2020 DIGITAL RESEARCH SYMPOSIUM

Gevirtz Graduate School of Education
Conference Program and Schedule

Building Interdisciplinary Community

Friday, May 29
9am - 2pm
#GGSEResearch

Contents

<h1 style="text-align:center">Conference Information</h1>

Thank you for joining this collaborative educational conversation at the first GGSE interdepartmental research conference. The vision of this event is to provide a space for students and faculty to showcase their own work and thinking and to foster connection building within GGSE, as well as with the larger UCSB community. Attend presentations and poster sessions with other graduate and undergraduate students, postdoctoral scholars, staff members, faculty, or alumni from ED, CCSP, and TEP and explore innovative research, degree-related work, and community-work. We invite you to network with old and new colleagues, challenge convention, and be inspired to collaborate and continue to build an interdisciplinary community within GGSE.

Due to the COVID-19 epidemic, this conference is being hosted virtually. Presentations have been organized by themes and will be co-occuring in separate Zoom rooms. Feel free to pop in and out of Zoom rooms at your leisure. Auditory notifications have been turned off in Zoom settings so as not to disturb presenters. Zoom links will be shared with registered attendees via email. Please check your inbox for "Symposium Agenda with Zoom links" from GSAE (education-gsae@ucsb.edu) on May 28 for the Schedule of Events that contains Zoom links. If you have any trouble please email GSAE using the address above.

Keynote: Dean Jeffrey Milem
Considering our Legacy: Doing Work that Really Matters
Drawing from a 40 year career in public service, this keynote will candidly begin the day by reflecting on some of the insights gained during this time and will consider the following questions: What can we do to insure that our work really matters, to enhance the chances that it will make a difference, to enhance the likelihood that it will bring about the changes we seek, to insure that our legacy as teachers, mentors, scholars, policymakers, and practitioners is one of which we can be proud?

Digital Courtyard: Are you looking for a space to continue to network, share resources, or expand on ideas or themes from your sessions? Use this unmoderated Zoom room to extend meaningful discussions following paper and poster presentations, ask additional questions, or simply check in to see what others have been up to.

Schedule of Events At-A-Glance

Keynote - 9:00AM

Digital Courtyard Opens - 10:00AM

Presentation Sessions I - 10:00AM
      Mixture Models: Latent Variables & Data Presentation
      Multilingual Students, Content Learning & Meaning Making
      Enticing Informal Learning: Curie-osity & Virtual Reality

Poster Sessions - 11:00AM
      STEM & Youth
      STEM, Choice & Higher Education
      Various Topics

Presentation Sessions II - 12:00PM
      Ethnography about/with Youth
      Autism, Equity & Intervention
      Strengthening Museum Experience Design
      Teacher Education for English Language Development

Presentation Sessions III - 1:00PM
      Supporting Underrepresented Undergraduate Students
      Parental Engagement, Development & Mental Health
      STEM Education & Educator Development

Closing Social Session - 2:00PM

Topic: Mixture Models: Latent Variables & Data Presentation

Zoom Room #1	Presentation Title/Author(s)
10:00-10:15AM	*Structural Invariance in Multigroup Latent Class Analysis: Perception of Disability Status and Academic Expectations* Adam Gerber and Karen Nylund-Gibson
10:15-10:45AM	*Mixture Models: Calculate the Explained Variance in Distal Outcomes from the Categorical Latent Variable* Delwin Carter
10:45-11:00AM	*Auxiliary variable visualization in mixture models: A Shiny application* Dina Arch, Adam Garber, and Karen Nylund-Gibson

Topic: Multilingual Students, Content Learning & Meaning Making

Zoom Room #2	Presentation Title/Author(s)
10:00-10:30AM	*School Kids Investigating Language in Life and Society: Growing pains in creating equitable and dialogic learning environments* Samantha Harris, Jin Sook Lee, and Valerie Meier
10:30-10:45AM	*Preservice Science Teachers' Understanding of Instruction for Diverse Learners: A Focus on Funds of Knowledge* Meghan Macias, Stacey Carpenter, Alexandria Hansen, Elisa Stone, Erik Arevalo, Matthew Shackley, and Julie Bianchini
10:45-11:00AM	*Moving Towards Meaning Making in Multiplication: A Preliminary Report of an Intervention in Number Sense* Tomy Nguyen, Rachel Lambert, and Monica Mendoza

Topic: Enticing Informal Learning: Curie-osity & Virtual Reality

Zoom Room #3	Presentation Title/Author(s)
10:00-10:30AM	*Undergraduate Motivations to Participate as Facilitators in Youth-Based Programming* Alexandria Muller, Mallory M. Rice, Devon Christman, Fatima Soto-Apolinar, Diana Arya, and Sarah Hirsch
10:30-11:00AM	*Activity and Storytelling in Virtual Reality* David Sañosa, Jim Gribble, Santa Iontchevska, Phoebe Tran, Sarah Kondo

Poster Sessions: 11:00AM - 12:00PM
Extra time left over at the end for whole group Q&A

Topic: STEM & Youth

Zoom Room #1	Poster Title/Author(s)
11:00-11:10AM	*Implications for STEM Retention and Career Aspirations through a First-Year Biology Seminar* Krista Lucas and Danielle Harlow
11:10-11:20AM	*Young Children's Emerging Scientific Practice Skills Linked to the Physical Environment at Color Wall* Jasmine Marckwordt and Meghan Macias
11:20-11:30AM	*STEM Programs' Impact on School Subject Interests of Girls* Claire Chen, Janee Roche, Alexandria Muller, Mallory Rice, Diana Arya, and Sarah Hirsch
11:30-11:40AM	*How Participation in STEM Focused Programming Resonates with Youth* Hailey Clemens, Alexandria Muller, Devon Christman, Mallory Rice, Diana Arya, and Sarah Hirsch
11:40-11:50AM	*Organizational Routines of Teacher Education* Michael Danhauser

Topic: STEM, Choice & Higher Education

Zoom Room #2	Poster Title/Author(s)
11:00-11:15AM	*A Critical Race Analysis: Examining the Impact of Race-Neutral Policies and Practices on Opportunity Landscapes for Black Collegiate Students* Jeremy Edwards
11:15-11:30AM	*Changes in Desired Career and College Major in 4-6th Grade Youth as a Result of Participation in STEM Programming* Priya Ravi, Nathalie Paesler, Alexandria Muller, Sarah Hirsch, Diana Arya, and Mallory Rice
11:30-11:45AM	*Differences in Benefits From Participation in a STEM Outreach Program for Undergraduate STEM and Non-STEM Facilitators* Kelly Vu, Alexandria Muller, Mallory Rice, Diana Arya, and Sarah Hirsch

Topic: Various Topics

Zoom Room #3	Poster Title/Author(s)
11:00-11:15AM	*Identifying the Building Blocks of Social Emotional Learning* Konnor McMillen
11:15-11:30AM	*Computer-assisted Heart Rate Variability Biofeedback and Sentence-Writing Performance in Students with High-Functioning Autism* Destiny Hoerberg, Dena Kaplowitz, and George Singer
11:30-11:45AM	*Designing Social Realities: Examining Youth's Identity Development Through Multimodal Literacies* Christine Hsu, Brigette Long, and Lilly C. Lew

Presentation Sessions II: 12:00PM - 1:00PM
*Presentation times include time for Q&A

Topic: Ethnography about/with Youth

Zoom Room #1	Presentation Title/Author(s)
12:00-12:30PM	*Understanding the territory from the perspective of peasant children in rural areas in Colombia* Alba Lucy Guerrero and Laura Leon
12:30-12:45PM	*Gender-based ecologies of violence and high school sexual health education: A critical ethnography investigating a California sociopolitical controversy* Jenny Sperling
12:45-1:00PM	*Kid's perceptions of gaming experience and learning with the Nintendo Labo* Megan Chow and John Cano Barrios

