

**PARKINSON'S DISEASE GENES INTERACT WITH ATP7 TO REGULATE  
COPPER DISTRIBUTION AND AVAILABILITY IN DROSOPHILA  
MELANOGASTER**

Presenter: Allen, Brooke  
Graduate, Biological Sciences  
Mentor: Prof. Alysia Vrailas-Mortimer

Authorship: Brooke Allen, Alysia Vrailas-Mortimer

Copper is an essential element for enzymes that catalyze oxygen-dependent reactions. When an organism is exposed to either excess copper or deprived of copper, this micronutrient becomes detrimental. A mechanism used to control copper distribution and availability involves the ATPase transporter, ATP7. This X-linked transmembrane protein is responsible for delivering copper into the lumen of the cell by utilizing both endocytic and exocytic mechanisms. Mutations in ATP7 have been shown to cause Menkes disease and Wilson's disease, which both share the phenotype of neurodegeneration. These genetic disorders with ATP7 defects both lead to mechanisms of neurodegeneration that is likely shared with other, more common neurodegenerative diseases, such as Parkinson's disease. A screening of possible candidate genes that interact with ATP7 was conducted by inhibiting Parkinson's disease genes in a ATP7 loss of function or ATP7 overexpression background. We find that several of the Parkinson's disease genes showed a genetic interaction with ATP7, indicating that the mechanisms of neurodegeneration caused by ATP7 mutations may be conserved in Parkinson's disease. These interactions and their link to neurological disorders will further discussed.

## **EVERYTHING AND NOTHING: THE DIARY OF ONE WHO LEAVES**

Presenter: Asiedu-Kwarteng, Japheth  
Graduate, Art  
Mentor: Prof. Tyler Lotz  
Authorship: Japheth Asiedu-Kwarteng

The artworks presented in this article are my visual vocabulary discussing the experiences of the diaspora. They discuss how people of the diaspora, especially the Ghanaian/African diaspora, negotiates spaces away from their homeland. On the other hand, they discuss the “diasporan’s” experiences of being a stranger in their homeland during a visit after a long stay away. Premised on being in the diaspora without my young family, I discuss my experiences of separation, belonging, fear, anxiety, perception, pain, stress, nostalgia, confusion, acceptance, rejection, etc and other complexities of living a dual life and having a transnational identity, through these works.

Keyword: diaspora, homeland, dual life, identity, experience, displacement

## **ESL TEACHERS' PERSPECTIVES: INCLUSION OF STUDENTS DESIGNATED AS ENGLISH LEARNERS WITH SPECIAL NEEDS IN THE GENERAL CLASSROOM**

Presenter: Bhat, Sukanya  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Sukanya Bhat

The purpose of this mixed method study is to explore ESL teachers' perspectives on inclusion of students designated as English learners with special needs in their general classroom. This topic is very essential at this time, since literature review proves that inclusive education for students designated as English learners with special needs helps to bring in learners from the periphery, making everyday education more responsive to learners. If inclusion has to be successful, then the educators implementing inclusion need to have favorable perspectives towards inclusion. Research proves that when educators tend to have neutral or negative attitude towards inclusion then it would be less effective in bringing out student's potential. Gaining the perspectives of ESL certified teachers on inclusion of students designated as English learners with special needs in the general classroom is very important since teachers play a great role in influencing curriculum design, teaching methods & providing equity for students' academic success. In their research, Shore & Sabatini 2009 & Artiles et al., 2006 observed that although the education literature on learning disabilities and on second-language acquisition is extensive, little is known about the characteristics of English learner students with learning disabilities ( as cited in Burr et al.,2015, p.1).Based on such research it is evident that most educators are less trained to distinguish students who truly have learning disabilities from students who are failing for other reasons, such as limited English. This research would also help determine the factors that could influence teachers perspectives on inclusion of students designated as English learners with special needs. This study employs a mixed method design involving a close ended questionnaire survey to 100 ESL certified teachers teaching third grade from 100 elementary schools in Central Illinois. This will be followed by pre observation interview of 2 ESL Certified teachers and observation of 2 classrooms where these teachers provide inclusion. The close ended questionnaire survey responses will help determine how the independent variables (i.e., gender, primary language, race, citizenship, educational qualification, experience working with ESL with special needs) affect the teachers' perspectives towards inclusion of students designated as English learners with special needs. Regarding pre observation interview questions, teachers' responses are audio recorded which will be transcribed. This transcript will be read carefully, to identify broad themes emerging from the data which will be further categorized into themes and ideas that will help answer the research questions.

## **THE RELATIONSHIP BETWEEN MATH FLUENCY AND MATH PERFORMANCE IN MIDDLE SCHOOL STUDENTS**

Presenter: Billig, Ryan  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Ryan Billig

Mathematics is always going to be a subject area that has high stakes testing and we as educators need to see how to best educate our youth and prepare them for these high-stake tests. Looking at the relationship between math fluency skills and overall math performance can allow us to do just that. While several studies have already shown there it is important to value and work on fluency skills in elementary schools, is this also true for middle schools as well? So often middle school students are getting problems wrong because they are adding, subtracting, multiplying, or dividing incorrectly. Would working on these skills throughout middle school have a positive impact on their math performance even though these are elementary level learning standards? This study looks at that by looking at relationships between 6<sup>th</sup> grade students' math fluency skills and their overall math skills through their standardized testing scores.

## **TEACHER PERCEPTIONS OF THE IMPLEMENTATION OF TRAUMA-INFORMED PRACTICES IN THE CONTEXT OF LITERACY**

Presenter: Bolin, Ashley  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Ashley Bolin

A considerable number of children are exposed to traumatic events, and many carry these traumatic experiences into the classroom. Through the use of trauma-informed teaching, teachers can support student's healing and growth. Unfortunately, due to a gap between theory and practice, teachers feel inadequately prepared to support trauma-affected students. As a result, teachers are hesitant to implement trauma-informed practices into their classroom. The purpose of this study is to explore the perceptions of teachers regarding the implementation of trauma-informed practices in the context of literacy. Using a mixed-methods approach, the study will explore 39 teachers' (preschool-twelfth grade, certified general and special education, 9 male and 30 female) perceptions of trauma-informed practices. Surveys and interviews will be used to collect data prior and following a district required training on trauma-informed practices in the context of literacy. The research questions that guide this study are: after participating in a professional development training, is there (a) a change in teacher perceptions related to implementation and (b) a statistically significant increase in teachers' positive attitudes towards implementation?

Keywords: trauma, trauma-informed, teacher, perceptions, attitude, professional learning, implementation, literacy

## **FLIPPED CLASSROOMS AND HOW THEY CAN BE USED TO MAKE CONTENT CONNECTIONS**

Presenter: Botello, Jessie Graduate,  
Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Jessie Botello

The world students live in and learn in is changing, and students are getting information in new and different ways, and learning in new and different ways. The traditional learning style classroom with students listening to lectures from teacher, taking notes, doing an assignment, and then being assessed isn't effective anymore. Over the last 20 years, learning has shifted from passive teacher-centered to active learner-centered. The more hands-on activities students can do the more engaged and interested in learning students become. The problem with this is there just isn't enough time to do all the activities students need in order to make meaningful connections in their learning. The flipped classroom model allows students to learn basic content on their own at home, and then engage in content connecting activities in-class in a group setting that allow ideas to be shared and different learning styles to emerge. This study will look to see how the flipped classroom model using concept connecting activities can be an effective way on increase student understanding of gas laws. The study was conducted over a 5-week period in an Honors Chemistry class during a unit on gas laws. Students watched basic content videos at home and did some basic problem-solving homework, and in-class students did group activities that were built on previous chemistry concepts and concepts within the gas law unit. The students were evaluated using group quizzes, individual quizzes, and a unit test. These scores were then correlated with other class data and data from the previous year's test scores to find emerging patterns. The students also completed a Likert scale survey about their opinion of the flipped model and how it helped with their understanding of gas laws. The overall goal was to determine if the flipped classroom model helped with student understanding of gas laws and if content connections were made throughout the unit.

## HOW TO MOTIVATE MIDDLE SCHOOL STUDENTS TO READ

Presenter: Buerkett, Danielle  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Danielle Buerkett

Middle school students are not motivated to read during their free time. They are also disengaged with novels that teachers “make” them read in class. The purpose of this study is to show that independent reading of choice and interest will keep students engaged in reading. 80 students participated in the study over a four week period during literature class. The researcher observed the students’ facial and body language while reading. A self reflection was also written at the end of the study to see what the students thoughts and feelings are about reading. Classroom environment that a teacher creates should encourage and motivate students to feel comfortable as a member of the class and hopefully have them be excited about reading. Research on reading motivation and engagement can help students become lifelong learners and strong community members.

## THE ROLE OF COPPER IN PARKINSON'S DISEASE

Presenter: Burkhardt, Jessica  
Graduate, Biological Sciences

Mentor: Prof. Alysia Vrailas-Mortimer

Authorship: Jessica Burkhardt

Parkinson's Disease (PD) is a neurodegenerative disease caused by the death of dopaminergic neurons in the substantia nigra region of the brain. PD is characterized by the presence of dysfunctional mitochondria and increased levels of oxidative stress. Though a handful of genes, such as parkin and PINK1, have been identified in familial forms of PD, most cases are sporadic. Therefore, it is thought that environmental factors may act on genetic risk factors to promote disease onset. Therefore, we are exploring the relationship between copper toxicity, which has been linked to other neurological disorders, and parkin and PINK1. We are testing the effect of environmental exposure to copper as well as altering copper levels genetically by manipulating the copper transporter ATP7, which is mutated in the neurodegenerative disorder, Menkes disease. Preliminary findings have shown that increased extracellular copper, from overexpression of ATP7, in conjunction with knockdown of parkin and PINK1 exacerbate Parkinson's symptoms.



## **RESTRICTIVE DIETARY PATTERNS AND WEIGHT REGAIN IN ADULTS BETWEEN 18-40**

Presenter: Casas, Isaac  
Graduate, Family and Consumer Sciences

Mentor: Prof. Erol Sozen

Authorship: Erol Sozen, Isaac Casas

Although multiple studies have examined the effects of carbohydrate-restrictive diets, their safety in the long term is still heavily debated. Moreover, the dietary restraint theory states that there is alteration in the way food is regulated, switching from physiological to cognitive control; this change makes individuals more susceptible to disinhibited eating. Furthermore, carbohydrates, such as fruits, grains, legumes, etc., are the primary sources of energy that our bodies require during moderate to intense exercise. That being said, their involvement in our diet is crucial, as they grant us the ability to perform and function more efficiently. This study will investigate perceived physical (weight gain), mental (stress, body dissatisfaction), behavioral (binge eating) changes of individuals who had a carbohydrate restrictive diet for two weeks in the last year. The survey will be developed based on previous literature and have been validated in prior research. The binge eating and overeating scale is adopted from the American Psychiatric Association's binge-eating scale (2013). The perceived stress scale is adopted from Cohen and Williamson's Perceived Stress scale. Finally, the body dissatisfaction scale is adopted from Gideon et al.'s eating disorder examination questionnaire (2018). All of them will be measured as a multi-item scale, ranging from either strongly disagree (1) and strongly agree (5) or never (1) to very often (5). Questions such as gender, age, income, education level, and ethnicity are included. The participants will be asked to report their weight and height. Body Mass Index (BMI) will be calculated as weight (kg) divided by height squared (m<sup>2</sup>) to their BMI categories. The survey will be distributed via Amazon Mechanical Turk and is expected to be completed by 500 participants. Amazon Mechanical Turk (AMT) is a crowd-sourcing Internet marketplace enabling individuals and business to coordinate the use of human intelligence. AMT is strategically chosen for this study because of its ability to recruit a large number of subjects that is more representative of the U.S. population than in-person convenience samples. Theoretically, the completion of the proposed study will add novel literature to the nutrition research field. Practically, at the completion of this study, we will propose strategies and approaches about restrictive diets, post-diet weight gain, stress, and body dissatisfaction. Furthermore, we also hope that the research findings will give nutrition literature an area to touch on regarding the education, training, and research.

