

Design research should strive to evolve with both society and technology so that the design field itself can continue to address and anticipate humanity's needs in a knowledgeable and conscientious way. Understanding earlier advancements in both design and social sciences is essential in illuminating our path to future progress. Indeed, my own research interest in virtual and physical communities stems from my participation in online music forums in the early 1990s, during the dawn of the world wide web and public access to the Internet. Subsequent advances in hardware, software and communication are but vehicles for enhancing our most human desire—to connect. Designers play important roles in this ever-changing landscape, which is why my research in communities, behavior change, intercultural collaboration, sustainability, and learning necessarily overlap with my teaching activities. These topics not only continue to shape and define professional fields such as user experience, interaction, and service design, but also greatly impact the trajectory of our society as a whole. Ultimately, I want my students' and my own work to be useful, meaningful, beautiful—and to connect with people on a deeper level that enhances their lives in helpful ways.

Background: graduate research

The productive interplay of in-person and digital interactions and communities is and has long been one of my research interests. Informed by varied approaches to contextual and user research, my graduate work and thesis explore the ability of virtual networks to create physical communities that interact both online and offline. My thesis looks in-depth at the sustainable food movement as a case study for community creation and engagement. Local food is a good candidate for exploration because, although there are already various levels of participants in the local food community, these people do not necessarily know each other.

Clay Shirky, a scholar of the Internet's socioeconomic impacts, describes this phenomenon as a "latent group;" my thesis project seeks to transform this latent group into a more cohesive in-person community through the creation of an online community, via digital communication tools. Additionally, my thesis project incorporates aspects of design anthropologist Elizabeth Tunstall's "Five Experiential Elements of Community." Tunstall's elements translate into a design approach that includes individual and community identity and opportunities for community learning to form a virtual community that encourages collaborative production and community visualizations. The value of the types of exchanges that could exist between the virtual and physical communities is supported by Lave and Wenger's theory of situated learning, a community learning model which distributes knowledge through communication, mentorship and observation.

The results of my study suggest that the design of social tools can not only contribute to online community learning, but also the adoption of new habits and growth of the in-person community.

Intercultural design collaboration

The confluence of real and virtual communities – and their potential for social impact – is fertile ground for continued exploration. These topics naturally dovetail with my current pedagogic research in intercultural design collaboration. For example, many students are unable to physically study abroad. Those who are fortunate to have that experience, however, often begin to cultivate the self-awareness, organizational skills, and sensitivity necessary to communicate and work effectively with people from other cultures. These skills are important both socially and professionally, and have great implications not only for the progress of design education, but for new approaches to innovation in the field.

For the past four years (at both University of San Francisco and recently at RIT) I have been collaborating with Prof. Denielle Emans of Virginia Commonwealth University in Doha, Qatar. We are working to create online study abroad opportunities so that students unable to visit another country can still have unique cross-cultural learning experiences. Working with fellow design students from drastically different eastern and western cultures poses both incredible challenges and rewards to students and faculty alike. In the past three years, I have delivered peer-reviewed co-authored papers on different aspects of intercultural design collaboration at seven international conferences, including several AIGA Design Educators Conferences. Our most recent co-authored paper, presented at the Design Research Society (DRS) conference in Chicago in June 2015, combines Tunstall's elements of community with Edward T. Hall's theories of high- and low-context cultures to inform a grounded theory analysis of our four different intercultural design collaborations. One of our findings is that the similarities in international design education curricula help to create a common language and way of facilitating communication and interaction between our very different students.

Behavior change and sustainability

While working at gotomedia, an interaction design and research firm in San Francisco, several client projects helped me explore design's role in social influence. We looked specifically at behavior change, persuasion, and emotion—all of which are fascinating examples to bring to applicable classes. At the 2012 Design & Emotion conference I presented some of our findings and methods, including our novel approach to developing design recommendations framed by target emotions for users. In my current courses, I continue to explore and teach these concepts through different approaches to sustainable

design. Additionally, I am combining the study of design's role in social influence with the aforementioned intercultural design collaborations, exposing my students to unique, multi-perspective approaches to address the wicked problems that impact us all.

Recently, I co-authored a case studies comparison paper on classroom projects in sustainable design with two like-minded communication and design faculty, utilizing examples from one of my interaction design courses at RIT. We presented our findings at the 2014 conference Just Sustainability: Hope for the Commons at Seattle University's Center for Environmental Justice and Sustainability. An extended and revised double-blind reviewed version of the paper was published July 2015 in a special issue of the journal Interdisciplinary Environmental Review. A major takeaway from our analysis is that sustainable design projects help students build necessary interpersonal skills, sensitivity and systemic thinking—all of which are desirable to employers—in ways that typical design projects do not often address.

