



**The Dr. James Girard Summer
Undergraduate Research Experience
(SURE)**

2024 Symposium

Lewis University

Tuesday, August 6, 2024



Schedule

Location: AS-158-A

8:30am–9:05am	Breakfast and coffee served in University Dining Room	
9:05am–9:10am	Welcome: Dr. Brittany Stephenson	
9:10am–9:20am	Opening remarks: Dr. Christopher Sindt	
9:20am–10:35am	Session 1	<p>Kiersten Smith: <i>Exploring the Role of Reactive Oxygen Species on Alzheimer’s Disease Pathogenesis</i></p> <p>Raven Robinson: <i>Navigating Service Provision and Community Perceptions in a Suburban Environment: A Study of Homeless Service Nonprofits</i></p> <p>Philiffe Tebalan: <i>Graph Theoretical Modeling of Self-Assembling DNA of the Fan Graph Family</i></p> <p>Claire Griffin: <i>Aligning Crime Metrics with Public Perception: A Data-Driven Approach</i></p> <p>Audrey Ang: <i>The Utilization of Whole Cell Catalysis for Dye Degradation</i></p>
10:35am–10:45am	Break	
10:45am–11:45am	Session 2	<p>Ahmad Yousuf: <i>Deep Learning for Software Testing</i></p> <p>Chuckie Gentile: <i>An Agent-Based Model for the Evaluation of Precision Nutrition through a Socioeconomic Lens</i></p> <p>Evan Burns: <i>Impartial Geodetic Achievement Games Played on Connected Graphs</i></p> <p>Aleksandra Borek: <i>Using Splice Switching Antisense Oligonucleotides to Treat Machado Joseph Disease</i></p>
11:45am–1:00pm	Group and Individual Pictures and SURE Luncheon in University Dining Room	
1:00pm–2:15pm	Session 3	<p>Aaron Allred: <i>Cyclin D3 and the Transcriptional Mechanisms Behind Neutrophil Differentiation</i></p> <p>Julianna Henrichs: <i>Parental Perceptions on Safe Storage Education in Illinois</i></p> <p>Octavio Ortiz: <i>Microbial Activity of Rhizosphere in Soils Amended with Biochar Produced from Different Species of Invasive Plants</i></p> <p>Angelina Martinez: <i>Comparison of the Chemical and Physical Properties of Biochar Produced from Different Invasive Plants</i></p> <p>Zachary Campbell: <i>Mathematically Modeling Recurrent C. difficile Infections in Long-Term Care Facilities</i></p>
2:15pm–2:25pm	Break	
2:25pm–3:25pm	Session 4	<p>Cynthia Lopez: <i>Exploring Attitudes to Occupational Voice Use in Fitness Instructors</i></p> <p>Vy Le: <i>Clustering Analysis of Traumatic Brain Injury (TBI)</i></p> <p>Ariana Estrada: <i>Incorporating Social Determinants of Health into Physical Therapy Curricula: A Scoping Review</i></p> <p>Saja Ahmed: <i>Nursing Faculty Views on Holistic Admissions</i></p>
3:25pm–3:30pm	Closing remarks: Dr. Brittany Stephenson	

Session 1

Exploring the Role of Reactive Oxygen Species on Alzheimer's Disease Pathogenesis

Kiersten Smith

Mentor: Dr. Daniel Kissel

Alzheimer's disease (AD) is the leading cause of dementia globally and is characterized by the formation of amyloid-beta plaques on the brain. Amyloid-beta is a subunit of amyloid precursor protein (APP) and has chemistries that lend themselves to sticky qualities. As these proteins aggregate and stick to one another, plaques form thus resulting in neuronal death. It is not understood what causes APP to separate into its subunits, leading to poor and inadequate treatment for patients with AD. Many causes are being explored looking at both genetic and environmental factors. Reactive oxygen species (ROS) are a potential environmental cause into the formation of amyloid-beta plaque. ROS are a natural byproduct of many cellular processes, especially those related to metabolism. When ROS accumulate, they can lead to the death of healthy tissues, exacerbating the neuronal death associated with plaque development. Metals in the body, such as copper, can help regulate the interactions between ROS and amyloid-beta. Research has suggested that copper can form a coordination complex with beta alanine that improved the lifespan and lowered the presence of ROS in a *Caenorhabditis elegans* model of AD. The potential for this complex to be used as a treatment for humans is currently being explored.