Topic: Autism, Equity & Intervention

Zoom Room #2	Presentation Title/Author(s)
12:00-12:30PM	*Parental Advocacy of Service Rights to Education of Children with Autism in the Context of China: A Plot Study* Hui Zhang
12:30-12:45PM	*Love, Limits, & Learning: Combining PRIDE, PBS, and PRT into a preschool-based treatment package for children with autism, ADHD, and related neurodevelopmental disorders* Kaitlynn Penner
12:45-1:00PM	*Social Validity of Autism Intervention & Education: First-Person Autistic Perspectives* Rachel Schuck and Rachel Lambert

Topic: Strengthening Museum Experience Design

Zoom Room #3	Presentation Title/Author(s)
12:00-12:20PM	*Designing Complementary Activities for Learning in Classrooms and Field Trips to an Interactive Science Center* Alexandria Muller, Ron Skinner, and Danielle Harlow
12:20-12:40PM	*Facilitator Understanding of Effective Open-Ended Facilitation Practices in a Science Museum* Jasmine Marckwordt, Alexandria Muller, Devon Christman, Ron Skinner, and Danielle Harlow
12:40-1:00PM	*Identifying Key Components of Engineering Design Curriculum to Inform Future Curriculum Development* Alexandria Muller, Destiny Schwab, Kyle Van Loon, Danielle Harlow, Ron Skinner, and Tarah Connolly

Topic: Teacher Education for English Language Development

Zoom Room #4	Presentation Title/Author(s)
12:00-12:30PM	*Preservice Secondary Science and Mathematics Teachers' Understanding of How to Teach Multilingual Learners: A Comparison Across Programs* Alexis Spina, Valerie Meier, Stacey Carpenter, and Julie Bianchini
12:30-1:00PM	*Mathematics Teacher Attitudes and Instruction towards Multilingual Learners through Professional Development Experiences* Cameron Dexter Torti, Sarah Roberts, and Julie Bianchini

Presentation Sessions III: 1:00PM - 2:00PM
*Presentation times include time for Q&A

Topic: Supporting Underrepresented Undergraduate Students

Zoom Room #1	Presentation Title/Author(s)
1:00-1:30PM	*Understanding Learners' Ideas About Photosynthesis Within a Community College Setting: A Learning Progression Approach* Erik Arevalo
1:30-1:45PM	*Division 1 at a Research 1* Marilyn Castro

Topic: Parental Engagement, Development & Mental Health

Zoom Room #2	Presentation Title/Author(s)
1:00-1:30PM	*How Lay Health Workers Enhance Father Engagement in Mental Health Services: A Mixed-Methods Study* Juan Carlos Gonzalez
1:30-2:00PM	*Textual Silences in Alternate Assessment Resources* Sunghee Choi

Topic: STEM Education & Educator Development

Zoom Room #3	Presentation Title/Author(s)
1:00-1:30PM	*Key Facilitator Practices and Strategies Across Informal Science Education Spaces* Alexandria Muller, Danielle Harlow, and Ron Skinner
1:30-1:45PM	*Exploring How Secondary Preservice Teachers Implement Engineering* Matthew Bennett, John Galisky, Faith Hyun, Meghan Macias, Alexis Spina, Sarah Hough Pattison, and Julie Bianchini
1:45-2:00PM	*Professional Development Aligned with Leaders' Goals in Early Childhood STEM Education: A Collaboration Between Researchers and Practitioners* Meghan Macias, Alexis Spina, Leah Rosenbaum, Brittany Caldwell, Jim Gribble, and Paul Reimer

HATS OFF!

**GGSE POST-CONFERENCE SOCIAL
2:00 PM**

ZOOM ROOM 1

Wear your favorite hat!
Catch up with friends or make new ones!

Abstract Catalog

A Critical Race Analysis: Examining the Impact of Race-Neutral Policies and Practices on Opportunity Landscapes for Black Collegiate Students

Jeremy Edwards

Abstract: This poster addresses college access for Black students and its implications for academic and career opportunities. This qualitative case study work highlights policies and practices that impact students' ability to prepare for and navigate college, especially as it pertains to diversity-seeking efforts from large historically white public research campuses that are designated Minority-Serving Institutions (MSIs). I apply both Bridging Multiple Worlds (BMW) Theory and Critical Race Theory (CRT) in Education as a basis for discussion of the multiple worlds that impact college decision-making and students' relationships within a university setting. Students in this study have an invested interest in the college they choose and strong belief that their school will prepare them for the future. Students relayed how they view their university, what they feel their university can offer them professionally, and provided suggestions for improvements on campus as it pertains to racial diversity and Black representation on campus. Interviews revealed a connection between students' early educational/career goals and their college pursuits to attaining these goals. This research provides a continuum and breadth of knowledge that allows for a deeper understanding about Black student access to career-driven opportunity through education.

Activity and Storytelling in Virtual Reality

David Sañosa, Jim Gribble, Santa Iontchevska, Phoebe Tran, Sarah Kondo

Abstract: The capability of virtual reality (VR) technology to simulate virtual worlds and allow a user to experience them with heightened perception and embodied interactivity shows great potential for educational applications. There is little research, however, on how this might apply to a creative learning context for arts and literacy development. I present a qualitative case study that examines the activity that arose in exploratory sessions where youth participants were invited to create stories using a VR drawing environment. My findings show that despite the focus on storytelling, each of the four sessions examined was defined by a different main activity: building and inhabiting a place, constructing and performing a narrative, creating and playing a game, and understanding the VR system in an investigation. The participant's activity in each case developed over the course of the session in ways that were uniquely mediated by the affordances of VR tools and the social interactions with facilitators. Facilitators mediated activity in each case by being co-present with the participant in the virtual world and experiencing their objects of activity together. Tensions arose when the object of activity differed between youth and facilitators. Overall, my findings suggest that the interaction between youth participant, VR tool, and facilitator within an open-ended activity structure can lead to many types of activities that develop and take rich form across technologies and communities. In addition to these findings I will present on in-progress work on VR storytelling and the use of other digital platforms for literacy development.

Auxiliary variable visualization in mixture models: A Shiny application

Dina Arch, Adam Garber, and Karen Nylund-Gibson

Abstract: This proposal presents an online application that may be used to visually display auxiliary relation information in the context of mixture models. Data visualization in mixture models may appear as trivial tasks to some methodologists (e.g., producing bar charts of conditional latent class probabilities, computing conditional transition probabilities, etc.), but is often less obvious to others. For example, covariate relations in a latent class analysis (LCA) are often presented in a table of logit coefficients; however, what likely would be more intuitive for interpretation of those logit values were plotted in bar charts for easy interpretation. Conventions for data and model results visualizations in the mixture model

setting are virtually nonexistent for both methodologists and applied users. As a consequence, even the most simplistic graphical displays and numerical summaries of model results are not automatically generated in software packages used to estimate the mixture models. The current necessity of transferring model results to produce visual displays that effectively communicate the meaning of the results to non-technical audience results in most of these post-processing tasks never being done, impeding the researcher's understanding of their results as well as limiting the explanation and discussion thereof. There is a sizable amount of research related to mixture models that present methodological innovations, developments, and model extensions that are often written by methodologists for methodologists. Our new, work-in-progress methodological innovation creates a tool that can easily create figures for mixture models. This methodological innovation, designed using Mplus, R, and Shiny in R, provides support for the use of graphical presentation of findings, not relying on just reporting statistical parameter estimates. By supporting the use of graphics and visualizations, the results of these complex models are made more accessible to a broader audience, increasing the impact of the work.

