User Centric Design model in view of contextual Issues and Challenges

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Abstract

The system's design should incorporate usability principles and take a comprehensive approach that considers both the user and their surrounding environment. It prioritizes the behaviors, needs and experiences of users. The design should prioritize inclusivity, seamless integration, and intuitive digital experiences. However, this approach brings challenges such as managing diverse stakeholders, overcoming resistance to change, addressing user diversity and accessibility, navigating technological limitations, and ensuring data privacy and ethical compliance. This necessitates striking a balance between user expectations, business objectives, stakeholder alignment, accessibility, and a comprehensive design approach. However, these efforts may be hindered by limited technological resources and resistance stemming from human diversity. Consequently, this study seeks to examine these challenges and propose strategies to address and mitigate them.

Keywords: User-centred design, Usability, User experience.

Background of the study

Usability is defined as the degree of ease with which a user can interact with a system, meeting the user's needs and interests while maintaining a high level of user satisfaction, and it encompasses the process of both understanding and learning the system. It has other attributes like accessibility, memorability, readability, and ease of use (ISO, 2018). As much as it benefits user centric design in system adoption and usage, it illicit challenges such as complex Stakeholder Management which the designer has to balance between different needs of stakeholders, data privacy and ethical dilemma involving the collection of personalized data which brings privacy issues, balancing business goals with user by focusing on business strategies, technology constraints, user diversity and inclusivity of demographics, culture and individual ability, resistance to the change institution inertia to embrace change. Technology should be used to reduce the user's mental load, so their skills will not be wasted in mechanical actions (Norman, 2006). The User-centered design is a design philosophy and process that prioritizes the needs, preferences, and behaviors of end users throughout the entire design cycle. Instead of focusing solely on aesthetics or technical specifications, UCD emphasizes creating products and systems that are intuitive and accessible for users (Karel Vredenburg et al, *2005).*

The designer ought to focus on the user; undervaluing the complexities of user experience design might result in simplistic and inefficient designs because it is a complex field. It is essential to acknowledge the complexity of the user and allocate sufficient time and resources to the design process. This entails being aware of the ever-evolving digital landscape, technology limitations, and user psychology. The approach creates an opportunity to intentionally include marginalized groups, ensuring their perspectives and experiences shape policy decisions. It enables individuals without technical expertise to make meaningful contributions, highlighting their lived experiences as a valuable source of insight (Goff, Bagley & Sadowski, 2024).

To a large extent, the housing institution has a diverse influence on the user-focused system. Businesses must include accessibility concerns from the beginning because accessibility is frequently disregarded and not given equal weight during the design process, which results in the exclusion of users with disabilities. This entails testing for accessibility problems on a regular basis, making sure accessibility standards are followed, and designing for different types of visual impairments. Businesses expand their market and show social responsibility and diversity by making their products accessible. The activity of understanding and specifying the context of use is very important as it is the basis for generating the requirements and the creation of the first design prototypes (Benyon 2010).

Further, Marti & Bannon (2010) disagree with this perspective by arguing that the participation of users in the systems development process must fit the context and may vary significantly from the proposal by the User Centered Design approach. Poor user experiences might arise from a failure to take into account the context in which a product is utilized. It is essential to comprehend the many settings and situations in which the product will be used. This knowledge can inform design decisions, guaranteeing that the final product is both aesthetically pleasing and useful in everyday situations. In practice, when working on a design problem, designers should take into account both the problem definition and the creation of a solution at the same time (Cross, 2007), and when marginalized representatives get involved, their input is sometimes ignored as not representative of the general population (Beauvais, 2018).

Liza Potts (2014) prefers the term "participant" to "user," to emphasize their active participation in the design and localization of systems, and the case of Ann Shivers-McNair and Clarissa San Diego (2017) makes a case for "community" as a more useful term than "user." User experience is frequently neglected when it is not ingrained in a company's culture. It is essential to foster a culture that recognizes and appreciates the significance of user experience. This entails teaching all organizational levels about the advantages of effective user design and how it supports the overall prosperity of the business and the product.