Navigating Service Provision and Community Perceptions in a Suburban Environment: A Study of Homeless Service Nonprofits

Raven Robinson

Mentor: Dr. Rachel Wells

Nonprofit organizations are responsible for providing the majority of services to individuals experiencing homelessness. Despite an increase in suburban poverty in this nation, much of previous research examines homeless service provision in urban areas. Suburban nonprofits may face different political and social environments, such as a greater reluctance to see homelessness as a problem in their community and limited public transportation. This qualitative case study examines the role of homeless service nonprofits in four suburban counties in two Midwestern states, Illinois and Missouri, providing an opportunity to identify variation both within and between states. We are conducting semi-structured interviews about how nonprofit directors and managers understand homelessness, including causes and solutions to homelessness, how these views of homelessness affect their services, and how nonprofits sustain support within a suburban community. This summer, we conducted 8 interviews with nonprofit directors or high-level managers in 6 different cities and two different counties within Illinois. We are moving into data analysis with transcription and emerging themes, ranging from the views of homelessness to partnerships, which will be examined more in the fall. This summer's analysis focused on two themes, barriers to services and challenges for clients. Our data suggests that elements such as strict HUD guidelines and lack of collaboration can create barriers to nonprofit service provision. Additionally, elements such as economic issues and prejudice can create challenges for clients experiencing homelessness.

Graph Theoretical Modeling of Self-Assembling DNA of the Fan Graph Family

Philiffe Tebalan

Mentor: Dr. Amanda Harsy

One recent application of graph theory and linear algebra is the theoretical analysis of self-assembling DNA nanostructures. In a laboratory setting, using technology pioneered by Seeman's laboratory in the 1980s, branched junction molecules of DNA can self-assemble into targeted geometric structures. By employing tools from graph theory and linear algebra, theoretical efficiency of this process can be improved by mathematically modeling the biological process of creating nanostructures from self-assembling DNA complexes. In this model, we represent k-armed branch junction molecules with tiles as vertices in a graph with half-edges. The half-edges depict the cohesive-end types of a DNA strand. We aim to determine the minimum number of tiles and cohesive-end types necessary to form the complete complex of a given target graph structure. The problem of modeling DNA self-assembly is particularly challenging when considering graph families that change in multiple dimensions. This research shares our results in determining optimal design strategies for graphs with multiple growth patterns like the Fan Graph.

Aligning Crime Metrics with Public Perception: A Data-Driven Approach

Claire Griffin

Mentor: Dr. Piotr Szczurek

The perception of crime often diverges significantly from actual crime statistics, creating a disconnect between analysts and the public. This research project aims to bridge this gap by developing novel crime metrics that better reflect public safety perceptions. Using extensive data from the Chicago Data Portal, including crime incidents and police sentiment scores, traditional crime metrics were evaluated, such as crime rates per population, against newly proposed metrics like crimes per square area and disaggregated crime impacts. Correlations were analyzed between these different metrics, and the perceived safety scores. Our current findings actually suggest that the sheer number of crimes provide the most accurate representation of perceived safety. This presentation will cover the methodology, current results, and future directions for enhancing crime metrics. By aligning statistical measures with public perception, our work aims to inform better policy decisions and improve actions towards urban safety.