I have also collaborated with faculty from disciplines across RIT on two sustainability-oriented grant proposals to the Environmental Protection Agency and the New York State Energy Research and Development Authority. Although these projects were not funded, these proposals are emblematic of my interest in interdisciplinary collaboration in this area. We are exploring other possible venues for these ideas.

Lastly, I continue to work on a project initially supported by an internal RIT Seed Funding grant to explore the feasibility of a sustainability pedagogy and collaboration network across disciplines at RIT. I have already identified and interviewed a range of faculty and will continue working on this project with our campus sustainability advisor in the 2015-16 academic year. I plan to present preliminary findings and ideas at the Association for the Advancement of Sustainability in Higher Education (AASHE) conference in October 2015.

Games & communication for learning

While at gotomedia, I also collaborated on an extensive research project for a client in the online learning industry. In addition to conducting an analysis and usability testing of the client's existing learning tools, I was involved in an exciting qualitative study on the "future of learning." The study ultimately enabled us to make recommendations for the next generation of the client's products, such as integrating some of the tools one might find in professional project management software so that students can better facilitate and manage group projects while exposing them to some of the management tools and strategies they might encounter in the field.

I am currently engaged in applied research in learning through several projects with faculty and students from different disciplines at RIT. "Gamified Digital Forensics Course Modules for Undergraduates," an NSF-funded project led by Prof. Yin Pan in Computing Security, brings together students and faculty in Interactive Games and Media, Computing Security and Graphic Design. Together, they are exploring how students can effectively learn about digital forensics through the interface design and mechanics of a detective game. I recruited two teams of undergraduate design students to work on this project, and am user experience and user interface design advisor.

I also serve as Video Project Advisor for the NSF-funded project, "Modular Steps Towards Broadening Expertise In Critical Infrastructure Protection," led by Computing Security Professor Sumita Mishra. I recruited Graphic Design and Live Action students to work together on the project, which involves considering and creating new ways to teach undergraduates about the United States' critical infrastructure. The students I am supervising are investigating humor and mixed media approaches to introduce classes to the concept of critical infrastructure protection through the design of an instructional video. Their final video should be ready for the Fall 2015 term.

In Spring 2015 I recruited a team of Graphic Design students and led them in an independent study to create the visual design elements for a game prototype as part of a grant proposal spearheaded by Prof. Owen Gottlieb in Interactive Games and Media. The game, a result of interdisciplinary collaboration between students and faculty from Interactive Games and Media and Graphic Design, explores collaboration and cooperation, informed by historical legal and religious communal systems. I am a co-PI on a federal grant proposal (currently in review) for funding to transform the physical card game into a mobile game prototype.

Future work

In addition to continued pedagogic research in intercultural design collaboration and sustainable design, I plan to maintain my involvement in multidisciplinary applied research projects. For example, I continue to collaborate with RIT's Senior Sustainability Advisor to create a multidisciplinary resource for faculty integrating sustainability into their courses. I am also working with a colleague in Graphic Design to plan annual community engagement design workshops for students across the School of Design. We are exploring possibilities for future funding and expansion of the initiative through grants and local foundations. The workshop holds great potential for future pedagogic, applied and engaged research.

ROLES IN COLLABORATIVE GRANT-FUNDED RESEARCH AT RIT

CURRENT PROJECT

Project Title

Modular Steps Towards Broadening Expertise In Critical Infrastructure Protection

Funding Agency

National Science Foundation,
DUE-1303269

Principal Investigator

Sumita Mishra, Computing Security, RIT

My Role

Video Project Advisor, supporting the CIAS student team of Maria Ace (Graphic Design major) and Patrick Hogue (Live Action major)

Project website

Project Overview (from project website)

This multi-partner project addresses an identified shortcoming in Critical Infrastructure Protection (CIP) education by developing curricular materials and expertise at the high school and undergraduate levels. Partnering on this project are three institutions: (1) Rochester Institute of Technology (RIT), a Center of Academic Excellence in Information Assurance Education (CAE-IAE) since 2003, with a multidisciplinary team of faculty representing expertise in critical infrastructure, computing, engineering, technology, and security; (2) Corning Community College (CCC); and (3) Greater Southern Tier Board of Cooperative Educational Services (GST BOCES), a program for high school students serving 21 schools in New York's Southern Tier counties.