Usability evaluation encompasses various methods, some engaging end users and others relying on human computer interaction experts (Shneiderman et al., 2016). A commonly used approach that involves end users is usability testing, also known as user testing. In this method, users interact with a prototype or actual system to complete real tasks while their behavior is closely monitored. Key metrics such as task completion time, execution accuracy, and navigation patterns are measured to assess usability.

Statement of the problem

The demand for the seamless interaction of user-based systems is on the rise, and has elicited the user-centric design as an approach to create intuitive, inclusive, and effective user experience designs. Its implementation has several challenges, including usability, individual user needs, technology, ethical issues, and resistance to change. This study aims to analyze these concerns to recommend methodology, frameworks and collaborative needs.

Objective of the study

The study seeks to assess the need to develop more effective, inclusive, and ethical user-centric practices in moderating user experiences and business output.

Challenges of user centric design

The user-centric design is an iterative process involving users at every stage of product design and development, and ensures usability, accessibility, and user satisfaction. The aim is to generate feedback to further improve the product and to determine if the design fulfills the specified user requirement, usability goals, and complies with general usability guidelines (Benyon 2010). The cycle of the user-centric design activities continues as long as the usability objectives have not been met. Consequently, there is no need to continue the iterative cycle when all usability goals have been satisfied. Norman (2013), asserts that in the design of everyday things, good design is intuitive and reduces user effort, leading to better adoption and engagement. Social interests are characteristics that take into account the social aspects of employing a specific product, technology, or feature, such as prestige and power (Agrawal et al., 2012).

Huatong Sun's (2012) cultural usability model that positions usability at the nexus of immediate and sociocultural contexts, between the local and global. The institution as a stakeholder often affects the actual outcome of user-centered design due to existing development workflows and decision-making priorities of business goals over user needs. (Garret, 2010) affirms that the required user research, prototype, and testing, which can extend development timelines and increase cost. Further Nielsen, (2020) stated that, data privacy concerns in collecting user feedback and behavioral data must align with regulations. The designer should engage and educate users in the holistic involvement in the process to get the value of the user-centric design goal. The presented methods

include: interviews, surveys, questionnaires, think-aloud, observation, and collecting samples of artefacts.

Technology

Aligning technology with the user needs and behavior, ensuring the products and systems are goal centered, however, limitations in hardware, software, scalability, and security can hinder the full realization of user centered principles (Norman, 2013), and the constraints can affect usability, performance, and accessibility in digital products. Frohlic & Sarvas (2011), recognize that the speed with which the technology market requires the implementation and the consequent maintenance practices approach can encourage different views on it and seem costly and time consuming for developers, the immediate vision.

User Diversity and Inclusivity

Human Computer Interaction professionals focusing on users scored their day-to-day experiences more negatively than other IT professionals, indicating substantial challenges within their organizations. In this regard, the system design professionals are mainly focused on users encountering difficulties in asserting the value of their experiences, methods, and techniques within their organizational context (Marsden & Holtzblatt, 2018). The cultural differences between users and designers sometimes give rise to difficulties in the development process. Herein, a prior research approach has exemplified several key points of disadvantages through applying the user-centered design process on a project (Abras et al, 2004).

Consequently, users are not simply viewed as objects of study but as active agents within the design process itself (Bannon et al, 2009). The accountability of user diversity and inclusivity is essential in user-centered design, to ensure that products cater for a wide range of users with different needs, abilities, and backgrounds. However, achieving true inclusivity presents several constraints and challenges. Below is a literature-based exploration of these constraints. However, the design for inclusivity is complex due to variations in user needs and constraints arising from technology, resources, and organizational priorities (Norman, 2013). Non-uniformity from different regions with unique languages, writing directions, and cultural norms that impact design choices (*Marcus & Gould, 2000*).

Complex stakeholder management

The design and development of complex systems with an embedded network or ecosystem of users and stakeholders is the focus of the agrawal et al. (2012) approach. Its goal is to give designers a complete tool to meet the demands of stakeholders who have significant influence over the adoption of a system or product and in addition, the results in Cajander et al., (2022) show that user centric design practitioners think that the methods and practices are often complex, which results in taking the practitioners too long to learn to use the user centric design practices efficiently. Additionally, they find it challenging to integrate new methods and practices into their current ways of working. Gray et al. (2014), point out that the process causes greater engagement between clients and designers, as well as other stakeholders and ultimately facilitate communication around the design.

