

SCIENCE IDENTITY AT A TEACHING FOCUSED INSTITUTION

All science instructors have the responsibility to incorporate inclusive and welcoming pedagogy in their courses to promote undergraduate success (Wyatt et al. 2021). One approach to promote student success centers on students developing connections to the scientific community and thus exploring their science identity (how one recognizes themselves in science). Prior research on science identity has largely been quantitative and from science major courses at research intensive institutions. Our study sought to widen this lens through the collection of both quantitative and qualitative science identity measures. Pre-course data was collected from 1280 students across 14 biology courses (including non-majors) taught by 16 different instructors. Survey results indicate that women, religious students, and non-STEM majors are starting the semester in their biology courses with a lower science identity than their peers. Additionally science identity is correlated with science engagement regardless of major. Therefore, if students are entering their biology courses with a lower science identity, they are less likely to be engaged with science. Qualitative coding of student views of scientists, their feelings towards being a scientist, and connection to the scientific community shows both some consistency in student views across courses and stark differences between student groups. For example, students who are taking more advanced biology courses are describing scientists more as learners and are recognizing themselves as a learner. However, students in introductory biology courses for majors are describing scientists more as experimenters. More worrisome is the overall lack of connection that all students feel towards the scientific community regardless of degree advancement. Students are not seeing themselves as part of the scientific community. Barriers to this connection are related to perceived lack of scientific knowledge and interest (especially for introductory students). These results highlight the importance of pre-assessing students' science identity to inform instructors on how to better support students regardless of major or advancement in their program.



DR. BRITT WYATT
Assistant Professor | Biology

I'm currently an Assistant Professor in the Department of Biology at Utah Valley University. I received my PhD in structural biology from Marquette University where I studied a bacterial metabolic enzyme called pyruvate carboxylase. At UVU, I primarily teach introductory biology to biology majors. I also do research in biology education, which is great because my research can help inform my teaching and vice versa. My main research interests are in science identity and inclusion within research experiences. I want to know how students and faculty define science identity and how science identity is formed in research experiences.

I still don't define myself as a scientist, which is weird. I do all the things a scientist does, but I feel like the word "scientist" is so strongly linked to certain stereotypes that I don't see myself within that identity. If I can't see myself as a scientist, how can I expect my students to see themselves as scientist? This concept is fascinating to me and I'd like to explore it more.

When I am not teaching or doing research, the remainder of my time is spent with my family. We enjoy hiking, the zoo, museums, and all sorts of fun kid activities. My self-care time is spent working out, reading sci fi books, and listening to podcasts/audiobooks.



DR. JOSH PREMO
Assistant Professor | Biology

I'm an assistant professor in the Department of Biology at Utah Valley University and in a past life I was a middle and high school science teacher in New York State. Due to a variety of factors I made the slog from there to Washington State University where I received a hybrid Ph.D. in Science Education/Zoology. I am broadly interested in social aspects of K-16 science learning. My early work focused on how different aspects of classroom social environments relate to student dispositions towards cooperating with their peers during learning. More recently I have begun exploring two areas along with Britt. These include: 1) Factors that predict success in student group work and 2) How affective aspects of students (motivation, belonging, identity, and perceptions of science) develop based on their experience in science classes.

I also have interests in educational psychometrics (i.e. how we measure different aspects of cognition) and science misconceptions.

At UVU I teach Methods of Science Teaching and Biology for Non-Majors while supervising beginning teachers out in local middle and high schools.

My general interests include fiction reading (fantasy and sci-fi mostly), a variety of outdoor activities, and trying to learn how to cook.

THE EFFECTIVENESS OF DELPHINIUM IN AN UPPER DIVISION BIOPSYCHOLOGY COURSE

Research focusing on student retention and success has provided evidence that student learning and student success is improved by increasing student engagement and active participation. Indeed, numerous high impact practices—such as gamification—have been shown to enhance learning. Research in the field of gamification has increased substantially in recent years. Various reviews highlight that gamification in the classroom boosts student-engagement, motivation, confidence, and performance (Subhash & Cudney, 2018). Interestingly, the impact of gamification in online courses remains understudied (Antonaci, et al., 2019).