About the Video Project

The video project undertaken in Summer 2015 aims to replace the 9-minute video by the Department of Homeland Security (DHS) that was originally used in these CIP courses.

Because the Critical infrastructure modules are aimed at high school and college students across all disciplines, it was important that the video not only provide an introduction to CIP but also pique students' interest in the concept and course material.

The DHS video did not appeal to students and was therefore ineffective for learning. It also did not address an important question within the course: What can individuals do to protect our country's critical infrastructure?

The in-progress video seeks to both introduce the content in an engaging manner as well as provide information about some of the sixteen sectors that comprise our critical infrastructure. Using a combination of live-action sketches, interviews, voiceover, and an animated segment, the student team is working to communicate with their high school and college audiences through humor, variety and relatability in a video that is shorter in duration than the original DHS piece.

ROLES IN COLLABORATIVE GRANT-FUNDED RESEARCH AT RIT

CURRENT PROJECT

Project Title

Gamified Digital Forensics Course Modules for Undergraduates

Funding Agency

National Science Foundation, DUE-1400567

Principal Investigator

Yin Pan, Computing Security, RIT

My Role

UI/UX Design Advisor, supporting the Spring 2015 student team of Robin Matson and Madison Behringer (Graphic Design) and the Summer 2015 student team of Tori Bonagura and Annie Wong (Graphic Design)

Project Summary from PI Yin Pan

This multi-partner project aims to enhance digital forensics curricula starting at the entry-level for both 2-year and 4-year college by introducing digital forensics content using game-based learning (GBL) approach. Many community colleges offer computer forensics Applied Associate of Science (A.A.S) degree and Associate of Science (A.S) degree for transferring to a 4-year college. However, only limited forensics curricular material can be covered in these forensics programs due to the fact that digital forensics courses have been primarily designed for upper-level undergraduate students, who are capable to understand abstract concepts and complex forensics technologies. This project proposes a game-based modular approach, introducing forensics concepts and technologies through games and visualizations, that allows digital forensics content to be covered at both basic and advanced levels.

About the Game Design

The design of this learning game is currently underway. Two Graphic Design majors began working on the user experience and user interface aspects of the game in Spring 2015. After they graduated, two other current Graphic Design students have become involved in the project (Summer 2015). They are currently in the process of developing a style guide to use as a reference as they pick up where the last team left off in the creation of the user interface. The Design students are involved in regular progress meetings with faculty and students from Computing Security, Interactive Games and Media, and Graphic Design. They will also be involved in usability testing as the visual design of the game evolves.

ROLES IN COLLABORATIVE GRANT-FUNDED RESEARCH AT RIT

IN-PROGRESS GRANT APPLICATION

Project Title

Codename: Purple
(Full title will be released when funded)

Submitted to

A federal funding agency (in review)

Proposal Submitted

June 2015

Principal Investigator

Owen Gottlieb, Interactive Games & Media, RIT

Co-PIs

Jessica Bayliss (Interactive Games & Media),
Kelly Murdoch-Kitt (Graphic Design),
Ian Schreiber (Interactive Games & Media),
David Simkins (Interactive Games & Media)

[Project Website](#)**Project Overview**

Codename: Purple is a card-to-mobile strategy game, set in 12th Century Egypt, along the lines of table-top games with mobile versions like Settlers of Catan or Ticket to Ride. In this game, players work to keep their family and the community thriving amid various crises and challenges. The game explores collaboration and cooperation, informed by historical legal and religious communal systems.

About the Game Design

The visual design of the game system blends historic references with findings from user research, resulting in a friendly and approachable style. Most of the card designs incorporate distillations of architectural references from the period with characters (roles), events or resources rendered in a lively style. The personalities behind the different people, places and resources makes them feel almost animated as they appear on the printed playing cards, and transition seamlessly to actual animations within the mobile version of the game. The printed cards also incorporate a variety of different patterns on the card backs, all of which are adapted from historically accurate architectural details and artifacts.

Grounded in research, the game's user experience recreates the landscape and lifestyle of 12th century North Africa, transporting players into a beautiful world that is simultaneously foreign, yet relatable. As they learn about the resources they must manage (e.g. a clay vessel)—all of which are derived from historical evidence (writings, artifacts) from and about the period—players are challenged to make strategic choices to progress in the game. The illustration style and color palette enhance the amiability of characters (role cards), compelling players to make positive choices in favor of community. Elements such as good and ill will are linked to specific roles within the game through similar color palette. Subtle design decisions like these help build each player's sense of accountability as the game progresses.