The Utilization of Whole Cell Catalysis for Dye Degradation

Audrey Ang

Mentor: Dr. Kari Stone

The remediation of azo dye effluent from the textile industry has become a significant environmental concern due to its toxic and carcinogenic properties. Our remediation strategy employs biocatalysis, an eco-friendly technique to degrade azo dyes, which are otherwise resistant to degradation, to non-toxic components. The use of *Caldariomyces fumago* via whole-cell catalysis for the oxidation of azo dyes presents a sustainable method that mitigates the adverse effects of these pollutants. The fungus *C. fumago* secretes a specialized enzyme, chloroperoxidase, which catalyzes oxidation and halogenation reactions. The stability of *C. fumago* is enhanced through encapsulation in calcium alginate beads, allowing these beads to be employed in various applications, such as flow cells or biosensors. Furthermore, encapsulating both the mycelia and spores in media solutions facilitate rapid fungal growth that prompts excretion of chloroperoxidase into the bead matrix, rapidly establishing a functional biocatalytic system for azo dye degradation. Overall, the combination of whole-cell catalysis and alginate bead encapsulation maximizes the potential of the enzyme chloroperoxidase. The findings of this study demonstrate the efficacy of this biocatalytic system in successfully degrading azo dyes.

Session 2

Deep Learning for Software Testing

Ahmad Yousuf

Mentor: Dr. Al-Sharif

Software testing is crucial for ensuring the reliability and quality of software, but it often involves high costs and time commitments, particularly in regression testing. This research project aimed to address these challenges by leveraging deep learning to optimize test suites, specifically targeting the identification and elimination of redundant test cases. The primary goal was to enhance testing efficiency without compromising test quality. We attempted an approach that involved analyzing execution traces and constructing call graphs to calculate similarity scores between test cases using deep learning models. These scores were used to rank test cases by priority, which would enable test engineers to focus on the most critical and diverse cases to maximize code coverage. The objectives of the project included creating a comprehensive dataset of call graphs, developing methods to identify similarities among test cases, and establishing a framework to prioritize and remove redundant cases. The desired results included a robust framework capable of identifying and ranking test cases based on their similarity measures, which aimed to streamline the testing process and improve overall efficiency. The methodology integrated execution trace analysis, call graph construction, and deep learning techniques to achieve these goals.

An Agent-Based Model for the Evaluation of Precision Nutrition Through a Socioeconomic Lens

Chuckie Gentile

Mentor: Dr. Brittany Stephenson

An individual's overall health is dependent upon many characteristics including age, demographics, physical activity, body-mass index (BMI), underlying health conditions, and socioeconomic status. To date, many guidelines to promote healthier eating have targeted the total population rather than focusing on the individual level. This project investigates the impact of an individual's socioeconomic status on both their overall health and the total population's health through an agent-based model (ABM) of Broadview, IL. Our ABM tracks individual characteristics, decision-making, and daily behaviors to determine an overall health score for each individual. The demographic breakdowns reflect reality, and individuals in the model have personal characteristics including age, sex, race and ethnicity, income, BMI, and medical information/disease status. In our initial steps to create an ABM of Broadview, we used Google Maps to develop a graphical user interface (GUI) which represents the village. Our GUI includes detailed information about Broadview's environment, including streets, houses, schools, restaurants, and grocery stores, among other landmarks. By modeling residents' daily interactions with both others and their surroundings, such as grocery stores and restaurants (or lack thereof), we aim to identify how an individual's social network and resources affect their overall health score.

Impartial Geodetic Achievement Games Played on Connected Graphs

Evan Burns

Mentor: Dr. Marie Meyer

An impartial geodetic game played on connected graphs was introduced by Buckley and Harary. This research project studies a similar impartial geodetic game played on connected graphs and contributes to the field of combinatorial game theory. An impartial game is a 2-player game in which the possible moves are the same for each player in any position. Every impartial game consists of a finite set of positions and a collection of options for each position. In every move of the game, a player chooses a new position from the options of the current position. No position can be visited twice. Each position is associated with a nonnegative value, called the nim number. The nim number of a position determines whether the position is winning (nim value 0) or losing (positive nim value) for the player moving into that position. Therefore, the winning strategy for any impartial game is to always move to an option with nim number 0, if available.