Upper-level neuroscience-based courses such as PSY 3450 Behavioral Neuroscience are biology heavy and tend to have high withdrawal and failure rates. Needing to develop an online course delivery of PSY 3450, we wanted to develop the strongest course design possible to engage students and foster student success particularly in an online course delivery. The course used asynchronous video discussions, interactive content delivery, and the integration of MS Teams and OneNote to allow students working together in groups. In addition, we used Delphinium, a gamification plugin for Canvas, in the treatment group. Delphinium is an award-winning Canvas plugin that quickly adds an engaging overlay to ANY course. Its purpose is to improve student withdrawals, failures, dropouts, and performance. While currently data collection is still on-going, gamification—a type of high-impact practice—preliminary data shows that content mastery was increased. Namely, preliminary data show that use of Delphinium increased the number of passing students specifically by increasing final letter grades A and B. We hypothesize that gamification will improve student retention, student completion, and self-efficacy in PSY 3450.



DR. CLAUDIA JORGENSEN

Assistant Professor | Psychology

Claudia Jorgensen is an award-winning Associate Professor in Behavioral Science. Awards include the 2018 Dean's Excellence in Teaching Award, 2020 Faculty Excellence Award, 2021 International JoVE Award, and the 2022 Best Online Delivery Award. As a teacher of biopsychology, she aims to identify assignments and teaching techniques that foster student interest, enhance meta-cognition, and increase student success. Her first pedagogical research project focused on determining whether a non-traditional writing assignment can increase meta-cognition. Other SoTL projects have focused on determining the impact of Process Oriented Guided Inquiry Learning (POGIL), Peer Instruction, and Gamification on student retention and student success.



DR. JARED CHAPMAN

Assistant Professor | Organizational Leadership

Dr. Chapman is a researcher and educational technologist. He has 22 years experience facilitating education and training development as a coach, trainer, manager, and professor. His career focus has been creating environments where people can be effective and successful. His broad work experience and education (including work as a general manager, production manager, instructional designer, technology specialist, and trainer) allow him to engage multiple perspectives when designing solutions to educational issues. He has been developing gamification platforms and publishing gamification research since 2012.

STUDENT ENGAGED LEARNING DURING LIVESTREAM CLASSES

The proposed project has developed teaching livestream classes in Teams, by integrating student engaged learning activities. During classes I use the news reading assignment developed in 2011. The assignment was included in the toolkit of the AACSB (download.pdf (aacsb.org)) as an example of teaching classes on international relations by using the New York Times.

In this assignment, students select a certain country and then read articles daily from the current issue of The New York Times that address the international relations topics of their chosen country. Each lecture begins with a discussion on topics covered in the articles for the chosen countries.

Students are required to submit two response papers during the semester on the countries they studied. Both papers must analyze comprehensive foreign policy processes covered in the newspaper articles for the chosen country during the semester; each paper must be no more than two pages in length. This assignment is worth one fourth of the total earned points for the course.

The project will analyze Teams implementation of this approach during both the class time for lecturing specific chapters and the following class time when students discuss the content of the quiz taken on the chapter and the news articles about the studied countries. Results of the project will be presented in the paper to be submitted to the academic Journal of Education for Sustainable Development. It will be a follow up to our published paper <https://doi.org/10.1659/MRD-JOURNAL-D-19-00070.1>



Dr. Baktybek Abdrisaev has been working as a Lecturer in the Department of History and Political Science at Utah Valley University since 2007. He teaches courses on International Relations, Diplomacy, Comparative Politics, and Sustainability and Mountain Development. His research focuses on issues of Central Asia and sustainable mountain development. He served as Ambassador of the Kyrgyz Republic to USA during 1997-2005. Dr. Abdrisaev's professional career after receiving his Ph.D. in Applied Physics from the Institute of Electronics, Academy of Sciences of Belarus in 1990 included serving as Associate Professor at Bishkek Polytechnic Institute and National Academy of Sciences of Kyrgyzstan.

**DR. BAKTYBEK
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Lecturer | Political Science

SURFACE LISTENING OR DEEP ENGAGEMENT? SOUNDING THE LIMITS OF "READING" WITH AUDIOBOOKS

For the past two years, I've been inviting students to openly listen to audiobook editions of our course texts and complete surveys on their experience with this medium. What I've learned along the way has changed how I've viewed the relationship between research and teaching, the nature of academic labor, and the very act of reading itself. My initial findings are suggestive of just how much we have underestimated the use of audiobooks among college students. Indeed, over 75% of respondents (n=64) report having previously listened to audiobooks and, of those listeners, 68% reporting having previously used audiobooks to complete assigned readings. While the number of respondents is still small, these figures remain relatively consistent across sections. More significantly, they point to the pressing need to move beyond disciplinary debates over whether listening to an audiobook is really reading at all.

