER) to be incorporated into the curriculum.

“Not only do the redesigned courses enable students to progress through the material at a pace and level that are comfortable for them and reflects their prior knowledge, using OER allows us to curate and incorporate appropriate, relevant, and engaging content, and create and deliver meaningful practice and assessment,” Prucha and Tartt report.

The adoption of Realizit addressed other challenges students previously faced. The instructors found publisher content and courseware platforms were not always user-friendly or had frustrating technical problems. In the past, Prucha and Tartt also noticed students found the non-adaptive nature of the pre-PAL classes and the high cost of courseware to be a barrier to success academically and financially. Those obstacles negatively impacted student rates of Drop/Withdrawal/Fail, as well as student success and overall satisfaction. Those issues could discourage students from pursuing a major or minor in Spanish.

“By integrating PAL and OER content, we have created courses that are more personalized, engaging, and meaningful, accommodating the diverse backgrounds and prior knowledge of our students,” they explain. “The individualized learning path provided by PAL ensures that students can focus on areas where they need improvement, advancing at a pace that suits them.”

Cost was another factor that impacted students’ attitudes. Prior to the redesign with Realizit, textbook and courseware costs for the Elementary Spanish sequence were almost $300. But students in fully online classes at UCF have not had to pay for access to Realizit, and students in hybrid classes pay an average of $30.

The adoption of Realizeit paid dividends for instructors as well. Prucha and Tartt are able to monitor student progress more closely through the tool and intervene with success strategies.

“Something we desired but did not expect was the level of autonomy and flexibility we would have over the content and its delivery,” they said. “Using Adaptive Learning and Open Educational Resources helped us increase content relevancy where our students were concerned and allowed for any necessary additions, updates, and/or edits in real time. The ability to adapt material relative to changes in technology, academia, and even more broadly, societal shifts, is a welcomed change in our instruction.”

Data suggests that the adoption of Realizit has had a positive effect on student success. Independent t-test analysis indicates that minorities enrolled in PAL sections had a significantly higher proportion of ABC grades when compared to those prior to PAL/OER inclusion (see Figure H.1).

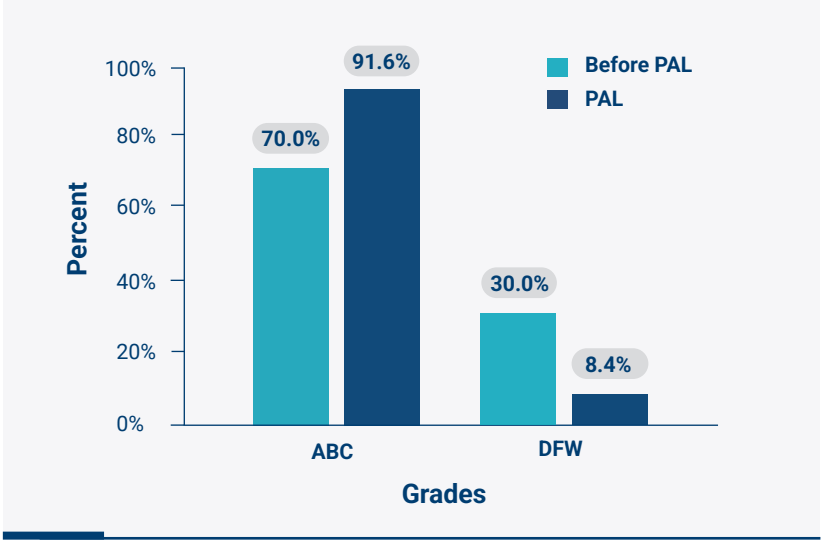


Figure H.1
SPN1121C
Percentage of Minoritized Students with ABC or DFW Grades

Anecdotal student feedback about the redesign has been generally positive and suggests they feel empowered in their learning. Some student responses about what they liked about PAL and Realizeit are shown below.

STUDENT COMMENTS ABOUT PAL AND REALIZEIT

"I like that I always got immediate feedback on questions. It made reviewing and understanding better."

"[Realizeit] knew when I didn't know something and it made sure I understood it before letting me pass."