Changes in Desired Career and College Major in 4-6th Grade Youth as a Result of Participation in STEM Programming

Priya Ravi, Nathalie Paesler, Alexandria Muller, Sarah Hirsch, Diana Arya, and Mallory Rice

Abstract: There are many studies showing how engagement with after school STEM programs increases the interest of youth in STEM (Riedinger et. al, 2016). However, few studies have focused on how participation in a STEM outreach program, specifically female-orientated , affects not only young girl's interest in STEM, but also their desire to pursue a major and/or career in STEM. The Curie-osity project focuses on connecting female, or non-binary scientists and engineers at UCSB with young girls, elementary to high school age, from a local after school program. The goal of this program is to demystify the STEM field and encourage youth to pursue STEM interests. To accomplish this, the girls attend weekly visits to UCSB's campus where they interview female professionals working in a STEM field. Afterwards, they participate in a hands-on activity relating to the work of the faculty. The goal of this study is to see how youth participation in the Curie-osity project affects young girls' interest in STEM, with a focus on youth career and college major interests. This study will be conducted through the analysis of coded pre- and post-program interviews with the girls, for the years of 2016 to 2019. The poster will present findings from these interviews which will allow us to see if the Curie-osity project influences the outlook and future prospects of participants during their time within the program.

Computer-assisted Heart Rate Variability Biofeedback and Sentence-Writing Performance in Students with High-Functioning Autism

Destiny Hoerberg, Dena Kaplowitz, and George Singer

Abstract: The purpose of this proof of concept pilot study was to evaluate the efficacy of HRV biofeedback with three children with autism on an independent writing task associated with a history of anxiety-based task avoidance and escape behavior. The dependent variables were indicators of performance on an academic task which typically elicited behaviors and behaviors associated with anxiety. The children were taught how to use a computer assisted heart rate variability biofeedback system. Two conditions were compared using an alternating treatment design. In one condition, the students were asked to write a request for a preferred item or activity which they obtained upon completing the task. In the other condition they played a computer game providing biofeedback for ten minutes prior to receiving the same task instructions. The participants (n=3) were 1st–3rd grade male students with high-functioning autism, behavioral symptoms of anxiety, and a history of avoidance of expressive writing tasks associated with problem behaviors. Results: All three of the participants had better outcome measurements in the "with biofeedback" condition. Each showed shorter response latency, increased writing speed, and higher writing quality ratings in the biofeedback condition than in the trials

conducted without biofeedback. Analysis of the results shows a clear improvement in response time after biofeedback for each of the three children. Additional trends that can be observed from the data in each figure covering all three children and in all three tested categories include decreases in variability in both conditions over time and an overall improvement over time. Conclusion: In conjunction with previous research findings on learning and arousal-modulation in autism, these research findings suggest that computer-based heart rate variability biofeedback may help to reduce hyper-arousal and anxiety to increase available attention and ability to perform academic tasks (McCraty, 2005) for lower elementary-aged students with high-functioning autism.

Designing Complementary Activities for Learning in Classrooms and Field Trips to an Interactive Science Center

Alexandria Muller, Ron Skinner, and Danielle Harlow

Abstract: Partnerships between schools and other institutions can create new opportunities for learning that leverage the affordances of multiple types of institutions. For example, informal science institutions, such as science museums provide rich learning opportunities for youth that can complement school learning. However, how to effectively design materials for these different types of institutions that are mutually beneficial is not well understood. We explore how to effectively design modules of activities that leverage the unique affordances of schools and an interactive science museum to result in students learning science through the practices of science and engineering during a field trip program and in pre and post activities completed in elementary school classrooms. This work presented here is part of a larger project which follows a design-based implementation research (DBIR) model and is conducted through a long term Research-Practice Partnership (RPP) between a research university and an interactive science center. Six design principles for developing complementary school and field trip activities are presented based on iterative development and testing the field trips and activities with 18 classrooms ranging from grades 1 through 6 and representing a range of demographics.

Designing Social Realities: Examining Youth's Identity Development Through Multimodal Literacies

Christine Hsu, Brigette Long, and Lilly C. Lew

Abstract: This poster presentation focuses on youths' identity development through digital storytelling in a community-based after school program. Although there have been several studies that explore this phenomenon, this pilot study uncovers ways in which elementary school-aged girls articulate their vision and demonstrate individual agency by grappling with creative decisions while engaging in multimodal literacies. In order to investigate youth's perspectives of their participation, researchers interviewed 2 girls about their experience digital storytelling on-site, their sources of motivation, and hypothetical questions regarding various degrees of group participation. The research team captured their responses with video and audio recording from two cameras. Afterwards, research team construct a multimodal transcript with event-mapping of the video footage and audio transcriptions. In addition to the multimodal transcripts, researchers include a cross-case analysis of interview responses from both cases. Thus, the visualization of these analyses unveils youths' relationships established through negotiation, social positioning of team members, consequential progressions of events, as well as human-computer interaction. This case study includes multi-layered evidence that reveals how elementary school-aged girls represent their social realities by creating digital artifacts and use readily available technologies to design their worlds. The implications of this study address systemic inequities with technology use among girls in under resourced communities as well as alludes to opportunities for digital citizenship and social empowerment.

Differences in Benefits From Participation in a STEM Outreach Program for Undergraduate STEM and Non-STEM Facilitators

Kelly Vu, Alexandria Muller, Mallory Rice, Diana Arya, and Sarah Hirsch

Abstract: Participation within outreach programs has shown to be beneficial for undergraduate mentors of K-8 STEM programs (Nelson et al., 2017); however, there is little research into the extent of these benefits (Carpenter, 2015). The Curie-osity Project works with elementary- to high school-aged girls to promote women in STEM by engaging them in research and other science-based activities with various female scientists and engineers at the University of California, Santa Barbara (UCSB). Undergraduate facilitators guide the girls through reading discussions about female scientists, watch over them during on-campus tours and associated activities in different labs and research sites, and assist the girls through interviewing and writing about the different scientists they have met throughout the program. Although the program is designed to heavily emphasize female involvement in STEM fields, the undergraduate facilitators consist of both STEM and non-STEM majors. This study aims to understand differences in the perceived benefits of participation between STEM and non-STEM major facilitators. To determine if there is a difference between the experiences of STEM and non-STEM facilitators, pre- and post-interviews of the facilitators will be conducted, focusing on their experiences facilitating various lab tours and STEM activities. This poster presentation will present the preliminary findings from pre-program interviews with facilitators. We will focus on four case studies (two STEM and two non-STEM majors) and elaborate on specific experiences based on differences in their STEM background.

Division 1 @ a Research 1

Marilyn Castro

Abstract: As universities continue to face increased pressure to produce measures of accountability for the retention and graduation of their student bodies, a look at various at-risk student populations has warranted a deeper look at student-athletes, who as a collective have faced growing scrutiny under the legions of academic misconduct brought to light in recent years (Leveille, 2005; Huml, Bergman, Newell, & Hancock, 2019). The governing body of intercollegiate athletics, otherwise known as the National Collegiate Athletic Association (NCAA), in response to the increasing disconnect between intercollegiate athletic values and those held from their host institutions, have made broad strides in implementing initiatives focused on degree advancement. Despite the academic legislation implemented by the NCAA in efforts to hold programs accountable for their athletes' academic progress, such as the Academic Progress Rate (APR) and 40/60/80, student-athletes continue to face a unique litany of challenges as a "specialized campus population" (Ting, 2009, p. 215). This nontraditional status of student-athletes has helped juxtapose their experiences with those of the majority student population. First-year student-athletes in particular are expected to successfully adjust to the academic rigor and social expectations that come with the first-year experience, however, unlike traditional students, they are also expected to quickly adjust to the athletic expectations of intercollegiate competition (Gaston-Gayles & Baker, 2015). Therefore, the purpose of this exploratory study is to get a better understanding of the first-year experience of student-athletes in a public research university, shedding light on the stressors identified by these Division-1 athletes.