Significantly, this project has reenergized my engagement with my field of Victorian studies. Since starting this project over two years ago, I have found myself researching public readings and the Victorian practice of reading aloud. I have attempted to make sense of studies in cognitive science that compare the visual and auditory processing of semantic content. And I've found myself wading into ongoing disciplinary debates regarding competing reading methodologies, the centrality of close reading, and a field-wide over-reliance on visual spatial metaphors for our interpretive practices.

At present, audiobooks seem poised to become the dominant mode of reading for a significant percentage of adults, undergraduate students included. Ultimately, my findings point to audiobooks' relationship to dynamic and pressing fields of critical inquiry, including affect studies, digital humanities, cognitive literary studies, and disability studies.



Ashley Nadeau is an Assistant Professor of Nineteenth-Century British Literature at Utah Valley University. Her research explores the relationship between the social and architectural histories of built public space, the Victorian literary imagination, and women's writing, and her work has appeared in *Victorians Journal*, *The Gaskell Journal*, and *Modern Language Studies*. Her current project employs pedagogical, classroom-based research to examine the role of audiobooks in undergraduate literary studies. At present, she is writing an essay on audiobooks and critical reading practices for an edited collection on close reading, Victorian literature, and studies in the novel.

DR. ASHLEY NADEAU
*Assistant Professor | English and
Literature*

LEVERAGING UNDERGRADUATE RESEARCH IN INTERMEDIATE WRITING

Research Question: How, or to what extent, does students' conducting an original research project as part of a researched argument essay help them see themselves as active participants in academic conversations?

According to Kilgo, Sheets, and Pascarella (2015), students who participate in undergraduate research (UR) tend to persist, and increase their learning. Surprisingly, Kilgo et al. found writing intensive courses had little impact on student learning and development. But little research has evaluated incorporating UR into writing intensive courses. I believe first-generation and BIPOC students, who are increasingly more common at UVU, could benefit from a writing-intensive course that includes UR.

For several years, my ENGL 2010 and 201H students have conducted a small original research project to include with their Researched Argument essays: an interview, a small survey, or a brief content analysis. This approach seemingly combines the best of both HIPs. While students' ability to synthesize information from existing sources is an important critical thinking skill, I believe that introducing them to UR early may help them transition from users of information to contributors of academic conversations. Sadly, many students miss how their research contributes to the larger conversation. I want (1) to determine whether performing original research helps students contribute to existing conversations and (2) to test strategies to help students use their research to enter a conversation.

I will examine students' written papers and reflective essays from my ENGL 2010—Intermediate Academic Writing (two regular sections and one Honors in Spring 2022, Fall 2022, and Spring 2023). Students also take surveys. In Spring 2022, those included a Get-to-Know-You Survey and an End-of-Semester Survey. Starting with Fall 2022 and continuing to Spring 2023, I added a midterm survey. Those surveys ask the same questions about students' perceptions of themselves as writers and researchers. These surveys combined with Goal-setting, Midterm, and Final reflective essays help assess their identity as writers and researchers over time.

I currently have 23 participants from ENGL 2010 and 14 participants from ENGL 201H. Most participants are from Fall 2022. I cannot assess data right now as I had so few participants during Spring 2022 and Fall 2022 is ongoing. Data analysis will commence in earnest in December and January after Fall 2022 has ended.

References

Kilgo, C., Ezell Sheets, J., & Pascarella, E. (2015). The link between high-impact practices and student learning: some longitudinal evidence. *Higher Education* (00181560), 69(4), 509–525. doi.org/10.1007/s10734-014-9788-z



Dr. Angie McKinnon Carter, a Senior Lecturer at Utah Valley University in the Department of English and Literature, strives to improve her teaching of composition and editing by studying writing conferences using speech act and discourse analysis. She is passionate about teaching writing and offering undergraduate research opportunities to as many students as possible. As an avid Marvel Cinematic Universe fan, she mines the films to create Marvel-derived metaphors that demonstrate her research findings and illustrate the writing process.