"I like the [learning] pathway the most, it was easy to follow and understand and gave a sense of order and direction rather than a disorganized lesson plan."

"[PAL] shapes itself to my knowledge as best as it can. I'm able to learn my mistakes a lot faster and more effectively than I would without it. It needs some tweaks but it's still a really helpful program. It's also really wonderful that I can access it whenever and wherever as long as I have a laptop. This made scheduling for me a lot easier."

Prucha and Tartt note any negative feedback generally stemmed from students who began the course sequence in a class with a traditional textbook and publisher courseware. Those students felt unfamiliar with the Realizit platform and resented having spent nearly $300 in textbooks for their previous course that they wouldn't use again.

"The problems we were trying to solve were multifaceted," Prucha and Tartt explain. "Ultimately the redesigned courses not only improve student outcomes and reduce DFW rates but also foster a more positive attitude toward continuing Spanish study. The incorporation of PAL and OER has supported our efforts to provide a high-quality, accessible, and motivating educational experience for students."

CASE STUDY I

Joshua Nave

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Southwest Tennessee Community College	Memphis, Tennessee	2-year public	Digital OER materials

The Spanish faculty at Southwest Tennessee Community College were concerned about equity gaps for African-American students, particularly African-American males, who had the lowest success rates in elementary Spanish courses. To try closing those gaps, they initiated the use of Open Education Resources (OER) in Elementary Spanish 1 and 2. Looking to be culturally relevant to students living in the Midsouth and the greater Memphis area, they developed much of the course content themselves and removed the previously used textbook from the curriculum.

"In Fall 2021, the average overall success rate for Elementary Spanish 1 was 67%, but just 57% for African-American males," instructor Josh Nave explains. "In Fall 2022, we began the OER initiative. In that semester, overall success rates increased to 78%, with success rates for African-American males rising to 65%." In asynchronous online courses, the overall success rate increased from 65% to 76%. Nave has some insight into why the hybrid courses saw higher success rates (see Figure I.1).

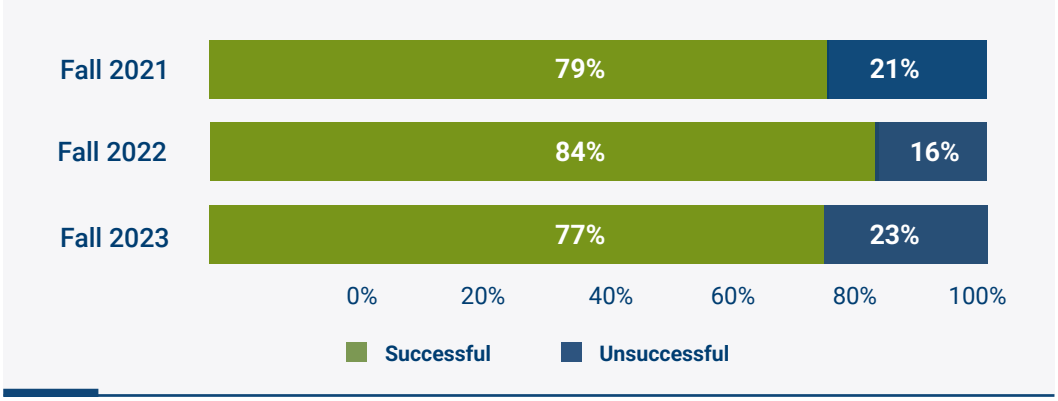


Figure I.1 Success Rates (Hybrid) Fall 2021-2023

"In the hybrid modality, the implementation of OER allowed us to be more responsive to where the students wanted to go in the course, thereby increasing their sense of agency," Nave explains. "We have not yet been able to transition this responsiveness to asynchronous online courses."

Although initial results were promising, sustained implementation of the project is ongoing. Due to low enrollment in Spanish courses, Spanish faculty members were deployed elsewhere and unable to continue developing the OER content. But the team is anxious to return to their work and improve on it.

"Our data shows a steady increase in the success rate of African-American students, which was the intent of the OER initiative," Nave reports. "However, a decrease in success rates for Asian and White students from Fall 2022 (the beta semester) to Fall 2023 shows the content needs to be revisited."