User Centric Design emphasizes designing products and systems based on user needs and behaviors. However, in complex environments with multiple stakeholders such as businesses, government entities, developers, and end-user managing competing interests poses significant challenges. They often find it difficult to conduct timely user research and usability studies within development processes. This leads to them using methods they are familiar with, and avoiding learning or applying new methods, partly because they find new methods to be too complex or abstract (Cajander et al., 2022). A concrete description of a fictional person with the characteristics of the users. They use a narrative to describe the users' groups behaviour, aims, physical abilities etc. Benyon (2010) stresses that it is crucial to develop several different persons as it is impossible to map all characteristics onto one person.

Balancing business goals with user needs

In prioritizing the creation of products and services that meet users' needs, preferences, and behaviors. However,

businesses must also focus on revenue, growth, efficiency, and scalability. Balancing in balancing priorities conflict a rise presenting a major challenge in user centered design (*Norman, 2013*). Organizations often struggle to align user satisfaction with profitability, competitive advantage, and operational constraints.

Data privacy and Ethics

In focusing on creation of products and services tailored to user needs, behaviors, and experiences, by conducting ethical engagement with the user delivers on system understanding, acceptance and conformance with user experiences thus reducing on anxiety and harm. However, user centered design often relies on data collection to personalize interactions, optimize usability, and improve engagement. This dependence on user data introduces significant privacy and ethical challenges, especially regarding data security, informed consent, transparency, and regulatory compliance (Norman, 2013). Balancing innovation with ethical considerations is crucial to maintaining user trust and ensuring compliance with evolving legal frameworks.

Resistance to Change

As a technological based system, the user resistance is of essence and balancing this become ideal for an effective system from the user viewpoint, but through the results from the interviews, we can see that the participants were more hesitant about the process's future usage than those conducting the guided usage. For the practitioners to implement new approaches and processes requires training and facing resistance to change is common, since there is usually a fast pace in software development (Lind, 2017). The user environment standing often drift the perception, Norman (2006), also questions the ISO technical standards, to reveal the political and economic issues involved in the midst of standardized procedures for establishing national and international standards. According to Fugate et al., (2012), employee adverse reactions to changes will have enormous consequences; this is because they will inhibit the success of the planned changes.

The firm products or services may become old due to unwillingness to change in the rapidly changing digital landscape. As affirmed by Jones & Ven, (2016), rejection of change occurs because, within the organization, managers are not able to apply open communication to all employees. Finally, decreased organizational support and organizational justice. It's critical to keep up with the most recent platforms, best practices, and user experience trends. A website may appear outdated in comparison to others, which can erode trust. Businesses may maintain their competitiveness and innovation in user centric system strategies by fostering a culture of ongoing learning and adaptation among design teams.

User centric Design Constraints Framework

Based on the popping up challenges interplaying and are inherently intertwined in the development of systems from user viewpoint, the existing user centric design frameworks and models ought to be used incorporation of the identified user centric design implementation challenges namely technology constraints, data privacy and ethics, user diversity and inclusivity, complex stakeholder management, business goals and user needs and resistance to change.