In this game, players alternate choosing vertices on the graph, and we look at the vertex-set geodesic, which is the union of the set of previously chosen vertices and the shortest path between the vertex and the set. That set updates after each turn, and we call that set Q . The player that selects a vertex such that $Q = V$ wins our game. To solve a game is to determine its nim number and winning strategy. We solved this game on the following graphs: paths, cones over "G", wheels, friendships, and windmills.

Using Splice Switching Antisense Oligonucleotides to Treat Machado Joseph Disease

Aleksandra Borek

Mentor: Dr. Mallory Havens

Spinocerebellar Ataxia Type 3, also known as Machado Joseph disease, is a neurodegenerative disorder that is caused by excess repeats of the CAG trinucleotide sequence on Exon 10, which is part of the Ataxin-3 gene. The CAG trinucleotide sequence codes for the amino acid glutamine, and since the mutated Ataxin-3 gene now contains an excessive amount of glutamine, it causes the Ataxin protein in turn to malform and aggregate, which results in neuronal death. Neuronal death, consecutively leads to a loss of motor function, and eventually leads to death. There is currently no cure for this disease. Splice switching antisense oligonucleotides or ASO's, are small pieces of RNA that can bind to a pre-mRNA sequence. By binding to a certain sequence, those nucleotides can be skipped, or spliced out during the post transcription process to create a modified mature mRNA, without the unwanted repeats. ASO's can be used as a possible therapeutic to treat Machado Joseph Disease, as they can potentially skip Exon 10 altogether. To verify if the method was feasible, ASO's were tested in human fibroblasts to determine if skipping of Exon 10 had successfully occurred while a 21 day trial commenced using *C. elegans* as a model. *C. elegans* are a model organism, as they can be easily bred and maintained for study in a laboratory, and they themselves share genetic similarities to humans.

Session 3

Cyclin D3 and the Transcriptional Mechanisms Behind Neutrophil Differentiation

Aaron Allred

Mentor: Dr. Sarah Powers

Cyclin D3 was primarily characterized for its role in the cell cycle; previous research shows cyclin D3 also plays a role in regulating gene transcription. This research aimed to understand cyclin D3-influenced gene expression during neutrophil differentiation by identifying target genes and transcription factors impacted by cyclin D3. Cultured HL-60 cells were used to study gene expression in precursors (uHL-60) and differentiated neutrophils (dHL-60) via qPCR. Additionally, cyclin D3 was added into uHL-60s, hypothesized to cause expression of target genes analogous to what was observed in dHL-60s. Added cyclin D3 resulted in similar expression to uHL-60s for *BRIP1*, *FBXO5*, and *LBH*, while *ITK*, *HECTD1*, and *POLQ* were variable in expression levels. Similar experiments used a series of cyclin D3 mutants investigating protein domains essential for interacting with other transcription factors, with R72S and Q244R as mutants of interest for future studies. A secondary approach focused on putative transcription factor complex RUNX1-CBF β for which an inhibitor is readily available. If cyclin D3 requires the complex for transcriptional regulation, inhibition would ablate cyclin D3's transcriptional activity. Inhibitor experiments had variable results, as the solvent alone control pushed the uHL-60s towards a differentiated state. A third approach focused on the gene regulatory motifs of a gene known to decrease in expression as HL-60s differentiate and is sensitive to the addition of cyclin D3 in HL-60s. Transcription factors that bind to these regulatory regions were compiled. Luciferase reporter assays will assess specific DNA regulatory motifs and transcription factors important for cyclin D3-dependent gene modulation.