## **PARENT SHAMING: THE IMPACT OF RACE AND ABILITY STATUS ON PERCEPTIONS OF PARENTING**

Presenter: Cicciarelli, Kara  
Graduate, Psychology

Mentor: Prof. Brea Banks

Co-Mentor: Prof. Karla Doepke

Authorship: Kara Cicciarelli, Brea Banks, Karla Doepke, Adena Meyers, Christy Borders, Amber Richardson

Perception plays an important role in the human experience. The current culture of the U.S. contains an abundance of pressure to appear and behave in a certain way. People passing judgements and making assumptions based on appearance has become so heavily entrenched in U.S. culture that many do not realize the judgements they are making, the conclusions they are drawing, or the impact of negative judgement, stigma, and faulty conclusions. In order to shift from a culture of judgement to one of embracing differences there needs to be recognition of the judgements being made. The goal of the current study was to develop a better understanding of how appearance and description impacts how a person is perceived and by extension judged through an experimental design dissertation project. Specifically, to determine if parents are perceived differently based on the race and assumed ability status of their children I used scenarios that included images of either a white or Black child and revealed the child as being either typically developing, having an invisible disability, or having a visible disability. Altogether, this research may contribute to a much larger discussion about the serious impact of human perceptions, assumptions, and judgements.

Keywords: Perception, parents, ability status, race

## **I SAW MY OTHER SELF AT THE ZOO: INTERNAL FOCALIZERS AND ILLUSTRATIVE SPACES IN ZOO NARRATIVES**

Presenter: Cintron-Gonzalez, Edcel J.  
Graduate, English

Mentor: Prof. Mary Moran

Authorship: Edcel J. Cintron-Gonzalez

The proposed poster will explain how the focalization of narrative voices in texts and the spacial aspects of illustrations highlight the otherness of human and non-human animal in Zoos. Heterotopias have the ability to open possibilities for human to interact with animals in desired spaces. Examples of these can be how in *Life of Pi* it is possible for a Tiger and a young man to survive days in the ocean without one eliminating the other. However, one space that can reflect a positive and negative desire for humans and animals is the Zoo. For the most part, Zoos can be seen as a space where humans can experience different wildlife and examine a variety of species of animals. While this is one of many illustrations we see of Zoos, Anthony Browne's "Zoo" and Katherine Applegate's *The One and Only Ivan* demonstrate instances where both human and animals use the Zoo as a space to narrate their social problems without telling the real and implied reader what they are. Both narrators, a little boy going to the zoo, and Ivan the gorilla, display characteristics of internal focalizers who invite their readers to interpret the illustrations provided by the picture book and novel to demonstrate a side of their life that can be interpret as their other. With the little boy, the reader has a glimpse of possible family abuse, and with Ivan, a sort of representation of how life would be if not born and trapped in a mall Zoo.

## **SOCIAL EMOTIONAL LEARNING: HOW AN INTEGRATED APPROACH AFFECTS STUDENTS' SELF REGULATION**

Presenter: Clarke, Jessica  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Jessica Clarke

The present study will investigate the effects of teaching social emotional learning (SEL) with an integrated approach into core curricular subjects of math and reading. Participants will be 18 first grade students in a rural school district. Data will be collected using a mixed-methods approach. Quantitative data will be collected from participants when they take a self-reflection assessment before and after the study begins regarding their feelings towards SEL skills. Qualitative data will be gathered during a three-week period of observations taken on students and how they use SEL skills to regulate themselves when taught these skills explicitly. Then, there will be a three-week period of observations taken when students are receiving SEL instruction integrated with math and reading lessons. The data will be triangulated and compared to find common themes that relate students' attitudes towards SEL with their usage of SEL skills.

## **TEACHERS OF THE D/DEAF AND HARD OF HEARING PERCEPTIONS AND SUGGESTIONS FOR PROFESSIONAL DEVELOPMENT**

Presenter: Colón, Cora  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Cora Colón

The purpose of this quantitative study is to investigate teachers of the d/Deaf and hard of hearing's perceptions of professional development (PD), both currently and what the recommendations are for PD moving forward. Effective professional development is crucial in the continuing education of teachers, especially those of servicing the unique d/Deaf and hard of hearing demographic of students. Thus, this study seeks to survey d/Deaf and hard of hearing (DHH) teachers from across the United States to gain understanding of the opinions of the DHH teachers on the topic of PD. The surveys will be coded and triangulated based on common ideas and organized by cross tabular tables. The findings from this study will enlighten administrators, DHH professional organizations, teacher leaders, and any other creators of PD on what DHH teachers views on current PD are and what suggestions they have for PD's future.

# **THE EFFICACY OF COLLABORATIVE STRATEGIC READING IN DIVERSE, MULTICULTURAL MIDDLE SCHOOL CLASSES**

Presenter: Conroy, Ethan  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Ethan Conroy

The COVID-19 pandemic pushed many students and teachers to learn and teach in ways they never had before. Remote learning proved to be an imperfect system through which many students struggled. Now that schools are back in person, learning loss and skill deficiencies are being seen in many students. The most at risk students for learning loss are typically those from lower socioeconomic standings, students receiving special education services, and emerging bilingual students. Collaborative Strategic Reading (CSR) is a collection of literacy and metacognitive strategies intended to help students work through new texts effectively and teach them proper remediation skills for when they do not understand what they are reading. In this study, CSR will be implemented by one teacher in two of their five seventh grade social studies classrooms. The two classes that receive CSR instruction will have their MAP English/Language Arts scores compared to the classes that did not receive CSR instruction to see if CSR is a valid method to increase student literacy skills. Previous research has proven CSR to be effective with learners of all designations.

## INVESTIGATION OF OXYGEN ISOTOPES IN ICELANDIC ROCKS TO UNCOVER RHYOLITE FORMING PROCESSES

Presenter: Cox, Riley  
Undergraduate, Geography, Geology, and the Environment  
Mentor: Prof. Tenley Banik

Authorship: Riley Cox, Tenley Banik, Justin Dodd

Iceland is the product of voluminous magma generation resulting from the combined influences of a mid-ocean spreading center joined with a mantle hotspot—conditions unique on modern Earth. Due to the combination of both features, Iceland has thick crust and a higher abundance of silicic rock than is normally associated with either ridges or hotspots. However, the processes that lead to silicic magma formation under conditions such as those on Iceland are debated. One of the best ways to distinguish between fractional crystallization and partial melting as the two main processes invoked to explain silicic magma formation on Iceland is to examine O isotope ( $\delta^{18}\text{O}$ ) concentrations in rocks and minerals. Silicates altered by low  $\delta^{18}\text{O}$  waters inherit a low  $\delta^{18}\text{O}$  value. There is an apparent shift in  $\delta^{18}\text{O}$  toward lower values in zircons derived from silicic melts over the last  $\sim 3$  Myr, coincident with the onset of Northern Hemisphere glaciation. Hyaloclastite, a rock produced when volcanoes erupt under ice or into water, also appeared in Iceland  $\sim 3$  Myr ago. Due to their hydrous nature, hyaloclastites are more easily melted or assimilated into shallow crust magmas, thereby potentially being a notable contributor to silicic magmas  $< 3$  Ma. Hyaloclastites also potentially retain a low  $\delta^{18}\text{O}$  values due to the hydrous nature of their formation and alteration, and meteoric waters during glacial times have even lower  $\delta^{18}\text{O}$  than is typical for Iceland during interglacials. To further assess a potential contribution of hyaloclastites to  $> 3$  Ma silicic magmas, we collected 39 hyaloclastite samples from across Iceland prioritizing both geographic and chronologic variability. Preliminary data suggests that sample glass fragments and whole rock powders are statistically indistinguishable and have a  $\delta^{18}\text{O}$  value of  $5.1 \pm 0.2\%$  ( $n=8$ ). Mantle-derived basalt has  $\delta^{18}\text{O} \sim 5.5\%$ ; our data suggest little-to-no contribution of low  $\delta^{18}\text{O}$  material to either the parent magma or from low- $\delta^{18}\text{O}$  waters incorporated syn- or post-eruption. Additionally, surface hyaloclastites do not initially appear to be a contributor to low- $\delta^{18}\text{O}$  silicic magmas. Future findings will further elucidate the role of hyaloclastites in Iceland's petrogenesis.

## **THE IMPACT OF A DISTRICT CREATED SEL CURRICULUM ON STUDENT BEHAVIOR**

Presenter: Dytrych, Amanda  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Amanda Dytrych

Within the last several years there has been a greater focus on the impact that SEL has on the behavior and academic achievement of students. Through my study I will look at the impact a district created SEL curriculum has on the behavior of students who come from middle to high income households with no previous trends of aggressive or disruptive behaviors in the classroom. Which will provide valuable information on the impact of SEL since it is focusing on a student population, curriculum, and data collection that is different from many studies previously done on the topic. The study will use both qualitative and quantitative data to track the progress and impact of the district created curriculum. Students will fill out a monthly survey that focuses on the areas of behavior tracked in the school. The teacher will complete a similar survey using observations and student SEL journals. The scores will be tracked from the beginning of the study until the end, looking to see if the scores are higher as students are exposed to more of the curriculum.



## ONLINE SEX WORK IN THE TIME OF COVID-19

Presenter: Ebersole, Courtney  
Graduate, Sociology/Anthropology

Mentor: Prof. Jason Whitesel

Authorship: Courtney Ebersole

Young college-age women have been increasingly using online sex work as a popular avenue to raise capital. This study explores the experiences of women (both cis and trans) undergraduate students who engage in self-produced sex work using the mainstream online adult entertainment platform, Onlyfans. Posting explicit content such as pictures and videos on the Onlyfans platform has allowed many college women to earn an income and fund their university costs, especially during the ongoing COVID-19 pandemic. This study aims to identify interpretative narratives used by undergraduate women in the U.S. to make sense of their labor as sex workers within capitalist relations. To access these narratives, online social research methods, collection of fieldnote data, and semi-structured interviews of industry participants has been conducted. Participants have been recruited using convenience sampling methods, such as snowball sampling as well as responding to participant recruitment flyers posted to social media. In interviews, participants have been asked about their initial motivations for producing explicit content on Onlyfans, the impact of the COVID-19 pandemic on their experiences as a sex worker, the labor required of them as a content creator, their reactions to Onlyfans announcing and then reversing a ban on explicit content, and opinions on how to ensure sex work platforms are properly supporting their creators. This intention of this study is to move toward strategies that would resist the capitalist exploitation of online sex work by centering the voices of sex workers themselves.

## **A STUDY ON THE RELATIONSHIP BETWEEN SOCIAL-EMOTIONAL LEARNING, INDIVIDUAL GROWTH AND STUDENTS' AND THEIR PERCEPTION OF THEIR ABILITIES**

Presenter: Foreman, Marisa  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Marisa Foreman

This study aims to analyze and identify any potential relationships between social emotional learning and student growth and/or perception of their abilities. The study takes place in a 2<sup>nd</sup> grade classroom in a fringe-rural school a year after the COVID-19 pandemic required schools and businesses to close. Students and teachers reinvented the ways in which learning has taken place for decades. With that shift came feelings of isolation and loneliness from both adults and children. After students returned, it became clear that the need for social-emotional learning was greater than ever. This study will be qualitative in nature and will use the one-group pre-test, post-test design. This study will provide insight into how SEL influences students' day-to-day decision-making skills as well as their feelings towards their abilities as they relate to social-emotional skills..

