Matthew Garvin

Experience Design Researcher

E: mtthwgrvn@gmail.com
W: mtthwx.com

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About Me: A short work history

I am an experience design researcher specialized in emerging technologies, design systems, and strategy.

I was trained at the University of Michigan School of Information (**UMSI**) and have had the great fortune of working with high profile organizations like **NASA** (Stennis, JPL, Johnson, and Langley) and **Tyler Technologies**. Through my work at UMSI I was also able to provide consulting for **IBM**, **MI Dept. of State**, and **GRDC**, a community development corporation in the historic Grandmont Rosedale neighborhood in Detroit.

Over the years, I have worked on a number of projects including, but not limited to: AR, conversation design, and medical systems engineering to support astronaut autonomy; applications to better coordinate teams of emergency first responders; complex systems design for circular economies; and information design to improve voter turnout, and more..

Prior to design research, I was a bar manager for a popular jazz club in Detroit, and account manager for a freight consultancy.
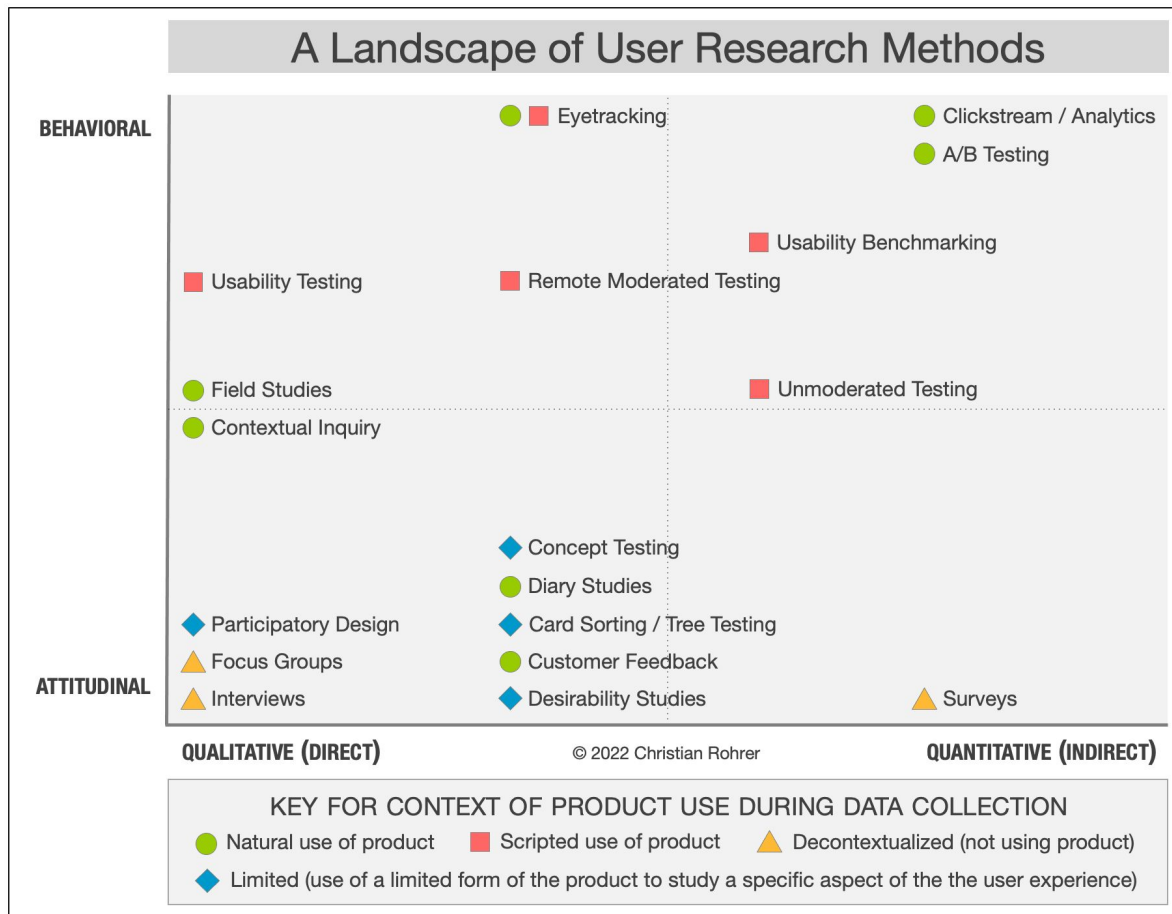
How do I work?

