

Undergraduate Research Symposium May 19, 2017 Mary Gates Hall

Online Proceedings

POSTER SESSION 1

Commons West, Easel 1

11:00 AM to 1:00 PM

Transitioning into Higher Education: A Data Driven Investigation on Freshman Interest Groups at the University of Washington

Joshua Noah Malter, Senior, Informatics: Data Science

Casey Lee, Senior, Informatics

Gianni Mancinelli, Senior, Informatics

Mentor: Amirah Majid, The Information School

Mentor: Lovenoor Aulck, iSchool

Mentor: Jevin West, Information School

The First-Year Interest Group (FIG) program at the University of Washington (UW) is a variant of University First Year Seminars (FYSs), which are found at nearly all accredited four-year US colleges and universities. FYSs are believed to boost social cohesion, support knowledge acquisition, and introduce first-year students to the breadth of academic choices available to them at the host institution. At the UW, the FIG program began in the early 1980s, and has grown to involve roughly half of all entering freshmen. Despite the widespread implementation of FYSs at universities, little research has been done to measure the efficacy of these programs. This study leverages UW registrar data (including transcript records and demographic information) on over 60,000 UW freshmen across 13 years to examine the performance of FIG and non-FIG students (as measured by graduation, retention, and grades) through econometrics-based analyses of transcript records. To supplement this quantitative analysis, we use text-mining/NLP on 6 years of FIG exit survey data consisting of the responses of 14,000 students to questions regarding their FIG experiences. Our objective in our work is to use UW student information to conduct a thorough audit of the FIG experience and its effects on first-year student performance and retention. We hypothesize that students who take FYSs have a unique academic experience that is reflected in their academic outcomes as well as social integration to campus. We hope our results will motivate further discussion on current practices around FYS both at UW and across the country, while providing quantitative evidence of their impact on students' academic progression.

SESSION 1R

COMPUTER SCIENCE: DISTRIBUTED SYSTEMS, VERIFICATION, SECURITY AND HCI

Session Moderator: Kurtis Heimerl, Computer Science and Engineering

JHN 111

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Drunk User Interfaces: Using Smartphone-Based Human Performance Tests to Detect Inebriation

Sayna Parsi, Senior, Linguistics, Informatics

Mary Gates Scholar

Mentor: Jacob Wobbrock, The Information School

The standard quantitative method for assessing inebriation is to use a breathalyzer. However, breathalyzers are primarily owned by law enforcement and used only after a drunk individual is caught behind the wheel. Unlike breathalyzers, smartphones are one of the most ubiquitous technologies in today's society. If smartphones could be used to reliably detect inebriation, they could be employed in ways to prevent drunk driving (e.g., by linking the smartphone to the car) or to incent good behavior (e.g., by lowering insurance for those who pass an app-based test before driving after 10 pm). We are running an ongoing study to examine whether or not challenging human performance tasks (e.g., typing, swiping, reacting) can be implemented on the smartphone to detect inebriation and prevent drunk individuals from getting behind the wheel. These tasks not only assess drunkenness from a performance perspective, but also from the perspective of the smartphone sensors.

POSTER SESSION 2

Commons West, Easel 4

1:00 PM to 2:30 PM

VizioMetrics: Evaluating the Importance of Visual Content in Scientific Literature

Olga (Lia) Kazakova, Senior, Informatics, Computer Science

Mentor: Jevin West, Information School

Mentor: Po-shen Lee, Electrical Engineering

Viziometrics is an image search engine and classifier created by researchers at the University of Washington eScience Institute. Its purpose is to further the communication of scientific results through increased access to visual information as well as study the relationship the use of visual information and between scientific impact. Currently the search and classification are performed on 8 million images from PubMed Central, a major research database for scholarly works in the life sciences and biomedical fields. As a part of continuous efforts to improve the Viziometrics platform, we are working on a feature that automatically identifies a ‘central figure’ in a scientific publication. We have defined the central figure as either the visualization that encapsulates key aspects of a scientific publication, or that which best represents the research findings. In order to improve the underlying central figure search algorithm we are conducting a study that answers the question: which image, if any, do authors themselves identify as a “central figure” within a given publication? The research presented here is based on a survey of authors, whose email contacts can be found in the PubMed database. Based on the survey data, we are looking for common features characterizing papers for which authors were able to find ‘central figures’, as well as those for which authors could not make a decision. We are using this data to increase the accuracy of the Viziometrics algorithm. As more data sets are added to the Viziometrics platform, we hope to encourage scientists to find new ways to collaborate and communicate across disciplines.

POSTER SESSION 2

Commons West, Easel 3

1:00 PM to 2:30 PM

Just How Effective Are Affinity Groups for the Retention and Advancement of Women in the IT Workforce?

Mina Tari, Senior, Informatics, Gender, Women, and Sexuality Studies

Mary Gates Scholar, UW Honors Program

Mentor: Hala Annabi, Information School

Women only make up 26% of the Information Technology (IT) workforce. These low numbers are attributed to the multitude of structural and social barriers women face in IT, which organizations have attempted to address through significant investment in Diversity and Inclusion interventions. However, women’s participation in IT has been falling from 36% since 1991, even with the substantial growth of the field. Currently, 93% of IT companies have a Women’s Affinity Group (WAG), yet no metric exists to assess the efficacy of these groups. Our research examines the characteristics, obstacles, and nature of participation for WAGs in IT through an interpretive, multi-level analysis, in-depth case study. By utilizing more inclusive frameworks of information science and feminist theories, focused on including perspectives of

intersectional identities, we improve our theoretical understanding of how WAGs are designed and used. We also holistically approach our evaluation, discussing current efficacy with WAG participants, non-participants, and organizational leaders. From our results, we will create an instrument for companies to create, deploy, and evaluate their WAGs, increase access and equity for women in the industry, as well as improve sensitivity education within IT-related disciplines in industry and higher education.