## **THE IMPACT OF COLLABORATIVE ORAL STORY-WRITING ON TIER 2 AND 3 STUDENTS' WRITING SKILLS**

Presenter: Fritsch, Anne  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Anne Fritsch

This study will explore the impact of collaborative oral story-writing sessions on students who receive tier 2 and 3 interventions. The story-writing sessions will involve teacher and students taking turns in orally crafting a story together which the teacher will write on the whiteboard. Pre- and post-assessments will be administered before and after these sessions to determine the impact of this activity on students' individual story-writing skills as well as their writing selfconcepts.

## **TEACHER PERSPECTIVES AND EXPERIENCES ON IMPLEMENTATION OF SEL CURRICULUM**

Presenter: Greenaberg, Bailey  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Bailey Greenaberg

Social emotional learning (SEL) has been growing in education, especially upon the return to in-person learning during the COVID-19 pandemic. With the COVID-19 pandemic continuing in the 2021-2022 school year, there have not been many studies conducted regarding the implementation of SEL programs in high schools during this time. This study was completed in a high school where they are in the early stages of school-wide SEL implementation where teachers' perspectives and experiences with SEL and its implementation were collected. Considerations should be made with teacher perspectives and experiences as the primary implementers of these programs.

## **TEACHER PERCEPTIONS ON THE EFFECTIVENESS OF HOMEROOM**

Presenter: Grimes, Laura  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Laura Grimes

As we emerge from the COVID-19 pandemic and the effects it has had on our education system since March 2020, the need for both academic and social-emotional support for students has never been more important. As schools work to find their “new normal” and take away lessons learned from the experiences since March 2020, we see opportunities to incorporate new structures into our school day. This is where the effective implementation of a homeroom/advisory period at the high school level comes into play. In this study, we examine teacher experiences and perspectives of homeroom and the effect that has on students’ academic performance.

## **KINDERGARTEN PLAY ENGAGEMENT AND TIMING**

Presenter: Ham, Claire  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Claire Ham

Kindergarten is part of the primary grades that guide and form a student's educational career. Students grow and gain academic and social emotional knowledge through immersion even more than teachers can plan for. One of the largest areas that students engage and evolve in is the area of play in the classroom. This study explores the relationship between the timing of play in the school day, and the engagement in academics from kindergarten students. This study includes research from two general education kindergarten classrooms that have implemented play in the classroom.

## **EFFECTIVE CLASSROOM PRACTICE METHODS IN AN AP CHEMISTRY CLASSROOM**

Presenter: Harris, Maricar  
Graduate, Chemistry

Mentor: Prof. Erin Quast

Authorship: Maricar Harris

The aim of this study was to investigate the most effective teaching strategies to elicit student confidence in an Advanced Placement (AP) Chemistry classroom. Empirical data (n=15) were collected by daily student surveys for a total of seven days. As nightly homework, students were assigned a video to actively watch. Survey 1 was administered at the beginning of class, prior to any face-to-face teacher instruction. A guided practice method was used during class time to review the concept presented in the video. Different learning modalities were used as practice, including collaborative practice problems, drawing representations of phenomenon, and verbal explanations. Survey 2 was administered at the end of class. In addition, formative assessments were intermittently administered during the seven days to gauge student understanding of the concepts presented. Data collected identified the guided practice tasks students deemed most effective at improving student understanding and thus more positively affecting student confidence with the material.

## IDENTIFICATION OF HOMEBOX GENES FOR CRISPR-MEDIATED GENOME EDITING IN CRAYFISH

Presenter: Hudspath, Caleb  
Undergraduate, Biological Sciences

Mentor: Prof. Wolfgang Stein

Authorship: Caleb Hudspath, Margaret L. DeMaegd, Rajit Roy, Andres G. Vidal-Gadea, Wolfgang Stein

Targeted genome editing is a powerful tool to identify gene function and study the molecular underpinnings of behavior. Recent progress has been driven by the rapid development of the Nobel Prize-winning CRISPR/CAS9 technique and its application to a variety of animal systems. However, genome editing progress has been slow in animal species that are difficult to raise and maintain in large numbers in research labs. For example, there has been only limited success in gene editing of decapod crustaceans such as crabs, lobsters, and crayfish, despite the large commercial and ecological importance of these animals.

We are working to implement CRISPR-mediated gene editing in the marbled crayfish, *Procambarus virginalis*, using its published genome and transcriptome sequences. Decapod crustaceans have a several week-long embryonic development, and reproduction cycles of several months. Here we are identifying target genes for CRISPR to allow early and high-throughput detection of successful gene editing. We searched for genes that determine early embryonic development ('homeobox genes') and lead to easily detectable phenotypes. We selected genes determining eye and body appendage development, as these features are readily detectable at about 60% embryo development (24 days).

**Eye:** We identified the marbled crayfish homolog of the *Drosophila melanogaster eyeless* gene as a potential guide-RNA target for CRISPR gene editing. *Eyeless* should present an easily identifiable phenotype of deformed eyes in early development. BLAST-ing the nucleotide sequence of *Drosophila eyeless* against the marbled crayfish genome revealed a single sequence with high homology. The BLAST returned an e-value of  $5e-60$ , indicating that the similarities to the *Drosophila eyeless* gene are unlikely to be a result of chance for this sequence. A conserved domain search revealed that, similar to other homeobox genes, the putative marbled crayfish *eyeless* gene possesses sequence homology to the HTH (Helix-turn-helix) domain, a superfamily of transcription factors.

**Appendages:** We have identified putative homologs of the *Procambarus clarkii Ubx* gene in marbled crayfish. This gene alters crayfish thoracic development by producing feeding appendages in place of the typical thoracic limbs. BLAST-ing the nucleotide sequence of *Procambarus clarkii Ubx* against the marbled crayfish genome revealed two homologous sequences (e-values:  $3e-78$  and  $7e-72$ ), with both regions possessing the homeobox conserved domains.

We are now identifying exons and introns in the putative marbled crayfish homeobox genes. Identifying the exons will allow us to design guide-RNAs specific to the coding regions of these genes, which will allow their specific knock-out by CRISPR-Cas9.



## **A DAY IN THE LIFE OF A POLICE OFFICER**

Presenter: Hunter, Melissa  
Graduate, Criminal Justice Sciences

Mentor: Prof. Jeffrey Walsh

Authorship: Jeffrey Walsh, Melissa Hunter

The primary goal is to gain a greater insight to specific instances in a person's life that may have led towards law violating behavior resulting in periods of incarceration. More specifically, the study participants have been asked what they feel led to their incarceration and what services and opportunities may have helped them to avoid the circumstances that led to their incarceration. The hypothesis in the present study is that the most salient challenges identified by participants will include domains of family dynamics, financial opportunities, educational experiences, and employment opportunities. Survey and interview data has been collected from ten study participants. Study participants were known associates of the Co-Primary Investigator and had an established relationship prior to their participation in the study. The Co-Primary Investigator used information collected as a means of comparison between the lives of the participants, prior to their being incarcerated, during their time of incarceration, and upon community reentry. It is anticipated that this information could be crucial in better understanding future directions for additional reentry programming. Similarly, information learned may also aid in targeted prevention efforts to assist in keeping people out of jails and prisons. Finally, the Co-Primary Investigator, a current active Police Officer, juxtaposes her own personal experiences with the challenges and opportunities of the participants in this study to explore areas of divergence leading to profound differences in justice system involvement.

## **AN INVESTIGATION OF ELL STRATEGIES TO USE IN A MIDDLE SCHOOL CLASSROOM**

Presenter: Jachymiak, Susan  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Susan Jachymiak

The purpose of this mixed methods study is to investigate strategies that help ELL students learn in a middle school setting. This topic is relevant due to the influx of students from different cultures and, due to this, teachers need to know how to best reach these students via the instruction that takes place within their classrooms. For an ELL program to be successful, there needs to be buy-in from the staff, and that is why faculty and staff will be surveyed via an electronic form in order to get authentic feedback. Students will also be assessed via exit slips in the classroom to see how much impact these various strategies are making in their learning process. After the responses are obtained, they will be analyzed. This research will lead to an increased amount of knowledge in terms of what is working within our school specifically and how this can transfer over to reach the needs of ELL students as well as all our students.

## **TEACHER PERCEPTIONS OF HOW PHONICS INSTRUCTION IMPACTS READING DEVELOPMENT**

Presenter: Kaiser, Lindsay  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Lindsay Kaiser

The purpose of this qualitative study is to explore primary grade teacher perceptions of how phonics instruction impacts reading development. Being that reading is an essential, lifelong skill, teaching the fundamentals of how to read words in the most effective way will forever be relevant and of importance. The existing literature surrounding the topic of phonics instruction validates the effectiveness of a couple different teaching methods. Although, researchers suggest the need for teachers to further develop their understanding and application of phonetic terms and rules to best support the needs of developing readers. Worthy of attention are the valuable opinions primary grade teachers have in regard to phonics instruction considering they witness and experience it firsthand. Therefore, this study will survey primary grade general education and special education teachers of phonics from two elementary schools in Central Illinois. The survey responses will be coded based on common values, ideas, experiences, and needs. The findings will be presented as themes to convey the perceptions teachers have of implementing phonics instruction with developing readers. To the benefit of various school personnel such as curriculum directors, administrators, literacy coaches, primary-grade teachers, and reading interventionists, this study will provide insight to teacher values and desires of phonics instruction that are honest.

## **MISTAKEN EYEWITNESS IDENTIFICATIONS AND OFFICIAL MISCONDUCT IN WRONGFUL CONVICTIONS**

Presenter: Kurtz, Meghan  
Graduate, Criminal Justice Sciences

Mentor: Prof. Michael Gizzi

Authorship: Meghan Kurtz

This project examines the relationship between eyewitness misidentification and official misconduct in wrongful convictions. A qualitative content analysis of exonerations including these factors from the National Registry of Exonerations has been used to explore not only the sources of eyewitness misidentification, but the roles of specific types of criminal justice actors. The research includes a detailed literature review of the methods that lead to misidentification and considers how it ties to other forms of official misconduct in wrongful convictions.

## **TEACHER ATTITUDES AND HOW THEY IMPACT STUDENT SELF-EFFICACY AND ACADEMIC GROWTH**

Presenter: Lacy, Michelle  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Michelle Lacy

The research study focus is on teacher attitudes and how they impact student self-efficacy and academic growth. After conducting an experiment, interviewing, and surveying, I was able to analyze the results to create an E-Poster focusing on the results and what they mean for educators. Because educators and their attitudes have such a lasting impact on students it is important to study how their actions directly impact student successes, motivation, and eagerness to learn. Teachers' attitudes can impact a students' self-efficacy, belief in themselves, directly lowering their confidence level towards academics leading to a lifelong struggle from just one meaningful altercation that a student can recall in the future.

## **THE DECLINE OF SCIENCE INSTRUCTIONAL TIME AND K-6 TEACHER'S SCIENCE SELF EFFICACY**

Presenter: Lewis, Anna  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Anna Lewis

This study of science instructional time in grades K-6 examines if science instructional time is on the decline in a small, rural school district. Large scale policy changes starting with No Child Left Behind continuing with Common Core State Standards put pressures on teachers to focus on specific core subjects: reading, writing, and mathematics. As this occurs, science and other subjects are taught less often per week to make room for more instructional time for those core subjects. This study will determine how much each grade level allocates instructional time throughout the week to determine if science instructional time is declining and if achievement gaps may result between grade levels. In addition, this study explores science self-efficacy (SSE) and attitudes of K-6 teachers. SSE survey data will help provide evidence of preparedness and effectiveness of teachers and attitudes towards teaching science content. The results will help provide a path forward to increase science instructional time if necessary, provide better training for mastery of content and increase comfortability teaching the inquiry process to learn science in K-6 classrooms.