Parental Perceptions on Safe Storage Education in Illinois

Julianna Henrichs

Mentor: Dr. Hannah Klein

In 2020, firearms became the number one cause of death for children ages 1-18 in Illinois and across the United States. These deaths are not just from upticks in firearm violence and homicide, but can also be attributed to suicide, unintentional, and accidental deaths. Many deaths could be prevented if firearms are properly stored and kept away from children. There is currently no mandated safe storage education required, though Illinois has started implementing safe storage laws. There has been little research done on the most effective and best ways to educate individuals on safe storage. In 2023, we conducted survey research with parents to assess their preferences for safe storage education in healthcare settings. While parents have stated they would be comfortable and would like for healthcare workers to tell them about firearm safe storage, the exact modality for the education is unknown. This year, we have conducted focus groups across Chicagoland to hear from parents about their preferences for safe storage education across multiple settings, including healthcare, education, and community-based outreach. Findings suggest cultural preferences matter when it comes to who is providing the education. Additionally, official pamphlets and educational materials appear more credible than education through spoken word.

These findings can help shape safe storage education programming moving forward. With limited funding towards primary prevention strategies like PSAs and educational pamphlets, these findings can help to target resources towards the most effective resources to share with the community. With increased education about safe storage, the ultimate goal is to reduce unnecessary firearm deaths in the community.

Microbial Activity of Rhizosphere in Soils Amended with Biochar Produced from Different Species of Invasive Plants

Octavio Ortiz

Mentor: Dr. Jerry Kavouras

Soil degradation is the physical and chemical decline in soil quality, which decreases soil fertility and productivity, resulting in lower crop yields. Biochar, a carbon rich substance made from biomass combusted in the presence of limited oxygen, can be applied as a soil amendment to address this problem. This research analyzes the microbial activity in soils amended with biochar produced from the leaves of different invasive plant species. Microbial activity and interactions with the soil and plants can vary significantly depending on the properties of the biochar used to amend the soil. Biochar was produced from the invasive plants: Canadian thistle, common reed and buckthorn. The biochar was mixed with soil collected from the campus nature trail, which was previously a landfill, and the mixtures were used to grow lettuce and cilantro to determine the effects on plant growth and microbial activity. One possibility is the biochar can serve as a carbon substrate for soil microbes. The hypothesis was tested by designing an experiment where biochar was used as the only carbon source in a minimal medium. By assessing the turbidity of cultures, it was observed that it varied depending on the type of biochar used, which suggests that not all biochar in this study can be readily metabolized by soil microbes. Future work includes analysis of plant growth and microbial activity in treated soils by characterizing microbes cultured from the treatments, EcoPlate analysis of the soil community metabolic profiles, and molecular analysis of microbial diversity.

Comparison of the Chemical and Physical Properties of Biochar Produced from Different Invasive Plants

Angelina Martinez

Mentor: Dr. Jason Keleher

Climate change has devastating impacts on the environment. When coupled with unsustainable farming practices, agricultural soils are degraded. Degraded soils may be compacted, polluted with agrochemicals, desertified, and susceptible to erosion. In its degraded state, the soil can lack essential nutrients and fail to provide important ecosystem services. Biochar has been applied as an amendment to degraded soils. This research examined the chemical and physical properties of biochar produced from three different invasive plants. The leaf properties of each plant species are different, so in turn the biochar will have different properties, which may influence plant growth. Biochar and biochar-soil mixtures were analyzed using spectroscopy techniques, including scanning electron microscopy, energy dispersive spectroscopy, and dynamic light scattering. These techniques provide data on the chemical and physical makeup of each biochar, including elemental composition, particle size, and zeta potential. Hydrophobicity was analyzed by measuring the contact angle of water on the surface of biochar and biochar-soil mixtures. Some biochar were found to have different qualities, in terms of particle size, elemental composition, and hydrophobicity. Future work includes the analyses of biochar-soil mixtures after a 12 week period of cultivating cilantro and lettuce to determine changes in the mixtures and correlations to plant growth.