I conduct research activities at **all stages** of the product design process: from the "blue sky" open explorations in the discover phase to validation oriented research in the deliver phase.

Discover

Contextual Inquiry, Task Analysis, Surveys, etc.

Deliver

Usability testing, human-in-the-loop, eye tracking, A/B testing…

Design

Card Sorting, RITE, co-design workshop, heuristics…

What methods do I use?

I utilize a broad toolkit of research methods, selecting the appropriate methods based on the research questions we are trying to answer while being mindful of project timeline and budget.

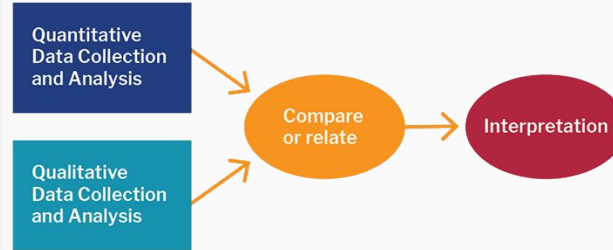I am skilled and experienced in **primary, secondary, exploratory, and evaluative** research.

A Landscape of User Research Methods

BEHAVIORAL

- ● ■ Eyetracking
- ● Clickstream / Analytics
- ● A/B Testing
- ■ Usability Benchmarking
- ■ Usability Testing
- ■ Remote Moderated Testing
- ● Field Studies
- ■ Unmoderated Testing
- ● Contextual Inquiry
- ◆ Concept Testing
- ● Diary Studies
- ◆ Participatory Design
- ◆ Card Sorting / Tree Testing
- ▲ Focus Groups
- ● Customer Feedback
- ▲ Interviews
- ◆ Desirability Studies
- ▲ Surveys

ATTITUDINAL

QUALITATIVE (DIRECT)   © 2022 Christian Rohrer   **QUANTITATIVE (INDIRECT)**

KEY FOR CONTEXT OF PRODUCT USE DURING DATA COLLECTION

- ● Natural use of product
- ■ Scripted use of product
- ▲ Decontextualized (not using product)
- ◆ Limited (use of a limited form of the product to study a specific aspect of the the user experience)

How do I mix methods?

The focus in a mixed methods approach to research is the matter of sequencing, concurrent, and transformative research design

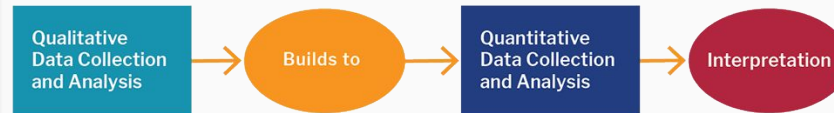## BASIC MIXED METHODS RESEARCH DESIGNS

Convergent Parallel Design

Quantitative Data Collection and Analysis → Compare or relate ← Qualitative Data Collection and Analysis → Compare or relate → Interpretation

Discuss areas of convergence or divergence between the quantitative & qualitative results

Explanatory Sequential Design

Quantitative Data Collection and Analysis → Follow up with → Qualitative Data Collection and Analysis → Interpretation

Determine what quantitative results need further explanation

Exploratory Sequential Design

Qualitative Data Collection and Analysis → Builds to → Quantitative Data Collection and Analysis → Interpretation

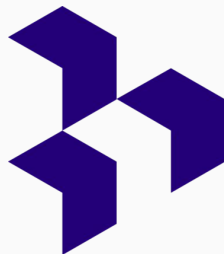Use qualitative results to develop a new instrument or taxonomy for quantitative strand

Some of my favorite tools

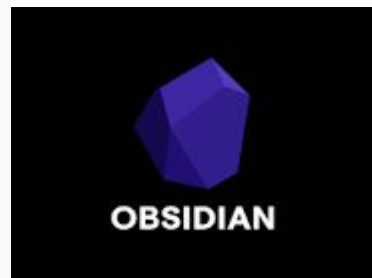Miro/Mural - collaboration, affinity diagramming, workshops