DR. ANGIE CARTER

Senior Lecturer | English and Literature

MATHEMATICS CHALLENGE AND SOLUTION FOR ENGINEERING TECHNOLOGY STUDENTS (CASE STUDY)

Math classes have been always a big challenge for Engineering Technology (ET) students; this challenge causes many students to change their plans in terms of finishing their degree because they cannot pass math courses. As instructor in Utah Valley University (UVU) in the ET department, I taught Math classes and I witnessed this problem with my students. It is surprising how they did well in their core courses such as Programmable Logic Controller (PLC) and Computer Numerical Control (CNC) classes while in math their performance is poor. Moreover, my students did very well in MATLAB® class; computational software, although it includes many of math concepts equations and skills. This work will investigate the solution for Engineering Technology students in general and UVU in specific, in terms of teaching math courses using technological methodology such as MATLAB® software.



Dr. Al-Nsour earned her Ph.D. in Engineering from Virginia Commonwealth University (VCU), in 2015. She had her B.S. in Mechanical Engineering from Jordan University of Science and Technology and her M.S. in Industrial Engineering from the University of Jordan. Her research interest focused on Automated Systems, Material Science, and Engineering education. She joined Brigham Young University (BYU) as an Affiliate Assistant Professor in 2015. Now she is an Assistant Professor at Utah Valley University (UVU) in the Engineering Technology department. Dr. Al-Nsour chaired the technology track at the Intermountain Engineering, Technology and Computing (i-ETC) international conference in 2022.

DR. RAWAN AL-NSOUR

Assistant Professor | Mechatronics

PARTICIPATORY ACTION AS A PEDAGOGICAL TOOL

The current project aimed to foster civic development by combining academic curriculum and pedagogical strategies with civic engagement. Specifically, it offers insights into ways to advance civic education and research through the use of participatory action research (PAR) framework. In each week of the spring 2022 semester, students read extant literature in civic development and civic education practices, reflected on their own experiences in the classroom, and through an iterative process, assisted in designing measures that were used in a longitudinal burst design study. This approach democratized the research process; students served as experts on their own experiences at UVU.

Findings from the study provide insights into the civic affairs and engagement of students and provided students with opportunities to deepen their knowledge through curricular programs while also enabling the development of a civic identity within the larger context of citizenship and community involvement. Results from the study may offer clear intervention points aimed at promoting civic engagement among students and will be submitted to the SRCD Teaching Institute conference for 2023.

DR. JENNIFER SHUBERT

Assistant Professor | Psychology

Before joining UVU, I was a visiting scholar with the Performance Science Institute at the University of Southern California and a postdoctoral scholar at Baylor University. My program of research is grounded in the positive youth development (PYD) approach, which posits that optimal development is marked by growth in attributes of caring, competence, confidence, connection, and character, and that contribution to community and society is a key outgrowth of these attributes. Within this framework, my research focuses on: 1) documenting developmental change in character strengths and identifying experiences in contexts such as families, schools, and community that foster growth in youth character, 2) examining developmental patterns of contribution through civic engagement, and 3) most recently, incorporating a social justice lens into positive youth development frameworks. By investigating the development of character and contribution my research has both theoretical and applied implications for optimizing positive development among youth.

EXPLORING STUDENTS' PERCEPTIONS IN LEARNING MATHEMATICS BETWEEN TWO INSTRUCTIONAL MODES: LIVE STREAMING VS. FACE-TO-FACE

The purpose of this study is to report whether there are differences in student performance between Live Streaming (LS) and Face-to-Face (F2F) in learning Intermediate Algebra (MAT 1010) and to explore students' perceptions with respect to experiences with LS and F2F courses. The research questions are listed below: 1. How is LS student performance different from the students of F2F courses? 2. In what ways do students express their perceptions or preferences in learning mathematics regarding experiences with LS and F2F courses? To do this, a qualitative analysis was employed. A thematic content analysis was used to explore students' experiences of LS and F2F courses after analyzing students' responses to the survey questionnaires. For research question 1, the LS participants showed higher scores of final grades than that of F2F participants, although both groups of students have shown increased mean scores between pre- and post-tests. For research question 2, we analyzed the data based on 4 different themes.

Theme 1: Factors of Content Understanding. The first sub-theme is to identify the most helpful course materials. F2F students relied on both class notes/ppt and homework assignments and quizzes; however, LS students focused more on completing homework assignments and quizzes. The second sub-theme, frequency of interaction with the instructor, encompasses variations in interacting with the instructor. Three-fourths (75%) of the F2F students have interacted with the instructor at least once a week, compared to the 45% of the LS students.