Mathematically Modeling Recurrent *C. difficile* Infections in Long-Term Care Facilities

Zachary Campbell

Mentor: Dr. Cara Sulyok

Clostridioides difficile (*C. difficile*) is one of the most frequently identified healthcare-acquired infections in the United States. Individuals shed *C. difficile* endospores that can survive for long periods on surfaces outside the host and are resistant to many commonly-used disinfectants. Numerous mathematical models have been developed to understand and quantify *C. difficile* spread in hospital settings, but little work has been done considering disease spread in long-term care facilities (LTCFs). In LTCFs, residents are generally over the age of 84, making them more susceptible to a *C. difficile* infection, with an increased chance of recurrent infection. This project focuses on the spread of *C. difficile* throughout LTCFs by modeling interactions between residents, healthcare workers, and surfaces, with an emphasis on recurrent infections. The model utilizes a system of ordinary differential equations to simulate the interactions and exposure of residents and identify strategies to reduce incidence rates in LTCFs.

Session 4

Exploring Attitudes to Occupational Voice Use in Fitness Instructors

Cynthia Lopez

Mentor: Dr. Victoria Reynolds

There has been a long-standing voice issue affecting professional voice users like teachers, singers, and physical trainers. They are vulnerable to dysphonia from overusing their voices as part of their work. We know a lot about how teachers use their voices and how and why they have problems, as well as how to treat them. Fitness professionals also use their voices as a “tool of the trade”, yet little is known about how they use, and care for, their voices. In our research, we discovered that most physical trainers have no idea how to care for their voice even though they acknowledge that they heavily depend on their voices for work. During the certification to become a physical trainer, there is no voice care training requirement. Therefore, physical trainers are not educated about the ways in which they should be using, and caring for their voices at work. Our research aims to investigate the thoughts, attitudes, and behaviors of fitness trainers around occupational voice use. This will allow us to identify risk factors and potential protective practices, develop assessment materials and target treatments specifically to the needs of this population. We have completed seven, in-depth semi structured interviews with physical trainers. Our interviews invited participants to guide us through their daily, professional, voice use, and describe the conditions of the acoustic environment in which they work. Data will be analyzed by maintaining an audit trail, and coding into themes. This data will provide insight into the attitudes of fitness instructors to voice, their vocal working conditions, occupational practices, and highlight any potential barriers and facilitators of vocal health.

Clustering Analysis of Traumatic Brain Injury (TBI)

Vy Nguyen Khanh Le

Mentor: Dr. Osama Abuomar

Traumatic brain injury is a major global health problem, affecting millions of people each year. Nonetheless, there are still significant unresolved issues that affect physicians, impacted persons, and their families. One of the primary concerns in TBI management is making an accurate diagnosis and assessment of the injury. To properly diagnose TBI and guide professional decision-making regarding the best course of therapy to enhance patient recovery, more research is needed. This research aims to improve the understanding of Traumatic Brain Injury (TBI) by using cluster analysis on two separate datasets. The first dataset is used to identify subjects with similar injury profiles and explore clusters of injury types that tend to occur together. This analysis aims to reveal meaningful patterns within the data, providing insights into common features and relationships between different injury profiles. In the second dataset, cluster techniques are also applied to gain a deeper understanding of the factors that influence the recovery process and outcomes of TBI. By examining key variables that have a significant impact on patient trajectories, this study attempts to highlight important factors that contribute to TBI outcomes. Through combined analysis of these datasets, this study aims to improve our understanding of TBI and contribute to better clinical practice and patient outcomes.

Incorporating Social Determinants of Health into Physical Therapy Curricula: A Scoping Review

Ariana Estrada

Mentors: Dr. Arvie Vitente, Dr. Carmina (Minnie) Rafael, Dr. Mark Apostol, and Dr. Adrian Suratos

Purpose/Hypothesis: This scoping review aims to investigate the integration of social determinants of health (SDOH) into Physical Therapy curricula. The hypothesis posits that while the significance of SDOH is acknowledged in healthcare, their incorporation into physical therapy education is currently limited. **Number of Subjects:** A comprehensive search identified thirteen (13) articles, with only one meeting the inclusion criteria for detailed analysis.

