THE DIFFERENCE IN UX DESIGN FOR INTERNAL VS. EXTERNAL SOFTWARE TOOLS

THE IMPACT OF DIVERSITY IN UX DESIGN

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The ability to create technology and innovate is truly what rules our society and makes the world what we know it today. As humans, we are consumed with getting and creating the next big thing that will take us into a better future. However, most of the time this obsession has caused us to lose sight of why we are creating this technology, and the answer to that is for humans. Therefore, in order to create the best technology for humans, we must take into consideration the complex relationship between humans and computers. Engineers and scientists have been able to do this by focusing on and designing according to the user experience and catering to their specific needs. User experience design can be defined as, "The creation and synchronization of the elements that affect users' experience with a particular company, with the intent of influencing their perceptions and behaviors" (Buley, 2013). This way of designing allows us to truly create for our users and have an impact on how they will ultimately interact with the technology through paying attention to factors such as usability, accessibility, learnability, and how to design for their diverse perspectives.

When we think of what that user looks like, most of the time it is an outside party that we are impacting from a distance through user experience design. However, how does this change the way we design when the users are the engineers themselves? When developing for a customer, there are different things that need to be taken into consideration vs. when creating for those who create for a living, because most of all, the way they interact with the product has a great influence. For the technical discussion, I plan to address how we as engineers must shift or change the way we are designing these technologies based on whether they will have an internal or external use, specially focusing on the user experience and what this looks like for different types of products including, but not limited to, software tools and websites. As I continue the discussion of societal implications of the topic of user experience designing, I will further

analyze the effects and impact of having diversity considered during user experience design process.

TECHNICAL DISCUSSION

For the technical discussion, I will be focusing and reflecting on my experience as a software engineering intern at Google, Inc. the past two summers and exploring the difference in design when creating external vs. internal tools. Both years, I had the opportunity to work on different product areas, although both still focusing on the front-end and user interface development of the Google Cloud and Google Ads platforms. Although they were the same overall focus of creating the most user-friendly user interface and tools, there was a large shift in the fact one was for external use and the other internal. It's important to understand where this difference comes from, and most prominently it's in the users.

As a part of the Google Cloud Platform front-end team, my main project consisted of developing a new page of the Google Cloud Platform Filestore UI. This component allows users or companies to create and manage a resource for their stored data in the cloud, and thus is considered an external tool. One of the most impactful portions of the project was producing the ideal user interface, which was done by the user experience (UX) team. A large part of project was to increase the usability and learnability of the tool. Since this is an external tool, with the intention of being used by those with little to a lot of technical experience, this was a large factor in the design process. Studies say that the first step to, "Become your user to know how to design for them" (Gualtieri, 2009). As engineers this is not always the easiest thing, as it may be assumed the user have more or less knowledge that initial anticipated. To alleviate this, there must be a flip in perspective to be able to see in the eyes of our users. This comes with research on user experience with past products as well as, elicitation of the target user base. When

designing the team had to consider factors including, what the order of the fields would make the most sense when first viewing the page, how to thoroughly explain the instructions without having to flesh out the details of the system, and how to make the external tool the most efficient for its intended goal. Through this technique the UX team part of Google Cloud Platform were able to create a design that was later implemented into the UI of the component for the external tool.

When it comes to the creation of an internal tool, as described previously, there must be a switch in perspective. Within the world of UX design, creating tools for an external base is usually the default. The idea and importance of user experience when it comes to creating technology for those that create gets left behind and must be prioritize just as much. This past summer, I designed and implemented a tool to improve understanding and readability of rules that define the Google Ads client platform. The tool allows engineers to see exactly how their code changes will ultimately affect the configurable UI by creating a standard and assisting with migration. In reflecting on my experience from the summer before, the process in which the design of the internal tool was created a differenced quite a bit, especially when it came to including user experience. Like external tools, engineers want to put themselves into the shoes of the user, but they are the user. This changes the perspective and makes as engineers; we were more reflecting on experience and communicating with those around us to understand how to design the technology, but this does not make it easier. These tools are being designed for further designing, so the goal changes overall.

STS DISCUSSION

My STS research will focus on the investigating the impact that embracing diversity when it comes to the user experience design and user needs has on the software development industry and society as a whole. First, it's important to define that when speaking on diversity in users, this can mean a multitude of things. But this is what makes it great. If we are able to develop and create technology that is accessible to all by considering all various types of diversity including race, culture, gender, socioeconomic status, people with health conditions or impairments, and even emotions (Khalid, 2006), we are able to create the best technology for all humans (Alegria, 2020).

When it comes to diversity in the software development industry overall, the numbers are very clearly not represented of the overall population of those who are using the technology. Looking at the numbers for women as an example, "White women's representation in computing peaked around 1990 for White women and around 2000 for minority women, but by 2009 women's representation declined" (Pozzer et al., 2022). This lack of diversity within the engineers creating the technology can be very hindering. Although there are many initiatives to change these statistics, we still need this perspective on the other side of the coin, and that's why having it a part of the user experience design is so essential.