Dovetailapp - browser based qualitative research tools and repository

Maze - remote product research platform

Obsidian - local storage markdown file knowledge base

# Case Study 1: Transforming Futures of Work

Project Background

- **Context:** The Generative Justice Lab at the University of Michigan was awarded a $1.5 million grant to research technology's role over 3 years in producing more equitable futures of work along race, class, and gender.
- **Problem:** Access to emerging technologies offers the opportunity for incremental adaptations to that particular context. This results in top-down solutions that do not have the desired impact in underserved communities.

- **Research Goal:** The primary objective of this research is to give artisans in underserved communities access to the latest technologies and identify the leading edge innovations that might support a circular (re: sustainable) economy. This research culminates in an annual co-design workshop where artisan collaborators discuss their relationships with technology and adopting it into their workflow without losing the satisfaction of engaging in their craft.

Challenges

Each artisan collaborator is a different project, and many offer the opportunity for the lab to engage in several projects.

How can artisans adapt technology in a way that doesn't alienate them from their labor, while also making it easier, more lucrative, and sustainable?

Many artisans eschew technology and a financial focus on their business.
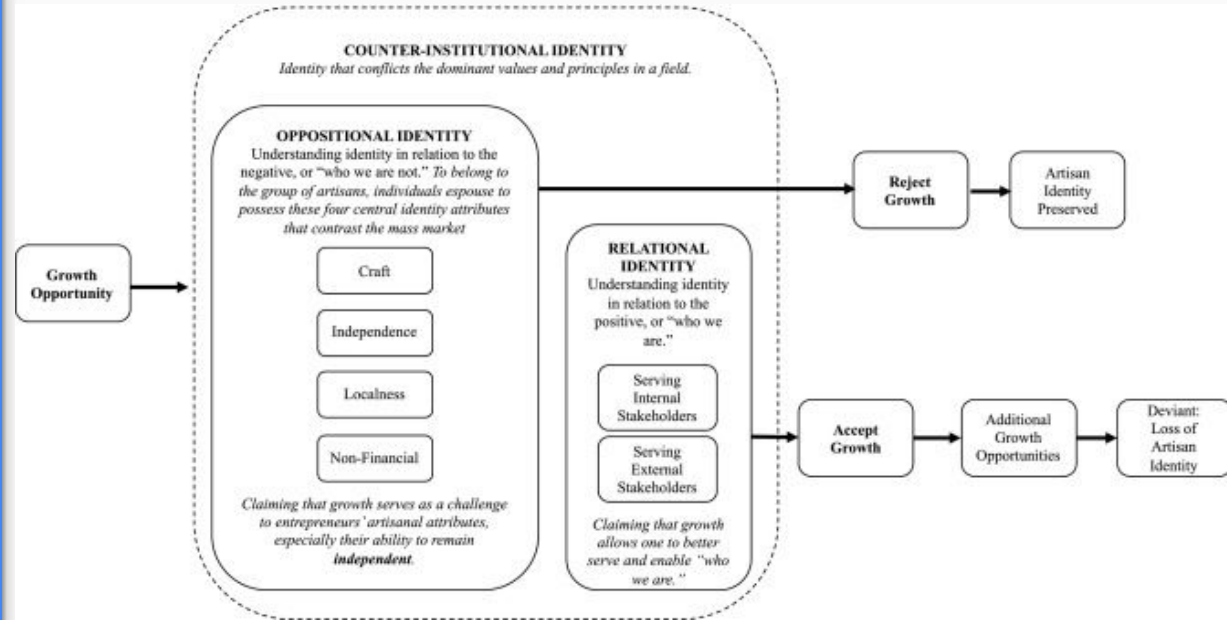
Solomon, S. J., & Mathias, B. D. (2020). The artisans' dilemma: Artisan entrepreneurship and the challenge of firm growth. *Journal of Business Venturing*, *35*(5), 106044. https://doi.org/10.1016/j.jbusvent.2020.106044

Methods

Each year **10** artisans are selected and given a **survey (pre-test)**, and **semi-structured interview**. In year 1, participants had the following user profiles:

- 2 x fashion designers
- 2 x fiber artisans
- 4 x urban farmers
- 2 x arts educators

During the interviews, artisans were asked about the materials, tools, and skills they use. How shipping, marketing, accounting is done. How new products/programs are developed. And what opportunities and challenges they see on the horizon. These sessions and site visits were all arranged and facilitated by me. Survey questions sought to establish a pre-intervention relationships to technology.