Materials/Methods: A thorough literature search was conducted across databases such as PubMed, CINAHL, and ERIC using keywords including "social determinants of health," "physical therapy," "curriculum," "education," "integration," and "teaching methods." Boolean operators (AND, OR, NOT) refined the search, exemplified by the string ("social determinants of health" OR "SDOH") AND ("physical therapy" OR "physiotherapy") AND ("education" OR "curriculum" OR "teaching methods"). The search followed PRISMA-ScR guidelines for systematic identification and inclusion of relevant studies. Screening was based on predefined inclusion criteria: relevance to physical therapy education, focus on SDOH, and publication in peer-reviewed journals. The final selection involved a detailed analysis of the chosen articles to evaluate the extent and methods of SDOH integration into physical therapy programs. The comprehensive report preparation adhered to PRISMA-ScR guidelines, ensuring a systematic and transparent approach. Key findings were illustrated using tables and charts, providing a clear and visual representation of the data and trends identified in the review.

Results: Out of the 13 articles, only one article met the inclusion criteria: "Instructing to Impact: Exploration of Doctor of Physical Therapy Education Instruction of Social Determinants of Health and Health Equity for People with Disabilities" by Herrman, D., Pechak, C. M., Berg, K., & Magasi, S. (2024). This study provided valuable insights into incorporating SDOH and health equity within the context of people with disabilities but did not comprehensively cover the entire curriculum. Additionally, it focused solely on DPT education and did not address Physical Therapist Assistant (PTA) education.

Conclusions: The review reveals a significant gap in understanding how best to integrate SDOH into DPT curricula. Despite the critical importance of SDOH in patient care and outcomes, current educational frameworks lack comprehensive integration. The included study underscores the need for systematic approaches to embed SDOH into physical therapy education and to include both DPT and PTA program curricula.

Clinical Relevance: Understanding and addressing SDOH is crucial for physical therapists and physical therapist assistants to provide holistic and equitable care. Integrating SDOH into DPT and PTA curricula can better equip future therapists to recognize and address these factors in clinical practice, thereby improving patient outcomes and promoting health equity. The researchers recommend conducting more inclusive studies to explore how physical therapy education programs introduce, reinforce, and ensure mastery of SDOH in both DPT and PTA curricula.

Nursing Faculty Views on Holistic Admissions Review

Saja Ahmed

Mentors: Dr. Tina Bobo, Dr. Daisy Sherry, and Dr. Linda Steffens

Background: The federal government projects that racial and ethnic minorities will account for 53 percent of the United States population by 2050 (Vespa, et.al., (2018)). As the population becomes more diverse, cultural competence in healthcare professionals become essential to meet complex healthcare needs. In spite of improvements in overall health, racial, ethnic, and other underserved communities continue to face health disparities.

Purpose: Implementing Holistic Admissions Review (HAR) is a key strategy that nursing programs can utilize to increase student diversity. This process involves adapting admissions practices to view the students as whole people and not just academic metrics. Diversifying the nursing workforce will provide compelling benefits for healthcare systems – especially in medically under-served communities. Faculty awareness and agreement with HAR is an important factor in the success of implementing a holistic admission process, but little is known about faculty opinions regarding HAR in terms of research findings. This gap in the literature is what this study proposes to address.

Methods: The study was conducted anonymously via a 15-question Qualtrics survey link sent via email to nurse educators with an invitation to participate. Phase One of the study was a pilot conducted at Lewis University over two weeks in April 2023. The survey included 10 declarative statements drawn from the AACN informational and training materials on nursing school admission to which participants are asked to estimate their level of agreement/disagreement. Phase Two of the study was conducted in September 2023 among a national sample of nurse pre-licensure nursing educators in the US. The invitation was sent to 6,000 plus faculty emails.