Exploring How Secondary Preservice Teachers Implement Engineering

Matthew Bennett, John Galisky, Faith Hyun, Meghan Macias, Alexis Spina, Sarah Hough Pattison, and Julie Bianchini

Abstract: This work-in-progress examines the implementation of engineering in edTPAs (teacher performance assessment portfolios) for preservice teachers in local secondary science classrooms. Implementing engineering activities in secondary science classrooms is not always easy for practicing

teachers, let alone preservice teachers. With the implementation of the Next Generation Science Standards (NGSS), science teachers are now expected to explicitly incorporate various science and engineering practices (SEPs) into their teaching practice. Preservice teachers, however, are not required to implement engineering in the lessons used for their edTPAs. We are exploring how preservice teachers engage students in the engineering design process (EDP). To conduct this study, we are analyzing approximately 50 edTPAs completed across 7 years. EdTPAs were first reviewed to find those in which engineering was used in some form (e.g., as a component of an overall unit; as an overall context in which a particular lesson exists). We are now reading through lesson plans and instructional, planning, and assessment commentaries to code for SEPs and aspects of the EDP. This process has led to a clarification of our codebook, specifically what qualifies as engineering, and subsequently what part or subpart of the EDP is demonstrated. In order to clarify what qualifies as engineering, we considered the NGSS and various other descriptions of the EDP and its components and subcomponents. Preliminary findings indicate that preservice teachers may utilize the EDP in their lesson plans differently in schools where engineering is a focus for the school compared to those in schools where engineering is not a focus. Further, there are various degrees to which preservice teachers can engage students in the EDP, especially for those science concepts which could easily be taught with or without some connection to engineering.

Facilitator Understanding of Effective Open-Ended Facilitation Practices in a Science Museum

Jasmine Marckwordt, Alexandria Muller, Devon Christman, Ron Skinner, and Danielle Harlow

Abstract: Facilitating science museum exhibit engagement and associated discussions is a challenging task as many educators work simultaneously with children and adults of a range of ages, backgrounds, and goals. Additionally, research has shown that informal science educators need to be immersed in long-term professional development that involves active learning, reflective practice, and collective learning through a peer group in order to abstain from didactic teaching methods (NAP, 2016). The University of California at Santa Barbara (UCSB) and MOXI, the Wolf Museum of Exploration + Innovation, have partnered to create a year-long apprentice program where museum facilitators participate in a wide array of professional development opportunities. The program participants attend weekly classes that cover an array of topics from good facilitation practices to accessibility training. In addition, each participant works 20 hours a week on the museum floor facilitating science engineering experiences with guests. Participants are interviewed three times throughout the program using a semi-structured interview protocol. This study examines how participant views of open-ended facilitation practices change throughout the course of the program. We will present a case study of three apprentice program participants of varying backgrounds and discuss their initial understandings of successful open-ended facilitation practices.

Gender-based ecologies of violence and high school sexual health education: A critical ethnography investigating a California sociopolitical controversy

Jenny Sperling

Abstract: The majority of U.S. public schools' sexual health education is truly limited, characterized in many states by abstinence-only frames and polarized dissent among parents, educators, and community members. Content and instruction unfairly affect youth of color, teens with disabilities, and LGBTQ+ identified youth, as both formal and hidden curriculum, reproduce hegemonic whiteness and middle-class heterosexuality (Elia & Eliason, 2010). Gender normative, racialized, and heterosexist discourses are common practice for many teachers who have ideologies stemmed in stereotypes and implicit biases, or from teachers who have received minimal preparation for teaching sexuality education (Garcia, 2009; Kumashiro, 2001). Each of these contributes to, and sustains, what I theorize as a gender-based ecology of violence for minoritized adolescent youth that is potentially perpetuated and reproduced through school-based sexual health education. California's Healthy Youth Act (AB 329) mandates inclusive,

medically accurate, comprehensive sexual health and HIV prevention education in public schools. However, even though community uproar grabs media attention and school board meetings bubble with public comment, it remains unclear as to what students are experiencing and making sense of inside educational learning spaces like high school classrooms and after-school youth organizations. Methodologically, this 2-year critical and feminist multi-sited ethnography includes not only the physical locale of a public high school (and its daily curricular activities through fieldnotes, participant observation, and interviews) but also local community spaces such as participation with after-school organizations, public gatherings within the community, school board meetings, and online social media groups—all of which inform students' academic experiences. In sum, this is a project of humanitarianism; one that speaks to the importance of preparing youth for their futures, empowering them with knowledge to be agentive about their bodies and informed about their decisions when it comes to their sexual health. It is a political (and therefore personal) project intended to not only contribute to scholarly literature and advance fields of research, but as a commitment to actively fight stigma and systems of oppression.

How Lay Health Workers Enhance Father Engagement in Mental Health Services: A Mixed-Methods Study

Juan Carlos Gonzalez

Abstract: Significant disparities exist for engaging Latino fathers in behavioral parent training programs (BPTs). In general, racial/ethnic minorities are less likely than whites to access mental health care and receive poorer quality of care. BPTs specifically have been developed and evaluated with mothers, thus excluding the perspectives of and towards fathers (Panter-Brick et al., 2014). It has been posited that father engagement in and attitudes towards treatment may be qualitatively different. While limited research characterizes Latino father engagement in their children's mental health care, promising findings exist when investigating father engagement more broadly. A meta-analysis showed overall enhanced child and parenting outcomes when fathers participate actively in BPTs (Lundahl et al., 2008), which fosters support for more research understanding how to better engage Latino fathers in treatment. Barnett and colleagues (2018) offer a conceptual model that describes how lay health workers (LHWs) can play an important role in the reduction of previously documented disparities among racial and ethnic minority families by means of addressing both supply determinants (few culturally appropriate providers), as well as demand determinants (unaware of services, stigma, barriers to care) among underserved communities. LHWs offer unique and valuable perspectives in the development of implementation interventions which aim to maximize the impact of EBPs. However, given that this workforce is predominantly composed of women, it is not clear what their attitudes and feelings of competence are regarding father engagement. Given the understudied nature of Latino father engagement in BPTs, the current study utilizes a mixed-methods approach (quan + QUAL) to characterize LHW current attitudes towards, use of, and confidence using father-specific engagement strategies. Fifteen Latina LHWs rated themselves on five-point scales as having positive attitudes towards (M=4.62, SD=.75) and moderate use of (M=4.00, SD=.95) father-specific engagement strategies. Confidence, however, was rated the lowest amongst these constructs (M=3.52, SD=.70), suggesting a possible need for training and support. Qualitative themes expanded on these findings highlighting positive attitudes of engaging fathers, reported barriers to engaging fathers specifically, and suggested recommendations for future use of father engagement strategies. Implications for implementation science outcomes are discussed.

How Participation in STEM Focused Programming Resonates with Youth

Hailey Clemens, Alexandria Muller, Mallory Rice, Diana Arya, and Sarah Hirsch

Abstract: Early exposure to STEM fields is vital for students to develop interests in STEM enough to pursue an eventual career in it (Tai et. al, 2006). Unfortunately, most programs designed to increase interest in STEM fields are targeted at high school and higher education students which is too late. The

Curie-osity project aims to engage young girls (fourth through sixth grade) in science and engineering, with the hopes that they might consider pursuing STEM in the future. Participants work together over the course of 20 weeks to develop interview questions, interview female scientists and engineers at the University of California at Santa Barbara, tour labs and engage in hands-on STEM activities that relate to the scientists' research interests. For the first ten weeks, the youth participants spend one hour each week on the university campus with a new female researcher learning about both their journeys in STEM as well as their active research. At the end of each visit, students complete short video diaries to document their favorite activities, what they learned, and fun facts about the scientists they met. This study aims to identify what the girls take away from their interactions with the scientists and their visits to the lab. Preliminary data analysis has shown two main categories of retention: (1) scientific content related to the scientists' research and (2) the relatability of the scientists through their journeys and daily life. First, we will analyze the video diaries the girls complete after their lab visits using coding methods informed by grounded theory. Secondly, we will also analyze the post-interviews which are completed at the end of the program to determine what information was retained throughout the entirety of the program and had the most lasting impact on the youth. This poster presentation will present preliminary conclusions from the first analysis of the video diaries and outline what the youth participants found to be the most interesting part and what resonated with them the most.