A **content analysis** was performed on transcriptions of participant responses to extract key themes. Three criteria were used to evaluate whether responses are indicative of further investigation:

1. *What are the assets this community has that can be leveraged as strengths to build upon?*
2. *What are the asset/actor ties?*
3. *Where are areas of intrinsic value to artisans and extrinsic value to customers?*

Findings

Among our top findings thus far:

- **Coopetition:** Artisans tend to prefer to support other artisans rather than scale up.
- **Community:** Artisans may be more likely to scale up if it has a positive impact on their community.
- **Quality:** Artisans prioritize quality and a commitment to craft over profits.

Impact

What did we achieve?

While the true impact of this work will not felt for years to come, thus far this research has resulted in:

- the formation of **2 artisan collectives**
- the design and installation of the **African Futurist Greenhouse**
- an AI culturally situated design tool (for more on CSDTs, visit the Generative Justice Labs website **csdt.org**)
- early discussion of an **Artisanal Futures** online shopping platform
- strengthening the social fabric between artisan groups
- Garvin, M., Eglash, R., Robinson, K., Robert, L., Guzdial, M., Bennett, A. (2022). Counter-hegemonic AI: the role of artisanal identity in the design of automation for a liberated economy. Manuscript submitted for publication.

Case Study 2: innovating NASA's milestone review

Project Background

- **Context:** I was contracted by the Exploration Medical Capability element of NASA's Human Research Program as a UI Architect to improve and extend NASA's model-based systems engineering capabilities to disrupt milestone reviews common in waterfall development and replace them with continuous review more appropriate for an agile development environment.

- **Problem:** Model-based Systems Engineering seeks to streamline the milestone review process by presenting information to reviewers in the model itself, rather than stacks of documentation that takes reviewers months to parse. Yet engineers are notoriously bad at communicating with non-engineers.
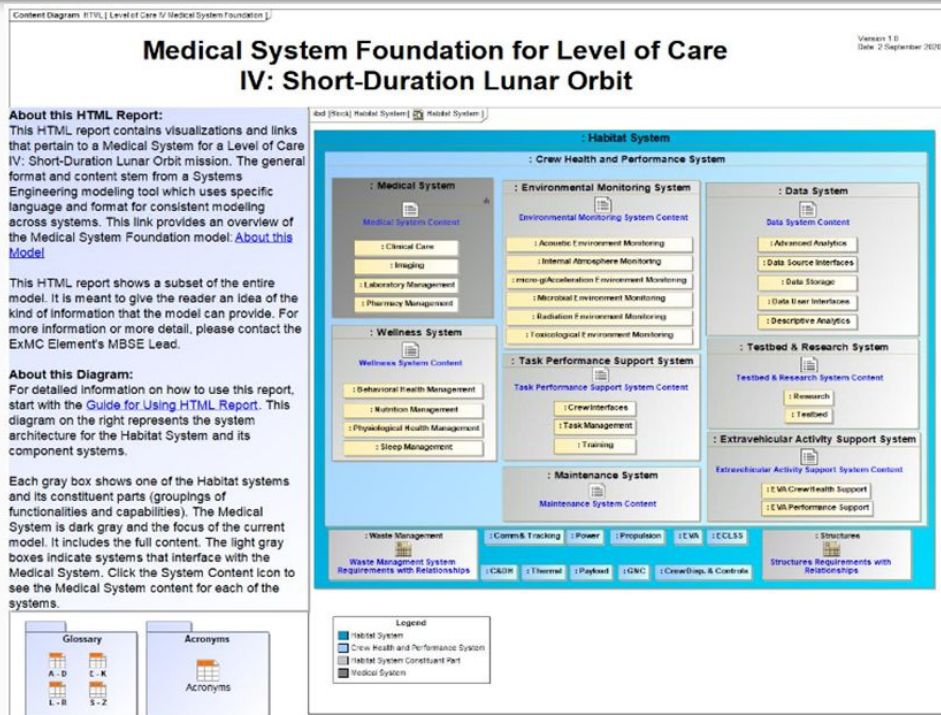
Challenges