Results: A total of 255 survey responses were received. In this study, 92% of respondents agree with HAR as a strategy to diversify the nursing workforce and address health inequities. Eighty-seven percent of respondents disagree that retention, graduation rates, and NCLEX pass rates suffer when diverse students are enrolled in nursing programs. Respondents were evenly split on their views on the use of metric-based admission standards as the best way to ensure qualified applicants to nursing programs. Finally, the majority of respondents agree that race (63%) and gender (71%) should be considered in the HAR process.

Limitations: Phase 2 of this study was conducted immediately after the SCOTUS decision to significantly limit the use of race in college admissions. Subsequently, many states passed anti-DEI legislature and eliminated DEI initiatives in higher education. Demographic information was not collected by state, but by region, which may have given more insight into the impact of geography and legislation by state.

Conclusions/Implications for Practice: Faculty awareness and agreement with HAR is an important factor in the success of implementing a holistic admission process. This study demonstrates nursing faculty agree with holistic admissions review as a strategy to diversify the nursing workforce and address health inequities. The study findings provide a summary of nursing faculty opinions regarding HAR, however, further research is needed on the impact of nursing faculty views on the HAR process.

List of Participants

SURE Students

Aaron Allred	Biology
Audrey Ang	Biochemistry
Aleksandra Borek	Biology
Evan Burns	Mathematics
Zachary Campbell	Mathematics
Samantha Curtin	Business Administration
Chuckie Gentile	Mathematics
Claire Griffin	Data Science
Julianna Henrichs	Criminal Justice
Vy Nguyen Khanh Le	Computer Science
Cynthia Lopez	Nursing
Angelina Martinez	Environmental Science
Octavio Ortiz	Biology
Raven Robinson	Psychology and Social Work
Kiersten Smith	Biology
Philiffe Tebalan	Mathematics
Ahmad Yousuf	Computer Science

SURE Faculty Mentors

Sam Abuomar	Professor of Data Science
Ziad Al-Sharif	Associate Professor of Computer Science
Amanda Harsy	Professor of Mathematics
Mallory Havens	Associate Professor of Biology
Jerry Kavouras	Professor of Biology
Jason Keleher	Professor of Chemistry
Taeyong Kim	Assistant Professor of Business Analytics
Daniel Kissel	Associate Professor of Chemistry
Hannah Klein	Assistant Professor of Justice, Law, and Public Safety
Hyeseong Lee	Assistant Professor of Education
Marie Meyer	Associate Professor of Mathematics
Sarah Powers	Professor of Biology
Victoria Reynolds	Associate Professor of Speech-Language Pathology
Brittany Stephenson	Associate Professor of Mathematics
Kari Stone	Associate Professor of Chemistry
Cara Sulyok	Assistant Professor of Mathematics
Piotr Szczurek	Professor of Data Science
Rachel Wells	Assistant Professor of Social Work

Health Research Services Administration (HRSA) Grant Students and Faculty Mentors

Saja Ahmed	Nursing Student
Ariana Estrada	Nursing Student
Tina Bobo	Assistant Professor of Nursing and HRSA NWD Grant Coordinator
Arvie Vitente	Professor, Doctor of Physical Therapy Program (Albuquerque Campus)
Daisy Sherry	Associate Professor and Associate Dean of the College of Nursing & Health Sciences
Linda Steffens	Retired Nursing Faculty
Carmina (Minnie) Rafael	Instructor, Doctor of Physical Therapy Program (St. Augustine-Miami)
Mark Apostol	Assistant Professor, Doctor of Physical Therapy Program (Touro University-NY)
Adrian Suratos	Assistant Professor, Doctor of Physical Therapy Program (Touro University-NV)

Acknowledgments

The Dr. James Girard Summer Undergraduate Research Experience would not be possible without all of our generous donors. A special thank you goes out to all of the following for continuing to make this experience a reality.

Financial Supporters

- James Girard and Constance Diamant
- Eduardo and Jody Sanchez
- Michael G. Graverson
- Aileen S. Andrew Foundation
- Russ and Dawn Smyth
- Karl F. Vogel
- Mary C. Hanely
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