Identifying Key Components of Engineering Design Curriculum to Inform Future Curriculum Development

Alexandria Muller, Destiny Schwab, Kyle Van Loon, Danielle Harlow, Ron Skinner, and Tarah Connolly
Abstract: Engineering is becoming more prominent in K-12 education as the Next Generation Science Standards (NGSS) are being adopted into school science curriculum. Unfortunately, many teachers do not feel comfortable teaching engineering within their classrooms due to their lack of expertise or experience (Trygstad, 2013). To help teachers bring engineering into their classrooms, the University of California at Santa Barbara and MOXI, the Wolf Museum of Exploration + Innovation, have teamed up to develop nine engineering field trip modules. These modules consist of two classroom pre-activities, one field trip to MOXI, and one classroom post activity, all centered around engineering design challenges that are accessible to students at various grade levels. Considering the goal of making engineering curriculum more accessible to teachers, it is crucial that these curriculums are versatile to fit into the classroom structure and maximize the comfort of the teacher. This study aims to identify what teachers value in these activities, which will be used as guidelines for future engineering curriculum development. We will use interviews from teachers who have either observed or tested the pre- and post- modules in their classrooms to identify common values of engineering activities between K-6th teachers. This presentation will detail these findings as well as present a set of concise guidelines for future engineering curriculum development.

Identifying the Building Blocks of Social Emotional Learning

Konnor McMillen
Abstract: Social emotional development is a hot topic in K-12 education at the moment. There has been an abundance of research that outlines the benefits of investing in students' social emotional health including reduced suicidal ideation, better school culture, higher academic performance, increased empathy for others, and much more. Non-profits, educational organizations, school districts and others have spent time and resources exploring what are the best ways to promote these social emotional skills. An issue I believe researchers are overlooking, however, has to deal with the amount of variation amongst students individually and groups of students. There is an emphasis on "universal programs" or a "one-size-fits-all" curriculum that can be implemented on a wide scale, but the problem might be that this is not practical. Not only do students have different individual experiences, but geographic differences

and demographics should be taken into consideration as well. For example, what works for a student in California might not work for a student in Illinois or Arkansas. There is so much variation to take into account that it can be overwhelming. The idea behind this proposal deals more with using a mixed method design to determine what the key aspects of "successful programs" are. Before we worry about curriculum and outcomes, are there certain things that a SEL program needs as a foundation in order to be successful? This is the question at the heart of this idea and proposal.

Implications for STEM Retention and Career Aspirations through a First-Year Biology Seminar
Krista Lucas and Danielle Harlow

Abstract: There continues to be more STEM jobs than qualified graduates to fill these positions, and recruiting students into STEM majors is insufficient. We know that of students who enter college intending to pursue STEM, nearly half do not finish their STEM degree. Here, we focus on retaining students who enter college with a declared biology major. This qualitative study examines this retention issue through the lens of identity theory, situated learning, and constructivism, in the context of a research-focused biology first-year seminar at a small, private university. It was found that the six participants felt more like scientists at the conclusion of the semester-long seminar, and all were planning to remain in the biology major and in STEM career pathways.

Key Facilitator Practices and Strategies Across Informal Science Education Spaces
Alexandria Muller, Danielle Harlow, and Ron Skinner

Abstract: Effectively facilitating visitor learning experiences in museums is complex. Yet, little is understood about what such training should include and how it should be delivered, especially if the training is to be useful across multiple informal contexts. Many informal education institutions currently offer training, but these vary greatly and often consist of observations or shadowing of existing facilitators. Motivated by the goal of developing a model for facilitator training, we conducted a three-round delphi study to identify practices and associated strategies valued by experts in the informal science education field. The first round gathered qualitative information about skills, practices and ideas experts in museum facilitation valued within their facilitators which led to the development of sixteen different key practices. The second round gathered both qualitative and quantitative feedback from the same museum experts on these sixteen practices and how they applied to the general informal science facilitation field. This information was used to narrow down the practices to those that were standard across the informal science education field. The final practices from this analysis will be sent out in a third round of expert feedback with the goal to reach consensus across the field about what facilitation practices are valued within these museums. These practices can inform future professional development and training programs. This paper discusses the first two rounds of the three-round delphi study and the objectives for round three.

Kid's perceptions of gaming experience and learning with the Nintendo Labo
Megan Chow and John Cano Barrios

Abstract: In this paper we explore the various interactions and applications in Nintendo Labo, a toys to life concept developed by Nintendo. Focusing on the roles of engagement, knowledge utilization and acquisition of new concepts, this paper broadens the general understanding of how video games elicit active learning. Within the past two decades there has been extensive analyses on the relationship between video games and learning. Gee (2004) has pioneered this area of research and brought to light the advantages of video games. When we think of video games, we often refer to the pleasurable and unpropitious properties. However, researchers have helped surface the underlying advantages that are associated with playing video games. The purpose of this paper is to provide a framework of analysis from which to interpret the experiences from the participants' perspective, when an unconventional video

game is used in an informal learning environment. The study was conducted at the University of California Santa Barbara, during a literacy summer camp for kids. The ages range from seven to twelve. Four groups were studied, with each group constructing a different object. A multiple case study was conducted using an ethnographic approach, as this was deemed the most appropriate to understanding a child's perception about their gaming experience. Furthermore, we analyzed each group's perceptions of their gaming experience and how such experience allowed the participants to use their prior knowledge to understand science-related content using two conceptual lenses.

Love, Limits, & Learning: Combining PRIDE, PBS, and PRT into a Preschool-based Treatment Package for Children with Autism, ADHD, and Related Neurodevelopmental Disorders
Kaitlynn Penner

Abstract: Background: For children with neurodevelopmental disorders, limited engagement, poor social-communication skills, and challenging behaviors can be a barrier to full integration and participation in the preschool setting. The use of PRIDE skills from Parent Child Interaction Therapy (PCIT) show promise in improving adult-child engagement and relationships for children with and without autism (Zlomke & Jeter, 2019). Research also indicates that there are several child-centered approaches, such as Positive Behavior Support (PBS; McLaughlin & Smith, 2017) and Pivotal Response Treatment (PRT; Koegel, Koegel, Vernon, & Brookman-Frazee, 2018) that are effective in promoting pro-social skills and decreasing challenging behaviors. Although these strategies have some similarities and all have promising empirical evidence, they remain part of separate models that have not yet been combined into a single treatment package. If effective, the combined use of these strategies may prove to be particularly effective in decreasing challenging behaviors, improving learning of social-communication skills, and promoting sustainable friendships in the preschool setting. Objectives: The current study adapted and combined the positive strategies from multiple intervention models to create a preschool treatment package. Specifically, PRIDE skills, the strategies of PBS, and the motivational strategies of PRT were adapted and combined systematically and sequentially in order to build positive relationships, decrease engagement in challenging behaviors, and improve communication and social skills. This package focuses on using these strategies in the child's natural preschool setting. The study set out to see how these combined motivational techniques can be applied in the context of the preschool setting and the children's response to combining these behavioral strategies in a novel way. Methods: A multiple baseline experimental design is being employed to evaluate the sequential addition of intervention components. Ten undergraduate-level paraprofessionals were recruited to work with three preschool-aged students. Student participants were identified by the child-care center as having significant social, communication, and/or behavioral challenges associated with ASD. Baseline videos were first captured without use of any interventions. During intervention phase, participant students were provided with ten hours of intervention per week for ten weeks. Participants will receive one week of PRIDE skills, two weeks of PBS (combined with PRIDE), and seven weeks of PRT (combined with both of the previous interventions). Fidelity of implementation data will be the primary outcome for the undergraduate paraprofessional participants. Behaviorally coded challenging behaviors, social initiations, and social responses will be coded for student participants. Results: Preliminary data from the first two phases of intervention will be analyzed and reported. Conclusions: This preliminary research may help inform the development of an combined intervention package for preschool setting that improves paraprofessional-student relationships, decreases challenging behaviors, and improves social-communication skills in children with autism and related neurodevelopmental disorders. Because such challenges are increasingly common in preschool settings, this approach may facilitate optimal student engagement by addressing multiple areas of concern simultaneously.