Theme 2: Challenges Encountered. We found the following three sub-themes here: (1) technical challenges (2), behavioral challenges, and (3) content understanding challenges.

Theme 3: Self-Satisfaction. The first sub-theme of self-satisfaction, feeling successful, connects to the students' self-motivation to study. More than 80% of LS and about 86% of F2F students described themselves as successful students. The most common reason was that they worked hard to complete their homework assignments. The second sub-theme, feeling valued, reflected statements in students' engagement with their instructor. The majority of students (94%) from both groups felt valued in class because of the instructor's help and support.

Theme 4: Preference for Future Course. More than three-fourths of students from both groups preferred the F2F course. For the LS course, the majority of students preferred F2F.



Dr. Eunmi Joung is currently an Assistant Professor in the Department of Mathematical and Quantitative Reasoning at Utah Valley University. She graduated from Southern Illinois University Carbondale (SIUC) with a Ph.D. in Mathematics Education. Her research interests include students' development of mathematical thinking and conceptual knowledge using multiple strategies for solving problems, educational assessment, and the integration of technology into mathematics education.

DR. EUNMI JOUNG

Assistant Professor | Developmental Mathematics

AN EXTENDED CALCULUS MOTIVATION INTERVENTION USING WRITING ASSIGNMENTS

Over the past decades, education (and specifically STEM education researchers) has begun to pay close attention to calculus. Calculus I is seen as a gateway course for most STEM majors. Calculus education has simultaneously been a very recently growing field within mathematics education research. Mathematics ability alone is not enough to predict mathematical performance, and motivational predictors are a good complimenting indicator for accurate predictions; calculus shouldn't be an exception. Two sections of Calculus I, taught by the same instructor, were tracked over the course of Spring 2022. Within these sections, a randomly selected group of students was selected as a subsection of one class and designated the control group, while another random selection of students was selected as a subsection of the other class and designated as the experimental group. Both groups had their grades tracked, and both groups were repeatedly given a utility value survey regarding their opinions about how relevant calculus was to their lives and careers. The experimental group was given periodic reflections, like short journal entries, throughout the semester, while the control group was not. The main research questions were to see how responses and utility value differ between students that took these motivation reflection assignments versus those that did not.



My focus is on Mathematics Education. More recently, this focus has developed mainly into researching calculus pedagogy, factors of student success in calculus, and successful uses of technology in the calculus series. I primarily teach math education courses for pre-service teachers, both elementary and secondary. I started at UVU in fall 2020, after three years at a previous institution.

DR. ZACH HURDLE

Assistant Professor | Mathematics

TEACHING & LEARNING IN VIRTUAL REALITY: METAVERSE CLASSROOM EXPLORATION

Virtual reality (VR) offers a potentially engaging environment for teaching college students. The faculty of an interaction design program is currently creating a college course where students are taught entirely in a VR classroom. The curriculum and study methodology are simultaneously in the development process and intend to measure the impact of such a course on students and instructors. The research questions in consideration involve understanding the needs for facilitating a classroom in a virtual world while ensuring learning occurs. The faculty plans to use the metaverse as a dual workspace and classroom for student participants. The metaverse is an online social experience where students interact through an internet connection in a seemingly lifelike digital space. Additional questions involve the adoption of a beta of the Meta Horizon Workrooms and whether the technology offers a viable platform for virtual classroom instruction. The proposed technology integrations include video conferencing, spatial audio, and additional app integrations for increasing student engagement and academic performance.



EMILY HEDRICK
Assistant Professor | Digital Media

Emily is a proud Wolverine who is not only a faculty in Digital Media, but an alumnus as well. She has worked for over a decade in the industry and been at the forefront of digital media technology. Emily has been involved in a wide range of projects that are constantly pushing the envelope of innovation. Most recently, she is focused on digital preservation with her efforts with the National Park Service and Beit Lehi archeology site in Israel. When she's not on campus or the metaverse, you can find her exploring the world.



MICHAEL HARPER
Associate Professor | Digital Media

Michael Harper has been a leader in pushing Digital Media at UVU. He began his work in the Dot Com boom and crash, in the early days of web development. Since then, Michael has been deeply involved in preparing students for the fast-paced world of digital media. Michael is currently developing a new Digital Media degree emphasis with Mixed Reality and has been a leader in Silicon Slopes on what will certainly change how people work and communicate online.