Milestone reviewers are drawn from a variety of areas such as: engineers, scientists, researchers, physicians, nurses, and pharmacists.

ExMC is attempting agile development in a waterfall environment (as per NASA policy).

No budget to incentivize participation in user research.

Document-based systems engineering
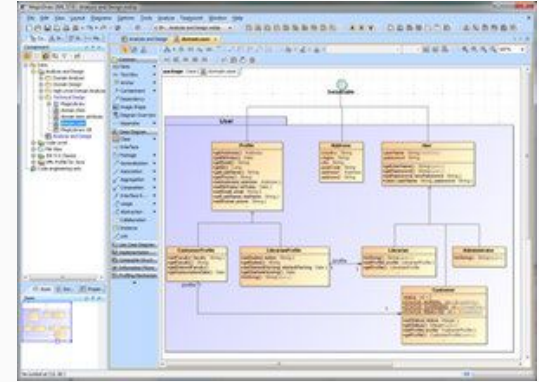
Model-based systems engineering

Methods

Given the challenges, I applied the **RITE (rapid iterative testing and evaluation)** to complete as many design iterations as possible in the 4 month timeline. **12 interviews** were conducted on the following user profiles:

- 5 x SE's / MBSE's
- 2 x clinicians
- 2 x pharmacists
- 2 x nurses
- 1 x element scientist

During the interviews, participants were asked about their review process. What is the most/least important information they seek? What do they dislike about the review process? What would they change about reviews? What software applications do they use most often in work and outside of work?

A **thematic analysis** was performed on transcriptions of participant responses to extract key themes. Two criteria were used to evaluate whether responses are indicative of potential weaknesses/serious issues in the user interface:
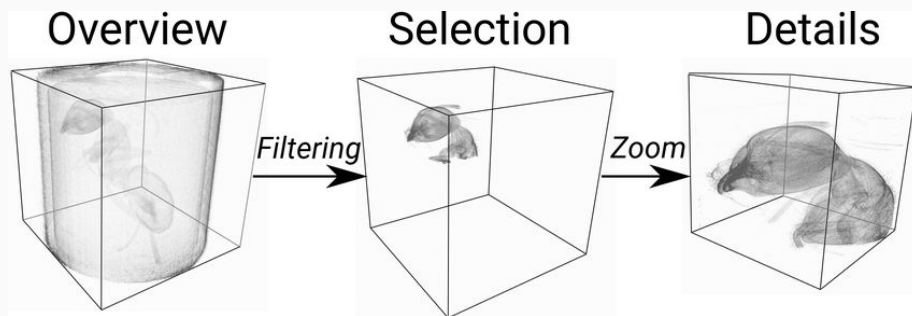
1. *What are user groups pain points with regard to milestone reviews?*
2. *How can we promote consistency in UI among MBSE's?*
3. *What are the most common interaction patterns across user groups?*

Only the responses that meet the above criteria are documented in this report.

Findings

Among our top findings:

- **Varying information needs:** Different user groups prioritize different information, all information must be easily accessible.
- **Design System:** Consistency in presentation is unlikely without a formal design system composed of reusable components, patterns, as well as color, size, space, typography guidance.
- **Overview first, zoom and filter, details on demand:** Schneiderman's classic mantra proved the simplest data visualization pattern to satisfy all groups.

Impact

Case Study 3: usability benchmarking of a records management system

Project Background

- **Context:** Tyler UX was engaged by the Manager of PM Research and Dev to conduct usability testing on the stepper navigation and workflow for the web-based fire records management system.