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Mathematics Teacher Attitudes and Instruction towards Multilingual Learners through Professional Development Experiences

Cameron Dexter Torti, Sarah Roberts, and Julie Bianchini

Abstract: The need for a focus on multilingual learners has increased due to the population of multilingual learners in K-12 environments increasing in recent years. The need to attend to multilingual learners in mathematics classrooms is more urgent with the implementation of Common Core State Standards-Mathematics. In addition to a change in curriculum, there are also differences in the ways students access the curriculum and interact with itself and one another. Teachers have not received adequate professional development regarding multilingual learners to combat biases and perceptions implicitly ingrained throughout the education system, leading to increased instances of microaggressions involving deficit-based biases and perceptions held by teachers. This is especially prevalent in mathematics classrooms in which teachers must navigate linguistic barriers in a content area often perceived as being "language-less" due to the prevalence of numbers. This study implemented a Studio Day cycle professional development with inservice teachers working with multilingual students in Math 1 classrooms. The Studio Day cycle provided multiple opportunities for interaction and the sharing of expertise while providing objective data on each participants' own practices. Through their participation in the Studio Day cycle, teacher perceptions shifted away from deficit-based thinking while improving multilingual learners' ability to access mathematical text.

Mixture Models: Calculate the Explained Variance in Distal Outcomes from the Categorical Latent Variable

Delwin Carter

Abstract: The inclusion of auxiliary variables in mixture models is an active area of research. The addition of both covariate and distal outcome variables creates a context where the latent categorical variable becomes a mediator in a mixture mediation model. This paper provides a framework for calculating $R2$ of the added value of the categorical latent class variable in the outcome via mixture modeling with covariates and distals outcomes. Utilizing the Cox and Snell $R2$ normally used in logistic regression, a $\Delta R2$ is calculated between the regression model and the mixture model, thus providing an estimate of $R2$ usable to explain the added value of the latent class variable above and beyond the covariates. To demonstrate the estimation of $\Delta R2$ an example that examines heterogeneity in depression (measured by the Patient Health Questionnaire - 8) in 1st generation Latino/as using Mplus software is illustrated. This paper presents a basis for calculating the additional contribution of a latent class variable in the context of the mediation mixture model. Calculations, Mplus syntax, and an illustrative example are included.

Moving Towards Meaning Making in Multiplication: A Preliminary Report of an Intervention in Number Sense

Tomy Nguyen, Rachel Lambert, and Monica Mendoza

Abstract: Previous research on mathematical education for students with disabilities center on deficits to prescribe behavioral interventions to remedy those deficits. Most schools in the US adopt and implement Multi-Tiered Systems of Support (MTSS) interventions that often do not align with the Common Core Standards. This creates difficulties for students to build mathematical meaning and sensemaking to allow for multiple approaches to mathematics. By shifting the focus to opportunities to make mathematical meaning instead of deficits within the student, an intervention was designed for elementary students (grade 4-6) who are significantly underperforming in multiplication and division including English language learners and students with disabilities. The interventions are designed to encourage student engagement in problem solving, discussions, mathematical practices, and building mathematical number sense with others. Undergraduate tutors facilitated eight number strings in small group instructions of 3-6 students over four weeks. Number strings are short instructional routines where questions are designed in

a sequence and shown one at a time. The number strings and facilitators encourage students to engage in mathematical discourse of their own thinking of math strategies and of other students' math strategies instead of pure mathematical procedure. By focusing on describing strategies, connections, and adaptations of their own and other's strategies, student mathematical and participation growth for those who are significantly underperforming can be observed. In this brief paper, development of a 4th grade intervention group was analyzed to show potential shifts in participation, conceptual understanding, and procedural understanding. Student discussions were analyzed and categorized in a tiered category of engagement and ability to share complete strategies. The research questions for this brief report are 1) how does participation in mathematical intervention promote student meaning-making and discussion, 2) what shifts in participation are evident, and 3) what shifts in conceptual and procedural multiplication emerged?

Organizational Routines of Teacher Education

Michael Danhauser

Abstract: Teacher Education Programs (TEPs) are organizations that are highly routinized. In most 1-2 year graduate programs, every cohort of students is taught, placed into student teaching, and assessed. While routines are generally associated with consistency and in some cases, monotony, research has shown how routines can be a source of change, connection and understanding (Feldman, 2000; Feldman & Rafaeli, 2002). Here, I propose that research should be conducted to answer the following research question: How do organizational routines impact TEPs? Utilizing a qualitative case study design, consisting of interviews, focus groups and observations, I propose treating a single TEP as a bounded case. In a time when teacher education is highly scrutinized, it is imperative to understand what TEPs are doing well and where improvements can be made. This research would add to the existing literature as investing organizational change has rarely been investigated in teacher education (Peck et al., 2009).

Parental Advocacy of Service Rights to Education of Children with Autism in the Context of China: A Plot Study

Hui Zhang

Abstract: Participants: 17 randomly recruited parents of school-age children with autism in China (with IRB approval) Research questions: The overarching research question guiding this inquiry is: What are the experiences of Chinese parent advocates of children with Autism for the service right to education? More specifically, what situations have contributed to their advocacy, commitment, approach they adopt in their effort to achieve educational equity for their children with Autism? Methodology: A protocol of questions will guide the interviews, and the interviews will be shaped to some extent by the focus of the interviewees. A demographic questionnaire will be distributed to participants and returned before interviews. Preliminary findings: Implementation of "Attending to regular school" policy; Bullies and stigmatization not only to the children, but also to their parents; Ideology related issue: Confucius and social Darwinism Religious belief and its influence to parents' advocacy

Preservice Science Teachers' Understanding of Instruction for Diverse Learners: A Focus on Funds of Knowledge

Meghan Macias, Stacey Carpenter, Alexandria Hansen, Elisa Stone, Erik Arevalo, Matthew Shackley, and Julie Bianchini

Abstract: In this mixed-methods study, we are analyzing survey and interview data to examine how 69 preservice secondary science teachers from three University of California teacher education programs understood four interrelated principles of effective science instruction for diverse learners: (1) building on students' funds of knowledge and other resources, (2) engaging students in cognitively demanding work, (3) providing students with rich language production opportunities, and (4) attending to academic

language demands and supports. Our analysis focuses on the principle of building on students' funds of knowledge and other resources, specifically how preservice teachers conceptualized this principle, the types of student knowledge and resources that preservice teachers recognized and used, and intersections with the other three principles. We center our analysis on this principle because building on students' everyday experiences, interests, and home and community contexts to inform science classroom instruction makes the science more meaningful to all students and can improve participation and learning for underserved students, in particular. Findings thus far suggest areas where science teacher educators can better support preservice teachers, such as with making connections to students' cultural backgrounds and community resources, drawing on students' linguistic resources to support academic language beyond vocabulary terms, and activating students' funds of knowledge when engaged in the cognitively demanding work of science and engineering practices.