## **USING COMPREHENSIBLE INPUT METHOD ACROSS THE BOARD: A CASE STUDY OF VOCABULARY LEARNING WITH A LANGUAGE LEARNING STRATEGY**

Presenter: Lynch, Monica  
Graduate, Educational Administration & Foundations

Mentor: Prof. Anna Smith

Authorship: Monica Lynch

Students are given facts, practice problems, vocabulary, and statistics in core subjects like science, social studies, and mathematics, that teachers want their students to retain and apply into their learning. However, do our students have skills to remember or break down the information that aids retention? This study will explore the Comprehensible Input (CI) method and strategies when applied in core classes of science, social studies and mathematics. World language students apply this method in the study of a target language and this method proves students are learning through consistent input and output of the language successfully along with strategies to establish meaning and develop vocabulary knowledge. With a mix-method approach participants will use reflection pieces to make discoveries in learning of application of CI strategies in core classes.

Keywords: comprehensible input, vocabulary development, establish meaning

## IMPORTANCE OF ORAL HYGIENE IN THE GERIATRIC POPULATION

Presenter: McElroy, Kayla  
Undergraduate, Communication Sciences and Disorders

Mentor: Prof. Taeok Park

Authorship: Kayla McElroy

The purposes of this study are to determine how large the problem of oral hygiene neglect is in geriatric care facilities and to advocate for its implementation. Previous research shows that providing geriatric patients with oral care costs pennies a day (Sheffler, 2018). The price of a patient lost due to the lack of oral care, however, cannot be measured. Oral hygiene practices are often neglected in institutions for the geriatric population due to low prioritization, nonroutines, and inadequate training of staffs. A lack of proper oral care can lead to undesirable consequences, namely aspiration pneumonia for the geriatric population. This condition occurs when foreign material enters the airway, causing an inflammatory condition of the lung (Wainer, 2020). Critical oral hygiene team members include nursing staffs, speech-language pathologists, and dental hygienists. For this study, two related professionals, a dental assistant and a speech language pathologist were interviewed to provide insight regarding the oral hygiene practice in their fields. The dental assistant discussed the importance of dental hygiene, mentioning poor dental hygiene's link to health concerns like decay, digestive issues, and periodontal disease. Dental hygienists additionally have an educational role. They model correct terminology and demonstrate proper oral care to their patients. The interviewed speech-language pathologist described the role of educating staff members about proper oral care techniques and how to provide the oral care. Staff members in geriatric care facilities can provide proper care by brushing a patient's teeth twice a day using a suction toothbrush and applying dry mouth gel to the lips and mouth every few hours, if required (Sheffler, 2018). Since oral care is neglected in care institutions for the geriatric population across the board, speech-language pathologists must also be advocates, ensuring these practices are carried out. This study demonstrates that a team of collaborating professionals is needed to help geriatric patients preserve their health, comfort, and their overall quality of life (Sheffler, 2018).



## **CLASSROOM TEACHERS' PERSPECTIVES ON COLLABORATIVELY TEACHING ENGLISH LEARNERS**

Presenter: McReynolds, Joanna  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Joanna McReynolds

Collaboration between ESL teachers and classroom teachers is the main focus of this study. Research has proven that collaboration between teachers is the biggest indicator of success for English Learners, regardless of what teaching model is utilized. This study highlights past research, identifying challenges, barriers and gaps when it comes to teachers' collaborative efforts. One of the gaps identified was classroom teachers' perspectives on this topic. This study aims to eliminate this gap through a mixed-methods approach utilizing both surveys and interviews of classroom teachers in order to gain a cohesive understanding on how to move forward in the right direction for supporting English Learners in a collaborative approach.

## **INCREASING FEMALE PARTICIPATION IN STEM COURSES**

Presenter: Meeks, Bronco  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Bronco Meeks

This research focuses on methods for increasing female participation in STEM courses at the high school level. The research uses a mixed method approach of a quantitative survey given to engineering instructors and a qualitative interview of leaders within female STEM organizations. The data will be used to evaluate commonalities among those that have successfully increased participation in STEM courses. The data analysis will allow for recommendations of interventions for high school STEM instructors to increase female participation. behavior management approaches utilized by teachers in middle school classrooms. Teachers and students are impacted daily by various behaviors and environmental factors causing the solution to this issue to be an ongoing process. Therefore, this study will focus on interviewing 5th through 8th grade middle school teachers about their use of behavior management strategies. The teachers will be selected at random based on their level of experience. Three teachers will be chosen with 1-5 years of experience and another 3 will be selected with 10 or more years or teaching experience. Teachers being interviewed are being chosen from one elementary school in central Illinois. With this study, the researcher, educators, and school personnel will be equipped with further understanding of how behavior techniques are being used in middle school classrooms.

## **INTEGRATION AND UTILIZATION OF TECHNOLOGY IN THE PRIMARY CLASSROOM**

Presenter: Meiss, Zachary  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Zachary Meiss

The purpose of this narrative study is to understand teachers' development in integrating technology into the classroom. This topic is imperative as internet and technology access increases for primary students. Districts have a barrage of barriers that impede their integration of technology. To weather this storm, the administration must guide their school districts through the difficulties in front of them. School district administrators need to work with technology leaders to assist teachers in positively integrating technology. A need for technology leadership that can be distributed among leaders of technology integration. Teachers need support and time to integrate technology into their lessons. With the appropriate professional development, districts should integrate technology in a meaningful way for students. Keywords: technology integration, barriers, classroom, professional development

## IDENTIFICATION OF GAP JUNCTION GENES INVOLVED IN TAIL-FLIP ESCAPE RESPONSES OF MARBELED CRAYFISH

Presenter: Miller, Jennifer  
Undergraduate, Biological Sciences

Mentor: Prof. Wolfgang Stein

Authorship: Jennifer Miller, Rajit Roy, Wolfgang Stein, Andres Vidal-Gadea

Electrical synapses are direct electrical connections between neurons used to transmit electrical potentials with short delays. They are often found in neural circuits that generate rapid behaviors, such as avoidance or escape reflexes. Electrical synapses are built by gap junctions that are composed of two channel pores (hemichannels) and expressed in adjacent cells. Together, the hemichannels form a physical connection between cell membranes. Each hemichannel is composed of multiple proteins that enable the quick flow of electrical current. In invertebrates, these proteins belong to the innexin family. While it is known that animals express a variety of different innexins, it remains unclear in most animal species which of them contribute to rapid signal propagation at gap junctions.

We use marbled crayfish (*Procambarus virginalis*) to examine the function of innexins in rapid escape responses. Like other crayfish, animals of this species show a rapid tail-flip that propels them away from potential threats in response to mechanical stimuli to the head. This tail-flip is mediated by medial giant (MG) neurons that are activated by sensory input and provide excitation to the tail motor neurons through electrical synapses. Several putative innexins have already been identified. To test their contribution to the MG tail-flip, we used RNA-interference (RNAi) to reduce expression of specific innexins. We then applied mechanical stimuli to the animal's head and monitored escape reflex trajectory and speed.

RNAi was administered to reduce expression of innexins 1 and 2. Animals received intraperitoneal injections with either saline, control dsRNA, or innexin-specific dsRNA. Untreated animals were included as additional control. Behavioral tests and innexin expression measurements were carried out 2 days after the injections. The tail-flip latency remained unaffected by the RNAi treatment and was similar in all treatment groups. In contrast, the time to reach peak velocity during the tail-flip was longer in animals treated with innexin dsRNA than in control animals (13ms vs. 15ms, N=6).

To determine the RNAi effectiveness, the ventral nerve cord was dissected and innexin 1/2 mRNA was extracted and quantified using gel-based PCR. The PCR confirmed that animals treated with innexin dsRNA had decreased innexin expression when compared to control animals, suggesting a correlation between innexin expression and tail-flip kinetics. Our results thus indicate that innexins 1 and 2 contribute to the MG tail-flip and are involved in rapid electrical signal propagation at electrical synapses. We are currently carrying out additional experiments to confirm our results statistically.

## **EFFECTIVE FEEDBACK ACCORDING TO SECONDARY EDUCATION MATHEMATICS STUDENTS: IS EDTPA RIGHT?**

Presenter: Montoney, Natalie  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Natalie Montoney

The purpose of this qualitative study is to explore the student perspective of effective feedback in a secondary education mathematics classroom. This topic is important at this time because teachers are spending many hours on feedback that is not being used effectively by the students. Additionally, edTPA, the high stakes teacher readiness assessment, gives the highest marks for feedback given in a certain way. Little research has been done to determine if students find this format of feedback effective in mastering the educational topics of the classroom. Additionally, if this is not what students find most effective, it needs to be determined what students view as effective feedback. This study will analyze reflections from about 50 students from a Central Illinois High school currently enrolled in Accelerated Geometry and Geometry, taught by the researcher. These reflections will be coded based on common ideas, and then be reported as themes to describe what students find effective in feedback and why. This research will inform teachers on how to provide feedback that students will find effective in learning, advise student teachers what students find effective in addition to what edTPA deems effective, and educate edTPA writers on if they are forcing students to provide feedback that is not considered most effective by the students.

## **USING DIVERSE PICTURE BOOKS AS MENTOR TEXTS IN THE MIDDLE SCHOOL CLASSROOM**

Presenter: Musselman, Tayler  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Tayler Musselman

This study investigates the benefits of using diverse picture books as mentor texts in reading and writing classes. Many secondary schools use chapter books, articles, or other high level texts as mentor texts. However, I believe diverse picture books can be just as beneficial if not more beneficial than high level texts. The central questions I will be investigating include: Are diverse picture books being utilized at the middle school level in the literacy curriculum? How are diverse picture books as mentor texts in literacy helpful to middle school students who are not yet performing at grade level? Previous studies have indicated that picture books can be beneficial to readers at the secondary level. Other studies have discussed the importance of incorporating diversity into all curriculum. However, there is little research around the benefits of incorporating diverse picture books into curriculums.

## ON NEURAL CODE SEARCH FOR SOFTWARE GENERATION

Presenter: Nadeem, Usama  
Undergraduate, Information Technology

Mentor: Prof. Shaoen Wu

Co-Mentor: Prof. Noah Ziemis

Authorship: Usama Nadeem, Noah Ziemis, Shaoen Wu

Reimplementing solutions to previously solved problems is not only inefficient but also introduces inadequate and error-prone code. Traditional methods achieve impressive performance on this issue by using autoregressive text-generation models trained on code. However, these methods are not without their own flaws. The generated code from these models can be buggy, lack documentation, and introduce vulnerabilities that may go unnoticed by developers. An alternative to code generation—neural code search—is a field of machine learning where a model takes natural language queries as input and, in turn, relevant code samples from a database are returned. Due to the nature of this pre-existing database, code samples can be documented, tested, licensed, and checked for vulnerabilities before being used by developers in production. In this work, in an effort to improve the performance of code search, we investigate the impact of various tokenization, pre-training objectives, and deep learning architectures on overall performance.