- **Problem:** Customers currently use client-based Managed Service Provider. The web-based application features modern visual design and UI patterns based on Tyler Forge, but no UX activities have been performed on Fire RMS prior to this study.

Challenges

Tyler Tech's organizational UX maturity is low, and still focused on "make it pretty" visual design and usability evaluations.

Participants were limited to the supervisors of end users rather than the end users themselves.
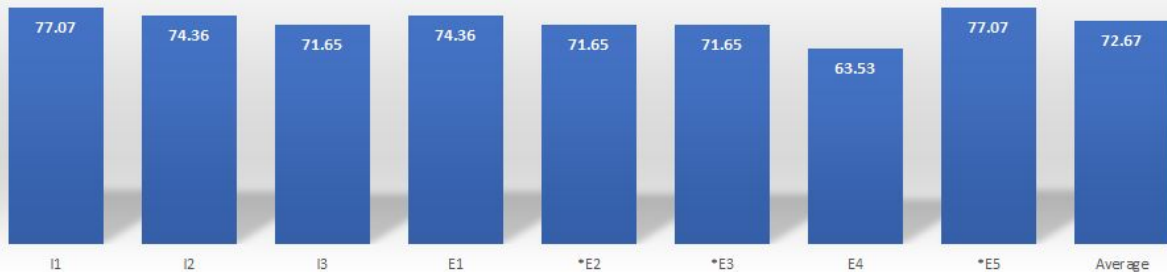
Product manager attended testing, skewing results because of professional relationships with test participants (participants would interrupt the test to discuss the weekend with PM)
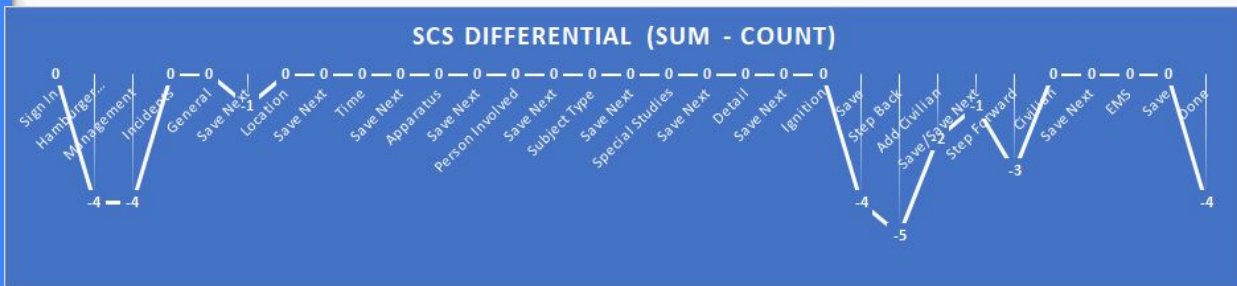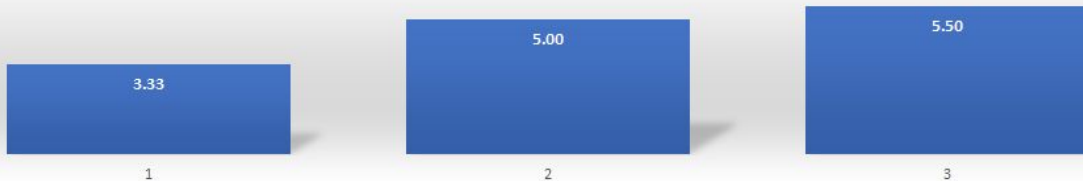
Methods

8 usability testing sessions were conducted on the following user profiles:

- 3 x internal Tyler employees / veteran firefighters
- 3 x advisory board members
- 1 x Lt. of a frontline engine company
- 1 x Battalion Chief

During the sessions, participants were asked to complete five tasks in the prototype and encouraged to use the 'think aloud' protocol (to 'think aloud' as they complete tasks). The sessions were facilitated by Matt Garvin (UXR), and observed by Gavin Pohl (Senior UX Designer), Rob Sturgill (UX Designer), and Connie Warner (Fire RMS Product Owner).