CASE STUDY J

Kathy Renfro

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Cuyahoga Community College (also known as Tri-C)	Cuyahoga County, Ohio	2-year public	Webex (required virtual meetings) Virtual office hours (on demand and scheduled) Optional asynchronous class sessions

Professor Kathy Renfro saw a worrying trend in the algebra courses she teaches at Cuyahoga Community College's Metropolitan Campus. Students in her online math courses were participating during the first two weeks to avoid the financial aid implications of withdrawing from the course. But following that deadline, students weren't as successful.

"The number of students who withdrew from my online math courses or became disengaged was astronomical," Renfro reports. "Once attendance was reported for financial aid purposes, I lost a significant number."

Renfro theorized that more student-to-instructor interaction might help, so she turned to Webex, a desktop video/audio conference call application. Renfro chose Webex because it was well-supported by her institution.

"Through my institution, I could receive both training and ongoing support," Renfro explains. "I was able to scaffold my use of the tool, making implementation more feasible."

Renfro uses Webex to hold required virtual meetings with her students, provide on-demand and scheduled virtual office hours, and set up optional asynchronous class sessions. She finds that these additional opportunities to connect with students enhance the adaptive component of her courses that she has been using since she began teaching 15 terms ago. Renfro initially thought the adaptive piece alone would make the difference for her students, but now feels the adaptive element needed to be combined with the Webex virtual connectivity requirement to finally become effective.

"I can point to a marked difference in my students' abilities to engage in the course early, their willingness to reach back for assistance and take advantage of office hours, and their successful completion of the courses," she observes. "This change came after I started requiring virtual check-in appointments within the first two weeks of class."

> **"I can point to a marked difference in my students' abilities to engage in the course early, their willingness to reach back for assistance and take advantage of office hours, and their successful completion of the courses."**
>
> — Kathy Renfro

CASE STUDY K

Shrikant Pawar

Institution	Location	Institution Characteristics	Digital Learning Tool/s Adopted
Claflin University	Orangeburg, South Carolina	4-year private HBCU	Claflin Moodle Learning Management System Canvas

For Dr. Shrikant Pawar, integrating digital learning tools from Claflin University's Learning Management System's Moodle and Canvas into his Computer Science Junior and Senior Seminars was a no-brainer.

"These digital tools are easy to learn and efficient, require minimal training, and are offered free for our students and faculty," he said.

Although his students needed preliminary training to use the tools, Pawar observed students showed confidence and interest engaging with these tools throughout the semester. Additionally, he noticed an improvement in his students' performance and progress tracking. More than 80% of Pawar's students were able to successfully pass the course while using Claflin Moodle and Canvas.

Pawar is also curious about incorporating other digital tools into his courses.

"I am interested in adopting GPT-3, a language processing model created by OpenAI for writing assignments, particularly literature reviews," he said. "However, since it is a new application, we are still researching its adaption merits and shortcomings for a classroom."

CONCLUSION

As these faculty narratives illustrate, equity for minoritized students is achievable, a goal worth pursuing, and digital learning tools have an important role to play in achieving equity. Four key takeaways emerge from these instructors' stories.

1. **Digital learning tools can increase student engagement.** Whether students are teaching concepts to other students, such as through Flip, or following an individualized learning path, through Realizit, these tools keep students motivated.
2. **Digital learning tools can strengthen connections between instructors and students.** Video conferencing, virtual check-ins, and reminders, using tools such as Webex, foster a sense of belonging and let students know their instructors are dedicated to their success. OER materials can be targeted to specific student demographics and interests.
3. **Digital learning tools can help build a greater sense of student agency.** Tools like Blackboard Collaborate facilitate virtual class meetings, allowing students to attend from home or asynchronously at their discretion. Adaptive learning materials can provide individualized pathways that cater to each student's needs.
4. **Digital learning tools can help narrow equity gaps.** As data from these narratives indicate, integration of digital tools impact minoritized students' success rates, levels of engagement, midterm and final assessment success rates, and overall course satisfaction and confidence.