## **PREDICTING CHARGED PARTICLE COLLISION CROSS SECTIONS USING MACHINE LEARNING**

Presenter: Nepomuceno, Josh  
Undergraduate, Physics

Mentor: Prof. Allison Harris

Authorship: Allison Harris, Josh Nepomuceno

The use of machine learning algorithms in the physical sciences has exploded in recent years, including many areas of physics such as high energy physics, quantum many body problems, quantum computing, molecular chemistry, and material science. However, despite their promise, these techniques have been slow to make their way into atomic collision physics. It is unlikely that machine learning techniques will ever replace first-principles calculations, but they may be able to fill the gap in available cross section data that is needed in fields such as plasma physics and biophysics. The success of the models in these fields relies, at least in part, on the accuracy and availability of electron scattering cross sections over a wide range of energies, target species, and collision processes. Unfortunately, the necessary data sets are often unavailable or incomplete due to the difficulty associated with detailed measurements and sophisticated theoretical models. Machine learning could represent a major leap forward in the prediction of cross sections for complex atomic and molecular targets that are beyond the reach of existing theoretical models. Here, we present preliminary data for the prediction of atomic and molecular collision cross sections using a feed-forward neural network. Validity of the machine learning algorithm is determined by comparison of the predicted cross sections to known data from experimental measurements and theoretical models.



## **USING A PHENOMENON BASED LEARNING APPROACH TO INCREASE HIGH SCHOOL STUDENT CONFIDENCE LEVELS IN CHEMISTRY TOPICS**

Presenter:     Norrman, Mark  
                  Graduate, Teaching and Learning

Mentor:        Prof. Anna Smith

Authorship:    Mark Norrman

Chemistry concepts can be difficult for high school students, especially when they begin to doubt their abilities as the complexity of the material increases. Many concepts being covered are hard for students to grasp since they cannot directly see the atoms in question, causing them to doubt themselves and struggle to achieve mastery of the material. This study aims to determine if using a phenomenon based learning approach to the material can increase the students confidence levels in chemistry. Using real world phenomena and models to help students understand the underlying concepts should increase their confidence levels. This increased confidence will help change their mindset into a more positive mindset leading to increased likelihood of mastery. The research used a mixed methods approach on 50-70 students completing their second year of high school in Dedham, Massachusetts. These students have previously only taken one high school science course, a Biology course that was taught in a hybrid model due to COVID-19 safety protocol. After completing a phenomenon based learning unit, students completed a Likert survey to rank their confidence levels on the material. These rankings were then analyzed to determine if this pedagogical style increased confidence levels. In addition to the survey, mini conferences were held with the students to allow them to expand on their answers to the survey. Students were then asked to apply the newly learned material to explain a second, similar, natural phenomenon

## **PROBING FOR INFORMATION: DIFFERENTIATING AMONG MULTIPLE PROPERTIES OF A SINGLE PROBE-SURFACE SYSTEM**

Presenter: Oak, Devyn  
Undergraduate, Psychology

Mentor: Prof. Jeffrey Wagman

Authorship: Devyn Oak, Ashton Grant

Many interactions with everyday objects involve wielding, manipulating, or hefting those objects by means of muscular forces. In doing so, people can perceive (and differentiate among) many different properties of that object – even when that object is out of view. For example, people can differentiate between the whole length of the object and the partial length of that object to one side of the grasp location. People can also perceive (and differentiate among) many properties of objects that are probed with a wielded object – even when both the probe and surface are out of view. For example, people can differentiate between the length of the probe and the distance of the probed surface. In this study, we investigated the degree to which people can perceive and differentiate among several properties of a single probe-surface system – the whole length of the probe, the partial length of the probe to one side of the grasp location, and the distance of the probed surface. We found that participants were able to differentiate among these properties. The results are discussed in the context of the mechanical variables that might provide information about such properties to a perceiver.

## **EXPLORING THE READING ATTITUDES OF HIGH SCHOOL STUDENT-ATHLETES**

Presenter: O'Daniel, Kyle  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Kyle O'Daniel

Both high school and collegiate student-athletes suffer from the “dumb jock” stereotype, despite a growing body of evidence suggesting the varied interests and abilities of this student population. In particular, student-athletes are often perceived as having more difficulties or disinterest in reading than their non-athlete peers. The current study aims to explore the reading attitudes of high school student-athletes, a group that is historically underrepresented in academic research, in a central Illinois high school. Data was collected using an adapted Rhody Secondary Reading Attitude Assessment (Tullock-Rhody & Alexander, 1980) with additional qualitative questions. Results of this study may help teachers and other educational staff to better serve this student population.

## DEFENSE MECHANISMS OF THE SELF AGAINST REIFICATION

Presenter: Park, Dani  
Graduate, Sociology/Anthropology

Mentor: Prof. Michael Hendricks

Authorship: Dani Park

Sovereignty of personhood demands that the Self is prioritized and placed above that of objects. In this sense, there is a distinction between Subject and Object that can never be breached:  $S > O$ .

However, under the logic of capitalism, nothing can be made sacred and thus incapable of being quantified and commoditized, including the Self and its many forms of expression (with special emphasis on labor). Such is the process of reification, in which human properties and processes—and eventually the human—become things capable of being commoditized. Thus, through reification a crucial concern becomes the abolition of the Subject/Object distinction in which neither has priority and therefore inherent value other than what can be quantified and objectified:  $S = O$ .

Given this change in relation, the objectification of the Subject and the subjectification of the Object serve to obfuscate, but never completely eliminate, the logic of reification. However, I argue that the Subject is never capable of being completely reified and instead utilizes defense mechanisms with which she seeks to subvert the process of reification altogether. This comes in three forms influenced by Freud's psychosexual development stages and Deleuze and Guattari's body without organs:

1. Oral (Internalization/Causation). This mechanism involves the process of "consuming" the object and thus demanding its acknowledgment of the Subject as above that of the Object. Through internalization, the Subject literally envelops the Object as the cause of said internalization, thereby rejecting the logic of the Object as external to the Subject. By internalizing the Object, the Subject replaces this externality as cause, thereby reasserting sovereign supremacy before reification.
2. Anal (Expulsion). This mechanism involves the process of "shitting out" the object. Through expulsion, the Subject maintains the boundaries—and asserts her ability to maintain such boundaries—that distinguish the Subject from Object by the literal pushing out of that which obfuscates the Subject/Object distinction, thus forcing the separation of the Subject/Object that subverts reification.
3. Genital (Creation). This mechanism involves the process of asserting creative dominance over the Object. By utilizing the Object in a manner not prescribed by externality, the Subject imbues the Object with a creativity that in turn demands the recognition of a new Object—one that is derived from the Subject. This productive force leads to the reassertion of the Subject-dominance before reification.

## **ARE TEACHERS IN MIDDLE SCHOOL USING HUMANIZING APPROACHES WITH STUDENT BEHAVIORS**

Presenter: Rappe, Ashley  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Ashley Rappe

The purpose of this study is to examine the use of behavior management approaches utilized by teachers in middle school classrooms. Teachers and students are impacted daily by various behaviors and environmental factors causing the solution to this issue to be an ongoing process. Therefore, this study will focus on interviewing 5th through 8th grade middle school teachers about their use of behavior management strategies. The teachers will be selected at random based on their level of experience. Three teachers will be chosen with 1-5 years of experience and another 3 will be selected with 10 or more years of teaching experience. Teachers being interviewed are being chosen from one elementary school in central Illinois. With this study, the researcher, educators, and school personnel will be equipped with further understanding of how behavior techniques are being used in middle school classrooms.

## **A STUDY OF THE IMPACT OF COVID-19 ON LATINX COLLEGE STUDENTS IN THE MIDWEST**

Presenter: Ricci, Molly  
Graduate, Sociology/Anthropology

Mentor: Prof. Maura Toro-Morn

Authorship: Molly Ricci

This study proposes to examine how Latinx Illinois State college students who were enrolled in the Spring, 2020 semester experienced the transition to online learning after the onset of the worldwide Coronavirus pandemic. We are interested in investigating how they were affected by the pandemic and how they coped with it in the aftermath of college closures and movement to online learning. We draw on qualitative data which will be collected through a series of 30 total interviews collected in a snowball sample with various starting points. We anticipate that the pandemic affected the students' learning and college experiences. Given what we know about racial differences in the impact of COVID-19 more broadly, we anticipated that Latinx students were differentially impacted in both the transition to online learning and their college experiences. We anticipate that our research will contribute to existing research by giving voice to the unique experience of Latinx students. We also want to examine the student's perception of the university's response. This study will contribute to the growing body of work that is emerging about the impact of the 2020 pandemic in college campuses across the nation.

## **CULTURALLY RESPONSIVE TEXTS IN A FAMILY & CONSUMER SCIENCE MIDDLE SCHOOL CLASSROOM**

Presenter: Riley, Sara  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Sara Riley

This research study analyzes how the use of culturally responsive texts in a middle school Family and Consumer Science (FACS) classroom can benefit students. As the demographics of today's public classrooms shift, educators are met with a convergence of social challenges that require teaching practices that help support and inspire all students. Culturally responsive teaching is a framework that meets these needs and layers in the use of multicultural texts. Classroom texts and supportive literature can be selected to mirror the faces and family backgrounds of students and tell the stories of diverse populations. This provides students the opportunity to learn about their backgrounds and the cultures of others, while connecting with ideas and interests of their peers. This qualitative study explored the potential benefits of reading, discussing, and interacting with culturally relevant and critical texts selected to support the learning targets of FACS units of study on consumerism, nutrition and cooking, and fashion and design. Insights on student interest, engagement, identity, sense of belonging, and cultural empathy have started to emerge. The findings start to suggest students benefit from reading and interacting with multicultural texts in many ways, including increased academic success and greater personal achievement. The findings also suggest Family and Consumer Science and other content-area programs can select related texts that promote cultural understanding and provide unique learning opportunities to meet the intellectual, emotional, and cultural needs of diverse 21st century classrooms.

## **TECHNOLOGY INTEGRATION WITHIN WRITER'S WORKSHOP**

Presenter:     Rocke, Valerie  
                  Graduate, Teaching and Learning

Mentor:        Prof. Erin Quast

Authorship:    Valerie Rocke

Technology drives the world we live in and is an integral part of students' lives in this 21<sup>st</sup>-century world. With that, one would assume, educators are preparing our future generation to understand how to best use these technology devices, but what we are often seeing is that technology integration is not taking place in the classroom. Technology is a huge advantage to students in the classroom when used correctly. Technology has the power to increase student engagement and, overall, benefit student growth. So, what's stopping teachers from integrating? Challenges are discussed as well as common strategies to incorporate technology integration within a classroom.



## MOLECULAR UNDERPINNINGS OF THE TAIL-FLIP ESCAPE CIRCUIT OF MARBLED CRAYFISH

Presenter: Roy, Rajit  
Graduate, Biological Sciences  
Mentor: Prof. Wolfgang Stein  
Co-Mentor: Prof. Andres, Vidal-Gadea  
Authorship: Rajit Roy, Andres Vidal-Gadea, Wolfgang Stein

Escape responses are highly stereotyped behaviors that enable an organism to avoid threats in its environment. These behaviors are mediated by dedicated neuronal circuits that process sensory stimuli in a rapid and robust fashion, which requires fast communication between neurons via electrical synapses. Moreover, a special class of electrical synapses, called rectifying electrical synapses, allow current to preferentially flow only in one direction, making neuronal signaling more rapid and stereotyped for fast, reflexive behaviors. Although *in vitro* studies have confirmed the presence of these gap junction proteins (called innexins in invertebrates) in electrical synapses, their functional role in escape responses is yet to be fully discerned. Thus, a full-fledged understanding of escape circuits and their molecular underpinnings is required.