Preservice Secondary Science and Mathematics Teachers' Understanding of How to Teach Multilingual Learners: A Comparison Across Programs

Alexis Spina, Valerie Meier, Stacey Carpenter, and Julie Bianchini

Abstract: Given demographic shifts and equity concerns, teacher education programs must prepare their preservice teachers (PSTs) to effectively teach English Learners (ELs). This study analyzed interview data from 100 science and mathematics PSTs enrolled in four California universities to learn how they understood effective EL instruction, how prepared they thought themselves to teach ELs, and the sources they identified as useful in their preparation. Results suggest that PSTs from the four campuses held similar understandings of how to teach ELs, with most PSTs focusing on scaffolding language and few explicitly attending to cognitive demand. Across programs, PSTs identified having culturally and linguistically diverse students in their placements and program coursework as the two most important factors contributing to their preparation.

Professional Development Aligned with Leaders' Goals in Early Childhood STEM Education: A Collaboration Between Researchers and Practitioners

Meghan Macias, Alexis Spina, Leah Rosenbaum, Brittany Caldwell, Jim Gribble, and Paul Reimer

Abstract: Previous literature has documented that the early introduction of developmentally appropriate mathematics education can have long-lasting impacts on children's persistence in math as well as in a range of other academic domains (NAEYC & NCTM Position Statement, 2010; Piasta, et al., 2015). Research also suggests that young children's play can be a rich resource for this developmentally appropriate work (Wager & Parks, 2015). Thus, early childhood is an important developmental period that is ripe for opportunities to engage students in deeply meaningful, intentionally playful, and culturally relevant mathematics experiences (Dobbs, Doctoroff, G., & Fisher, P., 2003). In order to address this need for early mathematics education, professionals who work in early childhood education settings need intentional supports and professional development opportunities. While the literature regarding effective professional development itself is extensive, drawing on and incorporating the needs of the participants from the beginning is an area that is underresearched (Garet et al., 2001). This study examines collaboration amongst researchers and practitioners to advance an early childhood mathematics professional development program that draws on the self-reported needs of the participants, and how the professional development reflects these needs. Researchers draw on initial and mid-project interviews with four groups of early childhood educators across the state of California to examine how the professional development aligns with their needs.

School Kids Investigating Language in Life and Society: Growing pains in creating equitable and dialogic learning environments

Samantha Harris, Jin Sook Lee, Valerie Meier
Abstract: Challenging the assumptions that English proficiency must precede meaningful engagement with demanding content and the practices that support such beliefs, this paper examines how a university-school partnership program--School Kids Investigating Language in Life and Society (SKILLS)-- was used to create culturally relevant and inclusive classroom learning opportunities for multilingual learners using a college-level sociocultural linguistics curriculum. We use 'multilingual learners' (MLs) to refer to students who have been institutionally designated as English learners to emphasize their holistic identities as multilingual, multicultural beings. We present pedagogical examples of efforts to foster students' ability to recognize and analyze sociolinguistic discrimination, injustice and exclusion and discuss the challenges involved in creating an equitable, dialogic, and participatory learning environment. The data come from a larger data set of 30 hours of video-taped classroom interactions; artifacts of student work, including students' original SKILLS Day research posters; and reflection notes written by the two SKILLS instructors. We present two examples of lessons from a SKILLS classroom of eighteen 9th-12th grade ML's. We analyze the video-taped classroom interactions paired with the corresponding reflection notes to identify instructors' intentional efforts to engage students in dialogic interactions while also noting missteps and missed opportunities and students' ability to foster dialogic interactions by creatively utilizing their multilingual abilities. Finally, we connect students classroom work in SKILLS to their final SKILLS Day projects and explore how SKILLS Day operates as a site where their language practices are publicly affirmed by teachers, peers, and scholars while giving students a platform to inform attendees about their linguistic and cultural expertise and to be taken seriously in an academic setting. Based on our findings, we propose some strategies and conditions to create meaningful opportunities for increased dialogic interactions that may lead MLs to different forms of civic engagement.

Social Validity of Autism Intervention & Education: First-Person Autistic Perspectives
Rachel Schuck and Rachel Lambert
Abstract: First-person, autistic perspectives can provide invaluable information about what it is like to have autism. One of the main things that autistic people, particularly children, do on a regular basis is attend school and receive additional interventions. There are thousands of research studies on various educational and intervention programs for children and adolescents with autism. Many of these studies assess effectiveness by measuring "objective" outcome variables, such as increases in spoken language or decreases in disruptive behavior. Some studies also assess social validity, the extent to which the intervention is seen as acceptable and useful to participants. For example, did participants find participation enjoyable? Do they plan to continue implementing the intervention even after the study is over? However, even when social validity is assessed, it is most often done by asking parents or teachers; rarely are autistic individuals' opinions taken into consideration. Given the history of autism intervention – e.g. its use of punishment, the purported goal to "cure" children of their autistic traits and return them to "normal" – it seems especially important to try to consult those receiving treatment in order to ensure mistakes from the past are not repeated. While formal assessment of autistic individuals' views of educational programs in research studies is rare, the current research project aims to retroactively assess the social validity of such programs in two ways. The first is to apply a narrative analysis to blog posts by autistic individuals in order to learn more about how they feel about the education they received. The second portion of the project will consist of interviews with autistic adolescents and adults in order to learn more about what in education/intervention worked for them, what did not, and what ideas they have for the future of the field.

STEM Programs' Impact on School Subject Interests of Girls
Claire Chen, Janee Roche, Alexandria Muller, Mallory Rice, Diana Arya, and Sarah Hirsch

Abstract: Exposure to STEM fields through out-of-school time (OST) programs have been shown to increase STEM-related interest and belonging in young girls (Adams et al., 2014), but there are few studies that show how these programs impact girls' subject interests in school. The Curie-osity project is a program that works to expose girls from 4th to 6th grade (ages 10-12) to extra STEM-related activities through close interactions with women scientists and engineers from the University of California at Santa Barbara. Under the guidance of undergraduate students, participants participate in science activities, interview female scientists about their research, and learn about women in scientific history. The aim of the Curie-osity project is to encourage girls to pursue STEM related interests. This current study aims to understand whether participation in the Curie-osity project affects the school subject interests of youth participants. We will track differences in school subject interests before and after participation in the program by examining coded pre- and post-interviews of participants from three consecutive years of the program (2016-2019). The interviews will be coded to identify school subject interests, and the findings will be used to run a paired sample t-test. This test will determine if STEM focused programs have a statistically significant impact on the school subject interests of girls. The interviews will also be coded to identify why the program may or may not change participants' interests in STEM subject areas. This poster will include findings from pre- and post-interviews that indicate whether the Curie-osity project influences girls' interests in STEM, specifically in school.

Structural Invariance in Multigroup Latent Class Analysis: Perception of Disability Status and Academic Expectations

Adam Gerber and Karen Nylund-Gibson

Abstract: Measurement invariance (MI) in the latent class (LCA) context has a number of unique challenges both in application and conceptualization (Kankaras, Moors, & Vermut, 2011). This is in contrast to the factor analytic context which is well established and applied (Vandenberg & Lance, 2000). For example, LCA models typically have a large number of parameters to be tested for invariance, making 'full measurement invariance' less likely to be supported or practically meaningful. Further, it is unclear how violations of full measurement invariance (e.g., partial MI) would translate to bias when making substantive group comparisons. This study illustrates an application of measurement invariance in the multigroup context. The sample consists of two groups of 10th grade students: Students who are perceived to have disabilities (POD) and those who are not (non-POD). Here the research focus is on understanding how academic expectations of these students vary based on their perceived disability status. The current paper addresses the following two questions: 1) What are the patterns of academic ecological expectations found for 10th grade students perceived to have disabilities and those who are not? 2) How are these patterns similar or different across groups? Invariance methods developed in the latent variable literature have only superficially been extended to the context of mixture models. Procedures and best practices are largely left unspecified leaving this an open and developing area of research.