No one-stop solution will close all equity gaps through digital learning. As April Crenshaw noted in her interview, "no *single* tool solved the problem" of increasing success rates in her Introductory Statistics course. However, as these instructors' stories demonstrate, commitment to teaching excellence, willingness to experiment with the wide variety of available digital tools, and institutional support can help faculty make progress toward closing equity gaps through digital learning.

MEET THE INSTRUCTORS

Stephanie Baxter

Stephanie Baxter is an instructor of mathematics at Jackson State University in Jackson, Mississippi. She received her bachelor's and master's degrees in mathematics education from Southern Arkansas University in Magnolia, Arkansas. Stephanie has taught mathematics to a wide variety of levels over the past two decades. She is passionate about helping students overcome math anxiety and developing and implementing teaching strategies to not only instill mathematical skills but also deepen critical thinking and problem-solving skills for all learners.

Lisa Dierker

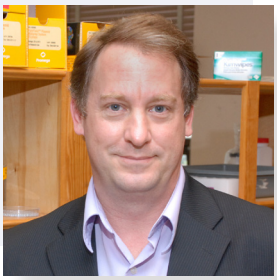
Dr. Lisa Dierker is the Walter Crowell University Professor of Social Sciences and Professor of Psychology at Wesleyan University. She received her PhD in Developmental Psychology from the University of Connecticut and completed postdoctoral training in Epidemiology at Yale University School of Medicine. A researcher in addictive behaviors, her more recent work, based on the NSF-funded Passion-Driven Statistics Project, centers on the dissemination of innovative pedagogical practices for teaching data analysis and applied statistics across the curriculum.

April Crenshaw

April Crenshaw is an Associate Professor of Mathematics with 20 years of combined experience in K-12 and higher education. An award-winning educator and sought-after conference speaker, she has gained national recognition for her innovative and inclusive teaching methods. Professor Crenshaw is deeply committed to making education accessible to all students by integrating equity principles into her courses and advocating for policies that dismantle barriers for historically marginalized groups. She is also a doctoral candidate in the Leadership and Learning in Organizations (LLO) Program at Vanderbilt University, where she is set to graduate in May 2025.

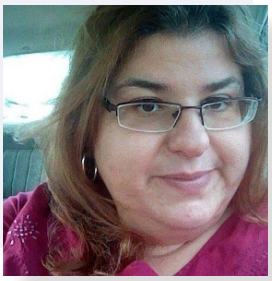
Mary Robinson

Professor Mary E. Robinson, EdD has been teaching Developmental Education courses at Montgomery College (MC) since 2007 and English 103 since 2018. Interested in developing and implementing Open Education Resources (OERs) into her classes, Professor Robinson completed professional development workshops about OERs. She is currently using OERs in her Blended English 103 course. Recently, she was selected for an MC Fellowship to co-develop assignments around one common United Nations Sustainable Development Goal. In 2019, with leadership representatives from MC, Professor Robinson visited the University of Gondar as part of the Montgomery College/Montgomery County Sister City trip, in hopes of using OER materials to connect MC with UOG faculty. Her teaching philosophy has three tenets: Professor as Learner, Professor as Course Facilitator, and Professor who is Student-Centered. As a life-long learner, Professor Robinson continues to re-tool by participating in professional development workshops.



Nicholas Panasik Jr.

Dr. Nicholas Panasik Jr. specializes in protein structure and function with emphasis on the structural basis for folding specificity and thermodynamic stability of the α/β barrel (TIM) enzyme. He organizes the University's Nobel Laureate Series and is a regular contributor to the National Science Foundation's Review Panels. Dr. Panasik has been the recipient of the National Science Foundation's Early CAREER Award and several teaching excellence awards, including being named a 2011 Distinguished Professor of South Carolina.



Camila Alvarez

Dr. Camila Alvarez is an Associate Professor of English at Indian River State College. She received her PhD in Text and Technology from the University of Central Florida. As a first-generation college graduate and first-generation United States citizen, she strives to be the educator she wishes she had in college.