The tail-flip escape behavior of crayfish has been used as a classical behavioral model for understanding escape responses. The neuronal circuitry of the crayfish tail-flip behavior has been largely worked out, with specialized giant neurons identified for the two major types of escape modes in the animal – the lateral giant (LG) and medial giant (MG) tail-flip. These escape circuits contain rectifying electrical synapses that facilitate rapid signal transmission from primary afferents to the motor neurons. However, the specific innexin proteins contributing to these rectifying synapses are still unknown. To address this problem, we are using the marbled crayfish (*Procambarus virginalis*) as a behavioral model. The marbled crayfish is a species of parthenogenetic crayfish whose genome and transcriptome data is largely available, making it easier to utilize cutting-edge molecular approaches in tandem with behavioral assays. We initially identified three putative innexin genes that are expressed in the brain and ventral nerve cord of the animal and are likely involved in escape. To test our hypothesis that these three innexin genes contribute to the escape circuit, we propose to use a two-pronged approach to interrupt the expression of these genes using RNA interference and CRISPR. This will be followed by behavioral assays to study the effects of gene disruption on escape behavior. The preliminary data from RNAi experiments suggests that silencing of innexin ½ in marbled crayfish results in slowing down of the tail-flip response. Next, we plan to individually knockout the putative innexin genes using CRISPR-Cas9 and examine its effects on behavior. Finally, by combining gene expression and behavioral data, we will be able to tease out a possible distribution of different innexins on the pre- and postsynaptic side of the escape circuit.

## **PARKINSON'S DISEASE MILD COGNITIVE IMPAIRMENT (ATTENTIONAL SET SHIFTING) AND THE ROLE OF THE DORSOLATERAL PREFRONTAL CORTEX**

Presenter: Salzman, Ashley  
Graduate, Biological Sciences

Mentor: Prof. Alysia Mortimer

Authorship: Ashley Salzman

Parkinson's Disease (PD) is a progressive disease involving the loss of dopamine (DA) neurons in the substantia nigra pars compacta (SNc). The cardinal symptoms consist of tremor, postural instability, bradykinesia, and rigid muscles. However, 20-80% of PD patients experience impaired cognition, and many consider cognitive dysfunction as more debilitating than motor dysfunction. In particular, PD is associated with an impairment in the cognitive function of attentional set shifting, which is an example of cognitive flexibility, or the ability to move back and forth between different mental sets. However, a synthesis of what is known about attentional set shifting in PD has yet to be performed. Therefore, I undertook a literature review and will 1) summarize theories about what causes attentional set shifting deficits in PD, 2) define examples of impaired attentional set shifting in PD, and 3) discuss the role of the dorsolateral prefrontal cortex in impaired attentional set shifting in PD. Finally, I will discuss future implications for research and treatment of impaired attentional set shifting in PD.

## **STRATEGIES TO INCORPORATE MULTICULTURAL LITERATURE IN THE SECONDARY CLASSROOM**

Presenter: Sanders, Jessica  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Jessica Sanders

The purpose of the study is to push to include multicultural literature in the classroom by providing a new strategy, textured teaching. The overall goal of this is to enhance student understanding and comprehension of cultures/races other than their own by incorporating textured teaching components. Including multicultural literature in the classroom is proven to have many benefits, but there has not been much research showing how to implement this within the classroom. This study would do just that. While textured teaching is incorporated in the classroom, student work will be collected, including homework and assessments, in addition to notes being taken whilst observing lessons. The collected data will be analyzed and evaluated with a narrative discussing the findings and the success found in textured teaching. The study results will provide teachers with a strategy to utilize in order to include multicultural literature in the classroom

## **DIVERGENCE AND CONVERGENCE OF THE GUT MICROBIOMES OF WILD INSECT POLLINATORS**

Presenter: Sauers, Logan  
Graduate, Biological Sciences

Mentor: Prof. Ben Sadd

Authorship: Logan Sauers, Ben Sadd

Pollination services provided by wild insect pollinators are critical to natural ecosystems and the economic value of crops around the world. Gut microbiota of these insects may determine health and the contributions of their hosts to these services. Thus, phylogenetically divergent insect pollinators represent a crucial system in which to investigate evidence for factors contributing to the assembly of host microbial communities, which is a general question in host-microbiota research. We investigated the microbiomes of multiple insect pollinator species from China, distributed across three insect orders. We found lineage specific divergences of dominant microbial genera and microbiota community compositions across the divergent insect pollinator genera. However, we found no broad phylogenetic signal underlying these divergences, even though one is present at finer phylogenetic scales. Although there is clearly no single insect pollinator associated gut microbiota, there is suggestive evidence that ecology, including diet, may be associated with community structure. Indeed, we uncover a similar microbe in the gut microbiomes of a pollinator fly and bees, but comparative genomics indicates potential functional differences that could relate to the evolution with host or other microbiota members. Overall, this study suggests selective processes involving ecology or physiology, or neutral processes determining microbe colonization may predominate in the turnover of lineages in insect pollinators broadly, while evolution with hosts and co-occurring microbes may occur under certain circumstances and on smaller phylogenetic scales.

## **THE CAUSES OF DATA SILOS, THEIR DETRIMENTAL EFFECTS, AND POSSIBLE SOLUTIONS TO THEM**

Presenter: Schaut, Levi  
Undergraduate, Information Technology

Mentor: Prof. Qi Zhang

Authorship: Levi Schaut

Data silos are collections of information within an organization that are in some way isolated from other parts of the organization, which may cause overlaps across silos, potentially reducing data quality. When data is siloed, it's hard for decision-makers to get a holistic view of company data. Data silos can have a variety of causes, such as the differences in priorities and goals of the departments within an organization, the company structure making it difficult to share information, and technology and software applications being incompatible with each other. Silos can make it hard to retrieve relevant data and can cause data inconsistencies, which can waste a lot of time and resources. To address the barriers in information sharing and collaboration across departments caused by data silos, over the summer of 2021, I participated in a team-based internship project in Optum, Inc. In this project, for processing drug monograph data supplied by OptumRx and improving data consistencies, I created a Python script that parsed through raw data in JSON format and added the data to an existing graph database. This provided a solution to data silos by consolidating all of the data into a single, connected system. In this project, a Python library called "pyTigerGraph" was employed to connect to TigerGraph databases; this software package can integrate the power of graph technology with Python notebooks and libraries. My work is a component of a team project of creating a Web application that queried the graph database for the monograph data and established seamless connections among all the data sets simultaneously, a task which would have previously required connecting to a separate database specifically for that data.

## **THE RELATIONSHIP BETWEEN FACT FLUENCY AND OVERALL MATH ABILITY IN MIDDLE SCHOOL**

Presenter: Schmidt, Kyle  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Kyle Schmidt

Math fact-fluency is one of the first skills developed by students in their math classes in elementary school. If a student does not maintain these skills throughout their schooling, their overall math ability may decline. This paper will analyze previous research that has shown there to be a relationship between fact fluency and a student's success in later schooling and ability to problem solve. At the middle school level, fact-fluency and math fact knowledge are key to succeeding because of the application that students must perform of math facts in problem solving. This study will analyze the results of two standardized tests, one that measures a student's math fact-fluency and one that measures a student's ability to apply math knowledge, by comparing the scores each student earns to determine the correlational relationship between the two tests. Students take both tests in the fall at the start of the school year, again in the middle of the year, and at the end of the year. This paper will collect the results of the first two tests and compare the growth from fall to winter, to better analyze the growth between fact-fluency and math ability. This analyzation will highlight the correlation between fact fluency and overall math ability. Then, the results of this study will guide the design of a curriculum that will better serve students struggling in math to build their math application skills through fact fluency work.

Keywords: math fact-fluency, application, problem-solving, math ability, standardized assessment, intervention

## **GAINING PERSPECTIVE: SPANISH-SPEAKING PARENT PERCEPTIONS ON INVOLVEMENT AND BARRIERS**

Presenter: Sherrill, Matt  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Matt Sherrill

The purpose of the proposed research study is to explore parental involvement as it pertains to parents of English Learner (EL) Middle School students. Research shows the link between parent involvement and academic achievement, while also showing that EL students are not necessarily seeing the same levels of achievement as their non-EL peers. As schools grapple with bridging achievement gaps that have occurred as a result of remote learning during the COVID-19 pandemic, it would be logical to try to increase parent involvement as a strategy to help bridge that gap. However, studies have shown that EL parents may have different perceptions from the school on what parent involvement looks like. Additionally, EL parents face a variety of potential barriers to their involvement. This study intends to explore these perceptions and barriers through the use of a mixed-methods survey, closely aligned with Joyce L. Epstein's (1987; 2007) six types of parent involvement. The survey will be administered to Spanish-speaking parents of EL students at a Central Illinois Middle School. Results of the study have the potential to help educators develop strategies to build stronger school-to-home partnerships for the improved success and well-being of EL students.

## **AN INVESTIGATION OF HOW GIFTED STUDENT INVOLVEMENT IN CREATING PROFICIENCY FRAMEWORKS IMPACTS LEARNING AND MOTIVATION**

Presenter: Shore, Rachel  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Rachel Shore

As standards-driven learning becomes increasingly more prevalent in classrooms, so too does the need for student involvement in that process. Gifted students benefit from being given more ownership over their education, so this push for more standards-based learning provides an opportunity to challenge those accelerated students further. This research study will focus on what happens when gifted students fully understand expectations and the skills behind the content they are learning, through the creation of proficiency frameworks that can act as a rubric for their argumentative writing. The increased amount of student involvement in these standards discussions will hopefully lead to improved student learning and motivation.



## THE DIFFERENCE BETWEEN TROPHIC AND REPRODUCTIVE EGGS IN THE STRAWBERRY POISON FROG

Presenter: Talbott-Swain, Evan  
Undergraduate, Biological Sciences

Mentor: Prof. Matthew Dugas

Authorship: Evan Talbott-Swain, Ryan Paitz, Matthew Dugas

Parents can benefit from feeding their offspring. Some frogs, in particular the neotropical poison frogs (Dendrobatidae), feed their developing tadpoles with unfertilized trophic eggs regularly throughout development. These eggs provide tadpoles with calories and perhaps nutrients that drive their growth and development (Dugas et al., 2016.; Dugas et al., 2017; Dugas et al., 2013). Eggs, at least when produced for reproduction, also contain hormones from the mother. These hormones have been well-studied in birds and reptiles, and a recent study confirmed that these are present in the eggs of poison frogs. Whether trophic eggs contain hormones and any difference between trophic eggs and reproductive eggs is unstudied. We collected both trophic and reproductive eggs from breeding pairs of the strawberry poison frog (*Oophaga pumilio*). We found that steroids are present in both reproductive and trophic eggs of *O. pumilio*. The types and quantities of steroids were similar in both types of eggs produced by the same female, although a rare androgen was found more often in trophic eggs. We also found that per-egg steroid quantities were lower in larger clutches. These results show, for the first time, that developing tadpoles are exposed to large quantities of steroids, and this exposure is variable. Further work can address the effects of these steroids on tadpole development.

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## **IMPACT OF USING LETTER-SOUND CORRESPONDENCE VS. WHOLE WORD MEMORIZATION TO TEACH A TARGET LIST OF SIGHT WORDS ON FIRST GRADE STUDENTS' ABILITY TO READ AND CORRECTLY SPELL THE WORDS**

Presenter: Teel, Amanda  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Amanda Teel

Primary teachers across the United States spend a portion of their reading instructional time teaching high frequency/sight words. Related literature on this topic indicates many instructional techniques for high frequency/sight words often focus on whole word visual memorization because many of these words have irregular spellings. The purpose of this mixed methods study is to explore primary teachers' beliefs and perceptions about teaching high frequency/sight words and to examine the impact of differing instructional techniques on students' ability to read and write a target list of high frequency/sight words within the Wilson Foundations curriculum. This study will survey kindergarten-2<sup>nd</sup> grade teachers and resource teachers at a Central Illinois PreK-8<sup>th</sup> grade private school who are familiar with high frequency word instruction and whose teaching experience varies in terms of grade level and number of years they have been teaching. Survey responses will be coded based on key terms and concepts that emerge about teachers' beliefs and instructional techniques for high frequency word instruction. Transcriptions of audio recordings of two of the first-grade teachers' (one being the researcher) high frequency word instruction will be coded based on key phrases used in instruction with similarities and differences in instructional techniques noted. First grade student participants will complete a pretest and posttest word reading and dictated spelling test of a list of 11 high frequency/sight words within the *Foundations* curriculum. Student scores will be compared and analyzed as to the number of words correct and any other trends that emerge, indicating the impact of the teachers' instructional techniques. This research will equip primary teachers, resource teachers, interventionists, and even parents with a greater understanding of evidence-based practices that best support how students learn to read and spell high frequency words.