Let's take user interfaces for example, as expressed in the study on Cultural diversity in user interface design (Teasley et al., 1994), interfaces support users by providing an appealing look and feel. From their study on various user interfaces created for certain types of users, they found the user's experiences had a connection to who the technology was created for. Without these perspectives considered, such as women having stronger and more consistent preferences than men, the technology was only fitting for one group at a time and didn't have a large scope.

More in practice a study done to compare the job portals between Saudi Arabia and the United States, showed a significant multicultural gap between the Saudi web portal and that of the United States (Soares et al., 2021). This poor usability for those who's

This past summer interning at Google I saw a great push for inclusivity in the user experience design with the user interface space. From this, I saw in practice the need and ability for this to create more successful technology. When creating the internal tool, the team created a plan to not only go to the target user, but to also look for feedback to create the technology for those who aren't in a technical role and should still be able to use it, emphasizing and prioritizing that diversity of perspective.

RESEARCH METHODS

The research for my STS will be expecting the influence diversity has on user experience design and how it can make a positive impact on software development in general. In order to delve more into the topic, I plan to focus on three main topics including 1) what diversity looks likes in the software development and UX fields today, 2) when diverse perspectives and user experiences are considered, what effects does that have on the design process, 3) bring in my experience from my internship working in UX/UI.

Mainly, I want to focus on obtaining certain statistics on the topic, especially when it comes to demonstrating the demographics and lack of representation. Then, I would focus on both theoretical and practical applications and studies when it comes to this diversity in user experience design. As well as, how this "user diversity" can be achieved as described in the User diversity in design for behavior change, which has aspects that can help connect the STS topic to the technical one (Coskun & Erbug, 2014). Lastly, taking the time to truly reflect on my

experience in my internship after learning formally through research about the topic, and bringing in research to understand how this looks at other big tech companies, especially when it comes to accessibility (Kamal et al., 2016).

CONCLUSION

My experience the past two years working on front-end development, creating for various types of user groups, including fellow employees and outside customers, and all of the intersectional identities within that has truly opened my eyes to how important this is. Accessibility is one of the most powerful tools and by doing this research to fully understanding the full implications of diversity within development, we are able to go into a future where this is prioritized more. With all of the new and impressive things being created every day, we need to ask ourselves the question, how can we make the software development industry more equitable. I believe through this focus; we will be able to achieve this.

REFERENCES

Alegria, S. N. (March 6, 2020). What do we mean by broadening participation? Race, inequity, and diversity in tech work. *Sociology Compass, Volume 14, Issue 6, e12793.* https://compass.onlinelibrary.wiley.com/doi/full/10.1111/soc4.12793

Al-Kabi, M. N., Alsmadi, I. M., Kamal, I. W., Wahsheh, H. A. (2016). Evaluating Web Accesbility Metrics for Jordanian Universities. (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 7, No. 7. https://zu.edu.jo/MainFile/Profile_Dr_UploadFile/Researcher/Files/ResearchFile_2297_46_41.pdf

Buley, L. (2013). The User Experience of One: A Research and Design Survival Guide. *Rosenfeld.*http://web.uchile.cl/DctosIntranet/05UsabilidadExperienciaUsuario/BuenasPracticas/BestPracticesUserExperience.pdf

Coskun, A., and Erbug, C. (2014) User diversity in design for behavior change, in Lim, Y., Niedderer, K., Redström, J., Stolterman, E. and Valtonen, A. (eds.), Design's Big Debates - DRS International Conference 2014, 16-19 June, Umeå, Sweden. https://dl.designresearchsociety.org/drs-conference-papers/drs2014/researchpapers/44

Gualtieri, M. (Sept 4, 2009). Best Practices In User Experience (UX) Design. *Forrester.* http://web.uchile.cl/DctosIntranet/05UsabilidadExperienciaUsuario/BuenasPracticas/BestPracticesUserExperience.pdf

Khalid, H. M. (July 2006). Embracing diversity in user needs for affective design. *Applied Ergonomics Volume 37, Issue 4, Pages 409-418.* https://www.sciencedirect.com/science/article/abs/pii/S0003687006000470

Soares, M. M., Rosenzweig, E., Marcus, A. (2021). Design, User Experience, and Usability: Design for Diversity, Well-being, and Social Development. *HCI 2021 International, Part II.* https://books.google.com/books?hl=en&lr=&id=k7I2EAAAQBAJ&oi=fnd&pg=PR5&dq=diversity+in+user+experience+design&ots=dM9k-F0RzW&sig=ECTceZdT85Aw4NlDSipWBDYGDjc#v=onepage&q&f=false

Pozzer, C. H., Zubaran, G., Ribeiro, V. (2022). Approaches to the relationship between cultural diversity and user experience in design products: a systemic review. *Logo.* https://www.lume.ufrgs.br/bitstream/handle/10183/247227/001146891.pdf?sequence=1&isAllowed=y

Teasley, B., Leventhal, L., Blumenthal, B., Instone, K., Stone, D. (Jan 1994). Cultural diversity in user interface design: are institutions enough*? ACM SIGCHI Bulletin, Volume 26, Issue 1.* https://dl.acm.org/doi/abs/10.1145/181526.181533