Teacher Learning through Participation in an Outreach Program to Link Field Trips with Classroom Curriculum

Alexandria Muller, Victor Corona, Ron Skinner, Tarah Connolly, and Danielle Harlow

Abstract: Field trips have a positive impact on cognitive development of youth; however, this impact is relatively small due to the brief nature of the visits. The use of pre- and post-visit activities in conjunction with a field trip can extend the effects of the field trip. Unfortunately, teachers are ill-prepared to teach science and engineering within their classrooms making pre- and post-visit activities less likely to occur. To combat this, researchers at the University of California at Santa Barbara and museum staff at MOXI, the Wolf Museum of Exploration + Innovation have partnered to develop Engineering Explorations (EE): a program linking classroom curriculum to engineering field trips to an interactive science museum.

Through EE, classes participate in two pre-visit classroom activities, one field trip activity at MOXI and one post-visit classroom activity. For this paper, we focus on the initial stages of program development where all activities were run by museum and research staff while classroom teachers observed and provided feedback on the curriculum. With many teachers being new or unfamiliar with engineering curriculum within their classroom settings, the goal of this format was to allow teachers to learn about teaching engineering without the pressure of planning and executing the whole curriculum. Teachers were interviewed before and after participating in the program. This paper explores what first through sixth-grade teachers have learned about engineering activities from participating in this program.

Textual Silences in Alternate Assessment Resources

Sunghee Choi

Abstract: In this preliminary study of parent involvement in Alternate Assessment based on Alternate Achievement Standards (AA-AAS) process, texts and documents of 51 DOE websites (50 states and DC State Board of Education) are examined with the following research questions; 1) What patterns of textual silences on parents' legal rights to participate in AA-AAS process are found on state department of education (DOE) websites? 2) Do textual sciences influence the establishment of an equal relationship between educators and parents regarding AA-AAS?

Understanding Learners' Ideas About Photosynthesis Within a Community College Setting: A Learning Progression Approach

Erik Arevalo

Abstract: In this study, we analyzed student responses to refine a construct map that will underlie a learning progression about photosynthesis. The responses were taken from an assessment that was administered to a collection of community college students. The assessment had a focus on the processes of photosynthesis and how the environment influences photosynthesis. An examination of the written responses along with Rasch modeling was conducted to check the internal consistency of the assessment and to determine what ideas the students had regarding photosynthesis. The initial findings indicate areas about photosynthesis that can be addressed such as the differentiation between cellular respiration and photosynthesis as well as how photosynthesis is a vital part in the regulation of the global climate.

Understanding the territory from the perspective of peasant children in rural areas in Colombia

Alba Lucy Guerrero and Laura Leon

Abstract: The role of children has been undervalued in terms of the possibilities they offer for the understanding of social phenomena and the reconstruction of the social fabric. Children like adults build meanings from their experiences and interactions with events, institutions and people that allow them to recognize themselves, think about their individuality, but also as part of a collective or a community; These experiences and interactions also allow them to acquire skills to understand their reality and be an active part in their construction. Children, as political subjects, when they are given opportunities to exercise their right to participate, get involved and commit to actions that have to do with the public interest. In this paper I will present the experiences of ethnographic work with two groups of peasant children located in the departments of Nariño and the South of Bolívar in Colombia. In these contexts we found that, although children have experienced structural situations of vulnerability related to armed conflict, poverty and isolation that often place them in positions of marginality, children also position themselves as subjects of knowledge, bearers of a large amount of knowledge about their territories that challenge the adult-centered looks that have prevailed both research and intervention with children. The dialogues and interactions with these groups of children, offered us a novel perspective on the complexity of the networks of meaning from which what happens in the territory is interpreted. From a collaborative

ethnographic perspective, we conducted research with children in their territories that included aspects related with ancestral agricultural practices in Nariño, and the collective memory of the armed conflict in the South of Bolívar. Participant observation, social cartography, drawings, interviews conducted by children, photography and walking through the territory with children were strategies to document children's understandings. The collaborative ethnography approach allowed us to access their knowledge by generating intergenerational dialogues between different members of the community that helped us understand the social and cultural dynamics of the territory and contribute to the strengthening of the social fabric.

Undergraduate Motivations to Participate as Facilitators in Youth-Based Programming

Alexandria Muller, Mallory M. Rice, Devon Christman, Fatima Soto-Apolinar, Diana Arya, and Sarah Hirsch

Abstract: With technology rapidly evolving and shaping our society, we need more Science, Technology, Engineering, and Math (STEM) literate citizens who can address future scientific and technological challenges. To that end, informal science education programs have emerged to encourage youth to pursue careers in STEM. Many universities offer outreach programs for youth to interact with scientists who work for these institutions; however, these STEM outreach programs are often dependent upon undergraduate facilitators to run successfully. Research shows that undergraduates are constantly overworked to the point of burnout, yet they regularly participate as facilitators in these youth-based programs. This study aims to understand what motivates these undergraduate students to participate as facilitators in youth-based programs, such as the Curie-osity Program. Curie-osity is a two-quarter program that brings approximately 30 female- or nonbinary-identifying 4th-6th-grade students to the University of California, Santa Barbara weekly to meet STEM faculty and participate in science activities. Undergraduate facilitators work in pairs with groups of four to five youth each week for the first quarter to interview scientists, go on lab tours, and participate in hands-on STEM activities. In the second quarter, the undergraduate facilitators work weekly with the youth to develop a final product that summarizes their experiences in the first quarter, such as a published book. To determine why undergraduates participate in extensive programming such as Curie-osity, we will use emergent coding of interviews conducted at the beginning of the program to identify common motivations amongst fifteen participants. This presentation will detail those findings and present potential implications of findings on the structure of informal science programming.

Young Children's Emerging Scientific Practice Skills Linked to the Physical Environment at Color Wall

Jasmine Marckwordt and Meghan Macias

Abstract: This research describes young children's (0-4 years old) engagement at an interactive exhibit centered on light and color, Color Wall, at a hands-on science museum. Researchers conducted audio- and video-recorded observations for thirty participants at the exhibit while taking field notes. Through the frameworks of activity theory and the contextual model of learning, we argue that physical affordances (i.e., exhibit design features) of a learning environment are crucial considerations for sustained engagement in Emerging Scientific Practice Skills (ESPSs). We identify young children's behaviors at Color Wall that indicate engagement in ESPSs. For this presentation, we focus on the two most-frequently observed ESPSs--Systems and Investigating. We propose engagement in ESPSs, which are stepping stones to more advanced scientific activities, as a worthwhile exploration experience for young children. Furthermore, we identify the exhibit design characteristics that facilitate this engagement and thus are supportive of young children's learning opportunities. This study contributes to an understanding of how exhibit design influences learning opportunities for guests in early childhood, a population often overlooked in such a stimulating environment as a science museum. While engagement in science content

and practices at science exhibits has been documented in numerous studies, less research has been devoted to studying the environmental factors which facilitate engagement, particularly with regards to our participant age group. Thus, this work is beneficial for exhibit designers as well as educators and parents of young children. Our findings point to possible entryways for children to interact with an exhibit in a meaningful way. Ultimately, we hope to illuminate the ways in which the learning opportunities for young children could be maximized in such a space.