A **content analysis** was performed on transcriptions of participant responses to extract key themes. Two criteria were used to evaluate whether responses are indicative of potential weaknesses/serious issues in the user interface:

1. *If the response emerged consistently across the sample.*
2. *If, in our expert opinion, the response highlights a usability or accessibility issue.*

Only the responses that meet the above criteria are documented in this report.

Metrics related to success rate, ease of use, and usability were collected and analyzed as benchmarks to track UX improvements and opportunity areas over time.

Findings

Participants had little trouble completing the tasks we put forth, with an **overall 94% success rate**.

Users identified **Task 1: Begin Incident Report** as the most difficult portion of the prototype, with an average response of 3.3 out of 6 on the **Single Ease Question (SEQ)**. We recommend reducing the number of interactions and **take users directly to an incident's dashboard.**

Test participants typically struggled to identify the **stepper** as the primary means of navigating back and forth through the prototype, but only 1 participant needed help. Qualitative analysis suggests a **lack of predictability** common in new feature implementation, but that users wouldn't have difficulty the 2nd time, indicating **the stepper is both learnable and memorable.**

Overall, participants had little difficulty finding the 'Done' button to submit a completed report in **Task 5.** Feedback suggests that the variety of call to action buttons in multiple areas: 1) Done, 2) Finish/New, 3) Save, 4) Save/Next; makes the interface **unnecessarily convoluted and slows down user workflow**. We recommend following material guidelines and grouping call to action buttons in the lower right of the screen. We also recommend implementing **autosave + version/history control** common in web apps to remove 'Save' labeling, **improve flexibility** and **prevent data loss**.

Success Rate (combined)	S + (P * .5)/O	Grade		SCS Score	Grade	Adjective Rating
Begin Incident Report	88%	B		90 - 100%	A	Excellent
Fill out report	98%	A		80 - 89%	B	Good
Error Management	100%	A		70 - 79%	C	Okay
Stepper Navigation	83%	B		60-69%	D	Poor
Submit Incident Report	75%	C		>60%	F	Very Poor
Overall	94%	A				

Ease of Use (combined)	Average	Grade		SEQ Score	Grade	Adjective Rating
Begin Incident Report	3.3	C		6	A	Very Easy
Complete Incident Report	5	B		4.5	B	Easy
Submit Incident Report	5.5	A		3	C	Okay
				1.5	D	Difficult
				0	F	Very Difficult

Usability Metric for UX lite (combined)	Average	Grade		UMUX-lite Score	Grade	Adjective Rating
This system's capabilities meet my requirements.	5.5	B		7	A	Excellent
This system is easy to use.	5.69	B		5.5	B	Good
				4	C	Okay
				2.5	D	Poor
				0	F	Very Poor

Usability (UMUX-lite linear regression SUS transform) (combined)	Average	Grade		SUS Score	Grade	Adjective Rating
	72.67	B		> 80.3	A	Excellent
				68 - 80.3	B	Good
				68	C	Okay
				51-68	D	Poor
				< 51	F	Very Poor

Lessons Learned

Fitts's Law
$t = a + b \cdot log2(d/w)$

Success Criteria Differential
(sum - count)

Success Rate
Success (S)= 1; Pass (P) = 0; Fail (F) = -1
(S+(P*0.5))/O

UMUX-lite to SUS regression

- UMUX-L = ((a. /7) + (b. / 7))/2 x 100
- SUS Score = $0.65 * ((a. + b. − 2) * (100/12))+22.9$

- The importance of gathering stakeholder requirements upfront.
- Greater appreciation for quantitative analysis. Through manipulating my own data and creating visualizations to show quantitative insights I've unlocked a new interest in statistics and data science.
  - Performed calculations with Fitts's Law
  - Calculated success criteria differential, ease of use average, UMUX-lite to SUS regression transform
- I published two articles with UX Collective during my time with Tyler Technologies.

Featured in UX Collective

Use heuristic evaluations prior to usability testing to improve ROI

UX scorecards: Quantify and communicate the user experience

Photo by Scott Graham on Unsplash   Photo by Markus Spiske on Unsplash

What questions do you have?

Contact:

Matthew Garvin
Detroit, MI

mtthwgrvn@gmail.com

www.mtthwx.com

Thanks!