## **THEATRE IN THE MATHEMATICS CLASSROOM: HOW THEATRE ARTS INTEGRATION IMPACTS THE AFFECTIVE DOMAIN**

Presenter: Turner, Chris  
Undergraduate, Theatre and Dance

Mentor: Prof. James Chrismon

Authorship: James Chrismon, Chris Turner

Arts Integration is defined by the Kennedy Center as “an approach to teaching in which students construct and demonstrate understanding through an art form. Students engage in a creative process which connects an art form and another subject and meets evolving objectives in both” (Silverstein & Layne, 2010). The benefits of Arts Integration have been researched extensively and include positive impacts on students academic achievement (Peppler et al., 2014), long-term retention of content (Rinne et al., 2011), and social emotional learning (Casiano et al., 2019). Theatre Arts Integration, in particular, has been found to positively impact student achievement in both language arts and mathematics (Walker et al., 2011).

For this study, the researchers investigated Theatre Arts Integration in the mathematics classroom, focusing, in particular, on the effect that integrating theatre into mathematics instruction has on students’ perceptions of learning mathematics. Students’ attitudes towards several aspects of learning mathematics have been shown to have a measurable impact on mathematics learning. Students’ confidence and their enjoyment of mathematics have both been shown to correlate to greater rates of growth in mathematics (Benken et al, 2015). Additionally, student motivation (to develop their understanding of mathematics) and students’ value of mathematics (understanding how math relates to real life situations) are both positive predictors of success in mathematics (Guy et al, 2015).

During this study, the researcher taught several arts integrated math lessons to 40 6<sup>th</sup> graders in two 6th grade math classes. The researcher employed several theatrical techniques, including Story Drama and scene development, as vessels for mathematics instruction. After the lessons, students were asked several questions to determine the effect that the Arts Integrated instruction techniques had on their Confidence, Motivation, Value, and Enjoyment of mathematics. A Likert scale (1-5) was used for each category, where a 1 indicated that a student strongly disagrees that the instruction improved their Confidence, Motivation, Value, and Enjoyment of mathematics, respectively. A 5 indicated that a student strongly agrees that the instruction improved their Confidence, Motivation, Value, and Enjoyment of mathematics, respectively. For Confidence, Motivation, Value, and Enjoyment, respectively, the mean ratings were 3.40, 3.90, 4.00, and 4.65, indicating that arts integrated instruction can have a positive effect on students’ perception of mathematics, which, as stated above, greatly influence students’ mathematical success.

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## **EXPERIENCING DEVELOPMENTAL PLAY ACCORDING TO KINDERGARTEN TEACHERS**

Presenter: Veldhuizen, Haley  
Graduate, Teaching and Learning

Mentor: Prof. Erin Quast

Authorship: Haley Veldhuizen

This study analyzed kindergarten teachers' perspectives on the implementation of developmental play in a kindergarten classroom. In order to understand the successes and challenges of implementing developmental play, eight participants who currently teach kindergarten and implement developmental play daily were selected. An electronic survey was conducted to allow teachers to share their experiences of implementing developmental play time while meeting academic standards and how learning happens during developmental play time. The findings support kindergarten teachers by giving them ideas on how to implement developmental play and how to support learning throughout developmental play. Further discussions regarding limitations, results, and future research are addressed. Keywords: developmental play, kindergarten teachers' perceptions, importance of developmental play, changes in kindergarten

## **ADOLESCENT WRITER IDENTITY IN THE 21ST CENTURY: DOES WRITER IDENTITY IMPACT ACADEMIC WRITING?**

Presenter: While, Andrea  
Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Andrea While

Personal identity is created through the compilation of influences that range from parental and peer influences to personal experiences and social constructs. These identities begin forming during adolescence, therefore possibly impacting the academic identities of students. Because of this overlap, it becomes advantageous to more closely examine the impact that identity has on writing and academics. In this study we look at the writer identity and academics dynamic in greater detail. The study will be conducted during a unit focusing on the formation of personal identity. Open-ended questions will be posed to a group of freshman students regarding identity and writer identity. Student responses and academic assignments will be collected and examined to determine if there is a relationship between student writer identity and academic performance.

## **2022 University Research Symposium Group Abstracts - E-Poster Option**

### **ADDRESSING THE FINANCIAL AND ENERGY POLICY DIFFICULTIES OF INSTALLING PV SYSTEMS AT ILLINOIS STATE UNIVERSITY AND CHEYNEY UNIVERSITY IN PENNSYLVANIA**

Group Leader: Baumann, Anthony  
Undergraduate, Technology

Group Member: James Smith, Undergraduate, Technology

Mentor: Prof. Jin Jo

Authorship: Anthony Baumann, James Smith

Colleges and universities make up 4% of the United States' carbon emissions. One thing that can fix this problem is by having institutions of higher education divest from fossil fuel sources and switch to cleaner forms of energy such as solar energy. Furthermore, solar energy can cut CO2 emissions caused by colleges and universities in the United States by 28% and meet college energy needs up to 75% or higher. This could help U.S. higher education institutions save on high costs of conventional energy, which on average cost about \$14 billion in energy bills. The goal of this comparative analysis is to see how state incentives, institutional programs, and electricity rates make a power purchase agreement more economically viable than an upfront simple ownership financing model based on the installation of solar systems at Illinois State University and Cheyney University in their respective states. By conceptually implementing solar systems at each University by using solar photovoltaic system design and performance models, a cost analysis comparing both universities can be conducted. Furthermore, this comparative analysis presented case studies through which each university can implement campus programs to help drive down system costs and how their respective states can implement energy policies to help aid solar installation.

## **FIELD WORK: ALLOWING ALL STUDENTS TO ROCK IT!**

Group Leader: Cardenas, Laisha  
Undergraduate, Geography, Geology, and the Environment

Group Member: Mark Grandos, Undergraduate, Accounting

Mentor: Prof. Allison Kroesch

Authorship: Laisha Cardenas, Mark Grandos

Field work is an instructional strategy that allows all students to be hands on in the real world. This research to practice presentation discusses ways to implement the instructional strategy within Business Education and Earth and Space Science Education to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.



## THE EFFECTS OF RACE ON FACIAL RECOGNITION

Group Leader: Carrillo, Michelle  
Undergraduate, Psychology

Group Member: MaKayla Smullin, Graduate, Psychology

Mentor: Prof. Dawn McBride

Authorship: Michelle Carrillo, MaKayla Smullin

Facial recognition is a huge part of our world today, and being able to understand different factors that play a role when we are recognizing faces is very important. Understanding how race plays a role when using our facial recognition skills, especially when faces display a particular emotion, will allow us to better be able to understand the world because race and emotional expression are such a big parts of our lives. The goal of this study is to bring more awareness to studying facial recognition with various types of races because in past studies there has been a lack of diversity, which could be a contributing factor to not getting accurate results when studying facial recognition effects in emotional expressions. In this study 100 participants from Illinois State University will be tested in a 2 x 2 x 2 design where they are asked to study faces with different facial expressions (angry and happy) race (Black and White faces). The participants will then be tested for their recognition of the faces at an immediate and 15 minute delay. We predict that faces tested at the short delay will be better remembered with an angry than a happy expression based on results from past studies. We expect this effect to reverse at the longer delay. We also predict that the race of the faces will affect this interaction, with the Black faces showing no reversal of expression advantage at the longer delay.

Key words: Facial recognition, race, emotional expression, time delay

## **PEERS SUPPORTING PEERS**

Group Leader: Connelly, Mary  
Undergraduate, English

Group Member: Cassidy Heffelfinger, Undergraduate, Kinesiology &  
Recreation

Mentor: Prof. Allison Kroesch

Authorship: Cassidy Heffelfinger, Mary Connelly

Peer mentoring is an instructional strategy that trains peer leaders to teach positive communication skills and problem-solving techniques to their classmates. This research to practice presentation discusses ways to implement the instructional strategy within Physical Education and English Language Arts to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.

## **FACTORS INFLUENCING STUDENT DIVERSITY IN HIGH SCHOOL SCIENCE CLASSROOMS**

Group Leader: Fink-Galletti, Claire  
Graduate, Teaching and Learning  
Group Member: Kayla Schahrer, Graduate, Teaching and Learning

Mentor: Prof. Anna Smith  
Authorship: Claire Fink-Galletti, Kayla Schahrer

Throughout the history of the United States, differences in race and gender have been a prominent topic in education. As educational practices evolve, the diversity and practices of science education remain stagnant. With the demographics of American schools quickly becoming more diverse, it is critical that science education catches up with these changes. There is ample research on the lack of diversity in science education and career fields. However, there is not much research looking into the cause of the lack of diversity in the sciences. The aim of this study is to add to the research on why there is a lack of diversity in the science classroom and thus later professional career realm. From here, researchers hope to propose strategies that institutions and educators can implement to make students from different races and genders feel more comfortable in the science field.

## PEER SUPPORT SYSTEMS

Group Leader: Howard, Kyle  
Undergraduate, English

Group Members: Matt Feeney, Undergraduate, Technology; Nathaniel Parson,  
Undergraduate, Music

Mentor:  
Prof. Allison Kroesch

Authorship:  
Kyle Howard, Matt Feeney, Nathaniel Parson

Using peer support in the classroom is an effective instructional strategy that helps bridge the gap for students with disabilities while supporting inclusion. This research to practice presentation discusses ways to implement peer supports in English Language Arts, music, and technical education courses to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.

## **HIGH STAKES CURRENT EVENTS**

Group Leader: Jackson, Blake  
Undergraduate, History

Group Member: Michael Park, Undergraduate, Teaching and Learning

Mentor: Prof. Allison Kroesch

Authorship: Blake Jackson, Michael Park

Using current events is an instructional strategy that helps teach important concepts in social conflicts and government policies. This research to practice presentation discusses ways to implement the instructional strategy within physical education and social studies classes to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.

## **ILLINOIS DEPARTMENT OF TRANSPORTATION'S UTILIZATION OF HIGHWAY RIGHT OF WAY: ENHANCING GOVERNMENT OWNED LAND WITH SOLAR POWER**

Group Leader: Jimenez, Eduardo  
Undergraduate, Technology

Group Member: Brennan Douglas, Undergraduate, Technology

Mentor: Prof. Jin Jo

Authorship: Eduardo Jimenez, Brennan Douglas

Some states' transportation departments showcased sustainable infrastructures using their land areas. For example, Georgia decided to make a section on I-85 to be a net zero highway. This highway has piloted a grid connected solar electric vehicle charging station that offers free charging. They also began to develop a drivable solar road on a rest stop along with a onemegawatt right of way solar project that will supply electricity to the grid. Other states have been using and exploring use of "highway right of way" as way to create highway solar energy projects. Although there is a growing solar market in Illinois, the Illinois Department of Transportation (IDOT) does not withhold any renewable energy projects that are integrated with highways, and they are not utilizing land that can be viable in producing electrical energy. IDOT is one of the largest landowners in Illinois which can be utilized to create renewable energy. IDOT would highly benefit from solar photovoltaic (PV) energy production because it can create a source of revenue with other direct and indirect benefits. The primary application would be to supply electricity to the grid as well as providing energy to the designated areas of rest stops. Another application is electrical vehicle (EV) charging stations that can create revenue or create free charging for people. We analyzed a section in I-55 and implemented a "right of way" photovoltaic energy system as well as designed PV system on the rest areas. For the design we utilized professional solar design and performance models to calculate the amount of solar energy and to perform a financing analysis. Another software tool called Invest was used, which to help solar energy highway by providing feedback on the solar project. We modeled a solar PV system that can connect to the grid as well as the rest areas and evaluated the possibility of integrating EV charging stations with the solar PV system. We analyzed the economic cost of the IDOT solar PV systems as well as the total energy produced. The research conducted concluded that the use of solar PV systems was beneficial in providing energy as well as lowering the cost of energy for the IDOT. The results show that there is enough energy to create EV charging stations in the rest stop area. This research study provides a replicable model for other IDOT owned land areas for further applications of renewable energy infrastructures.