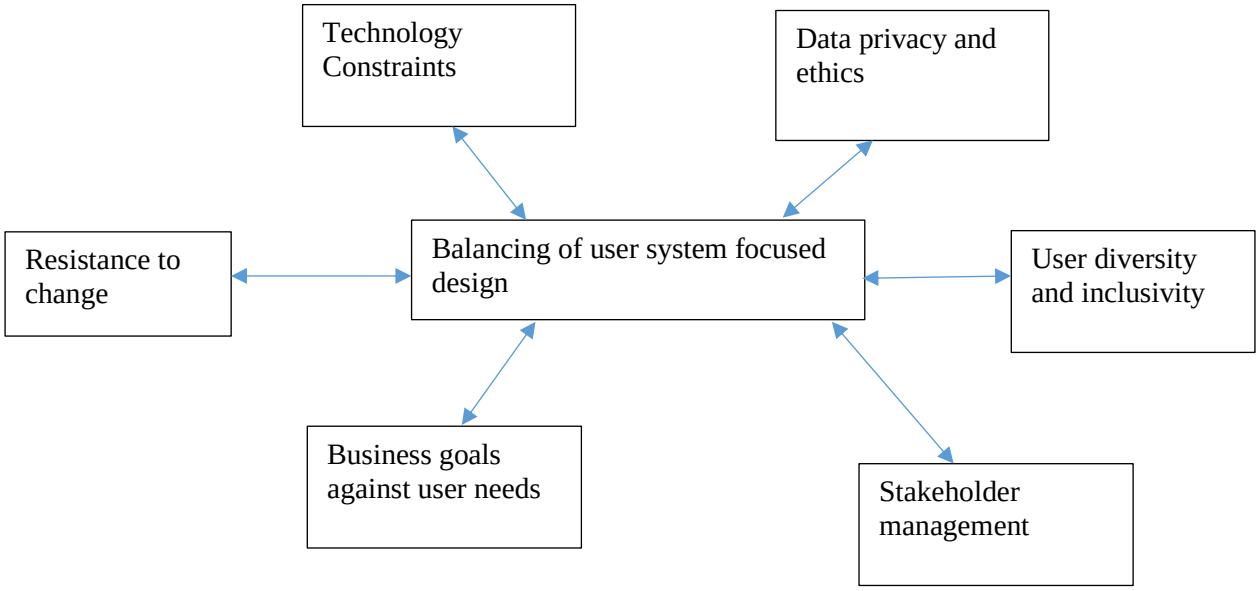

Figure 1: user centric design Constraints implementation challenges

Discussions

Technological constraints pose challenges to User-Centric Design, strategic planning and modern development practices can mitigate these limitations. Future advancements in computing power, artificial intelligence ethics, and cloud infrastructure may further improve the feasibility. To address the diversity challenges inclusivity of design thinking involving user groups during the design and testing phases is necessary, designers must have deep understanding of people for whom design and people should understand the design process (Saffer, 2010). Striving to be inclusive, addressing constraints related to user diversity requires proactive design strategies, adherence to accessibility guidelines, and continuous user research. Future advancements in artificial intelligence, voice interaction, and adaptable user interface design may further bridge the inclusivity gap.

Balancing business goals with user needs is a fundamental challenge in user centric design. While businesses aim for profitability and scalability, long-term success depends on maintaining positive user experiences and trust. Organizations must integrate user insights into strategic decision-making to achieve sustainable growth. While enhancing usability and personalization, it must be implemented responsibly to safeguard user privacy and uphold ethical standards. Organizations should adopt transparent, user-friendly privacy policies and integrate ethical design principles to build trust and compliance in the digital landscape.

Resistance to change is a significant barrier to implementing user centric design, but it can be mitigated through clear communication, stakeholder involvement, and phased adoption strategies. Organizations that successfully integrate this design concept benefit from improved user satisfaction, engagement, and long-term business success.

Conclusion

In conclusion, User-Centric Design plays a major role in ensuring that digital products and systems accommodate the varied needs of users while aligning with business objectives. However, implementing it faces several challenges, including technological constraints, intricate stakeholder management, reluctance to change, concerns over data privacy, and the imperative for inclusivity. Overcoming these obstacles necessitates a strategic and iterative methodology that incorporates user feedback, ethical considerations, and advancements in technology. Organizations must emphasize accessibility and inclusivity from the beginning, making sure that the diverse needs of users are taken into account throughout the design process. Moreover, it is crucial to find a balance between business goals and user satisfaction for long-term success, as a user-centered strategy enhances engagement, fosters trust, and creates a competitive edge.

To reduce resistance to change, organizations should establish clear communication strategies, engage stakeholders from the outset, and foster a culture of ongoing learning and adaptation. Adhering to ethical design principles and maintaining transparent data privacy policies are vital for preserving user trust and ensuring regulatory compliance. Ultimately, while user-centered design poses challenges, navigating these obstacles through a well-organized framework improves usability, fosters innovation, and enhances the overall user experience. Future developments in artificial intelligence, adaptive interfaces, and inclusive design practices will further improve the efficacy of user-centric systems, making them more accessible and intuitive for all users.

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