SESSION 2H

SUPPORTING STUDENT GROWTH FROM HIGH SCHOOL THROUGH THE UNIVERSITY

Session Moderator: Walter Andrews, Near Eastern Languages and Civilization

MGH 251

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Analyzing the Potential Effects of Online Tutoring in the Context of a Writing Center

*Madeline Gibson (Madeline) Clarke, Senior, Informatics
UW Honors Program*

Mina Tari, Senior, Informatics, Gender, Women, and Sexuality Studies

UW Honors Program

Riley Elizabeth Andert, Senior, Informatics: Data Science

Anne (Annie) Lace, Senior, Informatics

Mentor: Matthew Saxton, Information School

Mentor: Amirah Majid, The Information School

The University of Washington (UW) Seattle has over five writing centers on campus, where in-person tutoring is available for students. We hypothesize that certain obstacles reduce access barriers to writing center services for student populations, including those who experience disability, commute long distances, identify as ELL, or are non-residential. UW writing centers have seen an impressive increase in student use in the last 5 years. The overall increase in usage, coupled with changing student needs and resources has sparked an important conversation about the future of writing support services at UW. We hypothesize that online tutoring, in addition to the current model, could help solve issues of access. In order to explore this hypothesis we are have prepared a multi-phase, qualitative study, which is currently underway. Drawing upon the demographic and satisfaction data of current campus writing centers, we discuss what current gaps may exist and how online tutoring could potentially bridge them. The current tutoring setup, one-to-one in-person conversation, may also be excluding students who are not com-

fortable with this format. Through on-campus focus groups, interviews, and surveys we are triangulating on factors of the writing center experience most salient for different stakeholders. We also examine dimensions such as student's area of study, year in school, familial obligations, and current employment status as they may relate to writing center access. In a multi-factor perspective analysis, we gain perspectives of administrators, tutors, users, and potential users at writing centers on campus. In doing so, we pursue a better understanding of how writing centers could use online tutoring to provide services to students who would not have access otherwise. As students and writing center tutors we feel a deep, personal investment in this project and are excited to be a part of building a positive future for writing support at UW.

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3:30 PM to 5:15 PM

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Examining STEM Curricula: Exploring STEM Major Attrition through Student Transcript Data

Siyang (Lysia) Li, Senior, Informatics: Data Science

Peter Lu, Senior, Informatics: Data Science

*Rohan Aras, Senior, Informatics: Data Science, Community,
Environment, & Planning, Mathematics*

*Coulter Thomas (Coulter) L'heureux, Senior, Informatics:
Data Science*

Mentor: Jevin West, Information School

Mentor: Lovenoor Aulck, iSchool

The U.S is projected to face a shortage of a million graduates in STEM fields by 2022 according to the President's Council of Advisers on Science and Technology. Much of this is the result of the current attrition rate from university STEM programs. Only half of all students entering the university intending to major in STEM fields graduate with a STEM degree. Decreasing this attrition rate by just 20% (or by 10 percentage points from 50% to 40%) will address over three quarters of this million-individual STEM gap. Therefore, it is of great interest to study the systemic factors that influence STEM attrition. This study will contribute to the existing body of knowledge on STEM attrition by studying the trajectory of students into and out of STEM fields by examining transcript records for every undergraduate student at the University of Washington from 1998 to 2007. As a first step,

we will build a model that intuitively students' intended majors by calculating affinity scores based on prerequisite classes taken by students. Examining changes in these affinity scores over time will allow for the identification of inflection points where a student's interests are likely changing. With this information, we can identify when students change fields of study and, on a broader level, also identify when they transition away from STEM fields. We hope to then use a supervised machine learning model to identify the features of students' transcript records that predict if and when this attrition will occur. Ultimately, we hope this information will help inform institutional strategy to improve STEM curriculum design, resource allocation, and retention strategies.

POSTER SESSION 3

Commons West, Easel 3

2:30 PM to 4:00 PM

The Effects of Visual Presentation on Perceived Veracity of Unfamiliar News Sources

Anya Kim (Anya) Hsu, Senior, Informatics

Michael Magee, Senior, Informatics

*Marijn Burger, Senior, Computer Science & Software
Engineering*

Mentor: Jacob Wobbrock, The Information School

In online news, as in many forms of online and print media, the *appearance* of the content can influence the reader, perhaps even more than the content itself. Styling is chosen to make certain news sources look modern, traditional, or edgy, and these styling choices might affect readers' judgments. At the same time, creating and hosting websites that anyone can access has never been easier than it is today, as seen in the explosion of fake news across social media outlets during the 2016 U.S. presidential election. On a daily basis, people shared misleading or false articles because those articles looked convincing and affirmed the biases of their readers. Certainly the content, timing, design, and layout of news articles might all contribute to their propagation across social media, but the relative import of each of these factors is still unknown. In this work, we are interested in how the appearance of news, *independent of its content*, influences consumers' perceptions of an article's veracity. Our research project examined how the presence of certain visual attributes (e.g., layout, links, fonts, and use and arrangement of photos and videos) in news articles affects people's credibility judgments of unfamiliar news sources. We conducted an online experiment and semi-structured interviews to collect data from people currently attending universities. We showed them a series of content-neutral (i.e., "lorem ipsum") news articles and asked them to rate the credibility of each one on a 1-7 Likert scale. We also provided opportunities for narrative responses for more in-depth opinions at the end of the study. Our results indicate that presentational aspects do indeed af-

fect perceived veracity of online news sources. Designers can take these findings into account when seeking to communicate better with their users.