## **WHO GOVERNS THE VIRTUAL WORLDS: TENSIONS BETWEEN DEVELOPERS AND PLAYERS AS FORMS OF CULTURAL GOVERNANCE IN MMO VIDEOGAMES**

Group Leader: Kalantari, Mojde  
Graduate, Creative Technologies

Group Member: Ellie Parvin, Graduate, Creative Technologies

Mentor: Prof. Sercan Şengün

Authorship: Sercan Şengün, Mojde Kalantari, Ellie Parvin

This study focuses on tensions and conflicts between the developers and the players of massively multiplayer online games (MMOs), that emerge while developers struggle to regulate the public and the cultural domains of the virtual worlds and players generate methods to resist these regulations. Apart from deconstructional interventions like cheating and exploitation, players also stay at odds with the developers within the domains of intellectual properties, fan culture and other cultural behaviors. The study appropriates these tensions as collaterals of cultural governance in digital domains and discusses them with case studies. Keywords. Videogames, Digital games, Online games, Machinimas, Virtual worlds, EverQuest, World of Warcraft, Eve Online, DayZ.

## **BENEFITS OF PEER MEDIATION IN SCHOOLS**

Group Leader: Kraemer, Anna  
Undergraduate, History

Group Member: Francesco Cullotta, Undergraduate, Kinesiology & Recreation

Mentor: Prof. Allison Kroesch

Authorship: Anna Kraemer, Francesco Cullotta

Peer mediated instruction is an instructional strategy that promotes the development of both academic achievement and social skills of students with specific learning needs. This research to practice presentation discusses ways to implement the instructional strategy within the social sciences and physical education subjects to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.



## **MAKING SOCIAL CONNECTIONS THROUGH PEER SUPPORTS**

Group Leader: Leininger, Mallory  
Undergraduate, English

Group Member: Paul Patton, Undergraduate, Kinesiology & Recreation

Mentor: Prof. Allison Kroesch

Authorship: Mallory Leininger, Paul Patton

Making social connections through peer supports is an instructional strategy that aids students in forming relationships in the classroom with their peers to help them excel both academically and socioemotionally. This research to practice presentation discusses ways to implement the instructional strategy within English Language Arts and Physical Education to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.

## **CAN YOU SEE ME NOW?**

Group Leader: Loska, James  
Undergraduate, English

Group Member: Brandon Day, Undergraduate, Health Sciences

Mentor: Prof. Allison Kroesch

Authorship: James Loska, Brandon Day

Incorporating visual aids into the classroom is an instructional strategy that assists in the success of deaf and hard of hearing students within an inclusive environment. . This research to practice presentation discusses ways to implement the instructional strategy within health education and English education to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.

## **FOREVER FRIENDS**

Group Leader: Mcmillen, Meghan  
Undergraduate, English

Group Member: Matthew Kieft, Undergraduate, Kinesiology & Recreation

Mentor: Prof. Allison Kroesch

Authorship: Meghan Mcmillen, Matthew Kieft

A peer buddy program is an instructional strategy that has general education students assist students with disabilities . It helps students with disabilities by having them interact with other students which integrates social and academic skills. This research to practice presentation discusses ways to implement the instructional strategy within English and physical education to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.

## **STUDENTS SUPPORT STUDENTS**

Group Leader:       McNamara, Rachel  
                            Undergraduate, Family and Consumer Sciences

Group Member:      Jena Hassert, Undergraduate, Geography, Geology, and the  
                            Environment

Mentor:               Prof. Allison Kroesch

Authorship:         Rachel McNamara, Jena Hassert

Learning through peer support is an instructional strategy that promotes inclusion and social connections. This research to practice presentation discusses ways to implement the instructional strategy within geography and family and consumer sciences to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.

## WHY DO WE PRECRASTINATE? THE RELATIONSHIP BETWEEN PRECRASTINATION AND COGNITIVE OFFLOADING

Group Leader: Michaels, Liz  
Undergraduate, Psychology

Group Member: Elizabeth Marsh, Graduate, Psychology

Mentor: Prof. Dawn McBride

Authorship: Liz Michaels, Elizabeth Marsh

Precrastination can be defined as completing a task earlier than necessary despite incurring extra cost. This can refer to people who need to respond to emails or texts right away or people who need to wash the dishes as soon as they are done being used. The cognitive-load-reduction (CLEAR) hypothesis (VonderHaar et al., 2019) suggests precrastination is a form of cognitive offloading; completing a task early instead of having to remember to complete the task preserves cognitive resources for other tasks. The current study aims to examine if precrastination and cognitive offloading are directly related as a test of this hypothesis. This study will utilize an alphabetizing task where the participants will be asked to put a list of words in alphabetical order. The participants will also have to verify sets of math problems by determining which ones are correct or incorrect. The participants will have the option to choose when they want to complete the math task (before, during, or after the alphabetizing task). Precrastination is measured in this task based on when the participant chooses to verify the math problems relative to the alphabetizing task – verifying the math problems before starting the alphabetizing task or early within this task shows precrastination of math verification. For the second part of the experiment, participants complete the same two tasks. However, for the alphabetizing task participants are given a specific category of objects to list at the end no matter what letter they start with (e.g., animals). Participants will complete trials with reminders, trials without reminders, and then trials where they have the option to use or not use reminders. Results are expected to show a significant relationship between precrastination and cognitive offloading, such that those who rely on cognitive offloading will precrastinate more. The current study is expected to further support the CLEAR hypothesis and help us better understand why some people precrastinate.

## **DEVELOPING HOLISTIC GUIDELINES TO ASSESS A SOLAR PHOTOVOLTAIC SYSTEM'S SUSTAINABILITY FOR HIGHER EDUCATION INSTITUTIONS**

Group Leader: Miller, Austin  
Undergraduate, Technology

Group Members: Cole Cook, Undergraduate, Technology; Enoc Ilunga,  
Undergraduate, Technology

Mentor: Prof. Jin Jo

Authorship: Austin Miller

Sustainability will be the key to humankind's existence in the future; its importance is unmatched. The United Nations has established an agenda by 2030 that assembles 17 goals towards global sustainable development. The sustainability goals aim to end poverty, improve health and education, reduce inequality, and promote economic growth – while tackling climate change and preserving our ocean and forests. The purpose of this research is to dive deeper into sustainability at the solar energy scope. This is important as in the future world energy trends will shift toward renewable energy sources. Specifically, this research aims to establish a preliminary examination on a solar PV system's level of sustainability through review of the process plan, design, and operating improvements of the array. In a more refined scope, the research will be applied to a case study, Cheyney University of Pennsylvania. Cheyney University is interested in installing solar on their campus by selection of a proposal through the Department of Energy's design competition, the Solar District Cup. The research identifies aspects of a PV solar system from planning to post-life care and then examines these processes/plans and offers recommendations for improvement in the sustainability sectors. Sustainability can be seen as broken into four pillars: human, social, economic, and environmental. The intention of the improvements and recommendations established in the research is that it be used as a template or tool for other academic institutions to better their future designs.

## **TEACHERS' SELF-REPORTED PERSPECTIVES ON RESPONSE TO INTERVENTION AND FIDELITY AND THE EFFECTS ON STUDENT OUTCOMES**

Group Leader: Morris, Brittany  
Graduate, Teaching and Learning

Group Members: Malley Zadrzynski, Graduate, Teaching and Learning; Erica Varvil, Graduate, Teaching and Learning

Mentor: Prof. Anna Smith

Authorship: Brittany Morris, Erica Varvil, Malley Zadrzynski

Response to Intervention (RTI) frameworks are consistently used to help provide early intervention to at risk students. The current study aims to understand the perceptions of stakeholders involved in the RTI model in their school. Utilizing a survey to teachers who have experience with RTI, the researchers will analyze the results regarding participant background, fidelity of implementation, movement of tiers, and professional development insight. Based on tentative findings, we suggest continuation of teacher support through professional development, frequent fidelity checks, and support providing and implementing the evidence-based intervention.

## **FEASIBILITY STUDY OF INSTALLING A SOLAR PHOTOVOLTAIC SYSTEM WITH A BATTERY STORAGE TO OFFSET THE ILLINOIS STATE FARM AND ITS STORM SHELTERS' ELECTRICAL DEMAND**

Group Leader: Nihan, Jacob  
Undergraduate, Technology

Group Members: Gabrielle Hershey, Undergraduate, Technology

Mentor: Prof. Jin Jo

Authorship: Jacob Nihan, Gabrielle Hershey

Electrical energy demand at the ISU Farm has the potential to be supplied and maintained by a solar plus energy storage system located on the property. Research in this area would further promote sustainability initiatives throughout the university and help to alleviate some carbon emissions that may stem from campus energy consumption. Data was collected regarding load profile and energy consumption at the farm which allowed us to properly size the solar photovoltaic system and battery storage. To do this, we used professional energy simulation software tools such as Helioscope and Systems Advisory Model to assess expected system electrical energy output data. As a result, we present a couple of optimized system solutions through which we would be able to offset the farm's electrical consumption.



## **SUPPORTING TRANSITIONS IN THE CLASSROOM ENVIRONMENT**

Group Leader: Rzeszuto, Monica  
Undergraduate, Family and Consumer Sciences

Group Member: Michelle Mueller, Undergraduate, Family and Consumer  
Sciences

Mentor: Prof. Allison Kroesch

Authorship: Monica Rzeszuto, Michelle Mueller

Worksheets are an instructional strategy that help support the organization and process of a transition. This research to practice presentation discusses ways to implement the instructional strategy within Early Childhood in the Family Consumer Sciences Department to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.

## **KEEPING STUDENTS ACTIVE IN LEARNING: USING ACTIVITY BASED APPROACHES IN CLASSROOMS**

Group Leader: Szela, Justin  
Undergraduate, Physics

Group Member: John Green, Undergraduate, Kinesiology & Recreation  
Prof. Allison, Kroesch

Authorship: Justin Szela, John Green

An activity-based approach in any classroom is an instructional strategy that benefits students with disabilities who struggle with traditional learning via didactic teaching. This research to practice presentation discusses ways to implement the instructional strategy within science and physical education classrooms to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti-ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.

## **LEARNING OPPORTUNITIES OUTSIDE THE CLASSROOM**

Group Leader: Turcotte, Briana  
Undergraduate, Kinesiology & Recreation  
Group Members: Stephanie Flood, Undergraduate, English  
Mentor: Prof. Allison, Kroesch  
Authorship: Briana Turcotte, Stephanie Flood

Online Learning is an instructional strategy that provides students with disabilities opportunities to learn outside of the classroom and makes content accessible when students cannot be in a classroom. This research to practice presentation discusses ways to implement the instructional strategy within physical education and English to meet the instructional needs of all learners within our content areas. We will utilize a universal design for learning approach with an anti ableist and anti-racist lens. We will include research related to this instructional strategy and provide specific examples that reach across content areas.