Stacy Ybarra Evans

Stacy Ybarra Evans, EdD, is an accomplished educator and committed academic leader dedicated to fostering student success. Her educational journey began at Alamo Colleges Palo Alto College, where she laid the foundation for her academic pursuits. Currently serving as the Director of the Center for Teaching Excellence at Our Lady of the Lake University, Stacy leads initiatives aimed at enriching pedagogical practices and supporting faculty development. She also teaches the first-year seminar course, Learning Frameworks, at San Antonio College. Throughout her career, she has spearheaded transformative projects, such as implementing diversity initiatives and advancing online learning, showcasing her passion for innovation in education.

Anne Prucha

Anne Prucha is a Senior Instructor in the Department of Modern Languages and Literatures at University of Central Florida (UCF), where she teaches Spanish and Teaching English to Speakers of Other Languages (TESOL). She is currently involved in UCF's Center for Distributed Learning Pegasus iLab Course Redesign Initiative, working with colleagues to incorporate Adaptive Learning and Open Education Resource content into first-, second- and third-year Spanish courses. She co-founded and co-directed the UCF-Hillcrest Foreign Language Club. She has been a frequent participant in UCF's Faculty Center Summer Conference and its Student Consultants on Teaching (SCoT) project. Prucha is also a mentor for students enrolled in UCF's Spanish MA program.

Kacie Tartt

Kacie Tartt is a Senior Instructor in the Department of Modern Languages and Literatures, at University of Central Florida (UCF), where she teaches Spanish. She is co-founder of the Journey Cuba study abroad program. At UCF she helped co-found UCF-Hillcrest Foreign Language Club in addition to organizing the weekly MLL Game Day, prior to the COVID pandemic, in her department with the support and participation of her colleagues of all languages. She also works hand-in-hand with UCF's Center for Distributed Learning to further distance learning initiatives within the Spanish lower division at the University, most recently exploring Adaptive Learning methods and technology within her discipline.

Joshua Nave

Joshua Nave is an Assistant Professor of Teaching in Spanish at the University of Memphis. He teaches Spanish 1010: Elementary Spanish I, Spanish 1020: Elementary Spanish II, Spanish 2010: Intermediate Spanish I, Spanish: Intermediate Spanish II, Spanish 3303: Spanish Composition, and UNHP 1100 The Honors Forum. He has been the team leader for Spanish 1020 (Fall 2017), Spanish 2010 (Spring 2022), and Spanish 2020 (Spring 2018–Spring 2020). He has served as a co-director of the UofM Language Fair since 2018. He currently serves as the Media Coordinator for the Department of World Languages and Literatures and is involved in a variety of recruitment activities. He also serves on the UofM Study Abroad Scholarship Selection Committee and as a board member for the Tennessee World Language Teaching Association.

Kathy Renfro

Professor Kathy Renfro has been teaching for over 30 years and joined the faculty of Cuyahoga Community College's Metropolitan Campus in 2019. Her primary focus is in teaching students who may not love mathematics, blending a unique ability to both empower students in their abilities and challenge them in their thinking. Her research interests include dyscalculia and teaching and learning strategies that aid students with specific learning disabilities. She has served as a Fellow for the American Mathematics Association and has presented conference sessions on increasing student engagement in online classes. In 2023, Renfro was honored to receive the Ralph M. Besse Award for Teaching Excellence.

Shrikant Pawar

Dr. Shrikant Pawar is an Assistant Professor in the Department of Computer Science, with a joint appointment in Biology at Claflin University. Pawar earned his master's degree and PhD in Computer Science from Georgia State University. He's also a co-founder of a Connecticut-based AI company, ChestAi; a founder of Georgia Research Consulting (GRC), Research & Training in STEM Studies in Atlanta; and a research affiliate at Yale University School of Medicine. His dissertation focused on big data (next-generation sequencing, microarrays, X-ray crystallography, etc.) analysis using machine learning techniques (neural networks, SVMs, restricted Boltzmann machines, clustering algorithms, etc.). A detailed list of credentials can be found at Claflin Profile, LinkedIn, NCBI Bibliography, and Google Scholar.

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