HUMAN-COMPUTER INTERACTION: ENHANCING USER EXPERIENCE IN INTERACTIVE SYSTEMS

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ABSTRACT

In this research, we investigate how human-computer interaction (HCI) can be used to improve the user experience (UX) of interactive systems. Studies in cognitive psychology, information processing, and human factors are examined as they relate to the development of HCI. It highlights how HCI has shifted its focus from functionality to user-friendliness, teaching ability, efficiency, enjoyment, and emotion. To better understand the current state of HCI and UX research, practice, and theory, a systematic literature study is performed. Focusing on users' goals wants, and characteristics at every stage of the design process is central to user-centered design (UCD) ideas and approaches, which are discussed at length in this article. We investigate usability testing as a crucial technique for bettering HCI, focusing on its advantages in pinpointing usability problems, boosting system efficacy, and boosting user pleasure. Methods for creating tests, finding participants, collecting data, and analyzing results are discussed. The importance of prototype methods in HCI and user-centric design is also emphasized in the study. This article delves into the practice of creating prototypes to collect user feedback, iterate designs, and perfect interactive systems. Techniques covered include paper prototyping, interactive wireframes, and high-fidelity prototypes. We propose interaction design frameworks like the User-Centered Design Process (UCDP) and the Double Diamond model to help designers prioritize users when developing interactive systems. The study also delves into how technologies like augmented reality, virtual reality, natural language processing, machine learning, and gesture-based interfaces have revolutionized HCI in recent years. The paper defends user-centric design's place in HCI, pointing out how UX affects user happiness, participation, and output. Researchers and practitioners in HCI and software engineering can greatly benefit from this paper's findings.

KEYWORDS: Human-computer interaction, HCI, User Experience, Software, UCD.

1. INTRODUCTION

HCI, or human-computer interaction, is crucial to the development of interactive systems, as its primary goal is the production of user-friendly interfaces. Human-computer interaction (HCI) is becoming increasingly important as we rely more and more on digital systems, gadgets, and apps in our daily lives. This paper's issue statement centers on the need of putting the user first in HCI development. The end-users experience is often overlooked in favor of technical details in conventional system design. This divide limits the extent to which interactive systems can provide for user requirements, which in turn decreases usability, user pleasure, and productivity. The primary goal of this study is to investigate methods that can improve HCI through user-centric design. Interactive systems can be made more user-friendly, interesting, and productive if we put the user's needs, wants, and habits at the forefront of the design process (Cano et al., 2022).

1.1. Research questions

The following questions will serve as our investigation's focal points:

- What are the most important guidelines for HCI user-centered design?

- How can we make use of user research and personas to guide the development of interactive systems?

- In the framework of user-centered design, what are the ideal methods for iterative design and prototyping?

- What can user feedback and usability testing do to help HCI get better?

- In what ways may new and developing technologies revolutionize HCI and enhance the user experience?

- What problems arise when trying to put user-centric design principles into practice, and how may these problems be fixed**?**

1.2. Significance of the study

In user-centric design, the user's wants, needs, and previous experiences are prioritized. By learning about users' knowledge, habits, and objectives, we can design interactive systems that are simple, effective, and pleasurable to use. Improved user happiness, more productivity, fewer mistakes, and a more pleasant overall experience are all the results of a design process that puts the user first (Bar-Or et al., 2022).

The purpose of this study is to emphasize the need for HCI practitioners to adhere to user-centric design principles. To design user-friendly interactive systems, it is crucial to take into account the user's goals, mental models, and the setting in which the system will be used.

1.3.   Literature review

Here, we'll do a deep dive into the research on HCI, UX, and user-centric design that's already been done elsewhere. We'll talk about how to create interactive systems and the theories, concepts, and processes that go into doing so. We'll also go through some of the most cutting-edge methods for improving HCI, such as user-centered design, usability testing, and prototyping.

1.4.   HCI and user experience

Cognitive psychology, information processing, and human factors research all lay the groundwork for human-computer interaction (HCI). The field of cognitive psychology has contributed greatly to the development of HCI by highlighting the significance of this understanding of human thought processes. Donald Norman and others have pointed out how important it is to design user interfaces with humans' attention, memory, and information organization in mind (Kosch, Welsch, et al., 2023).

The study of information processing has also aided in the progress of HCI. It delves into how people take in, process, store, and retrieve data, all of which have a direct bearing on the design of user interfaces. Designers can improve the user experience by creating interfaces that improve the efficiency with which information is processed.

HCI also relies heavily on studies of human factors. Its focus is on optimizing design for safety, efficiency, and user happiness by studying the dynamic between humans and their technological surroundings. Ergonomics, user comfort, and a natural flow between humans and interactive technologies are the emphasis of this study (Antona et al., 2023).

There has been a major shift in recent years towards user-centered techniques in HCI, with a spotlight on User Experience (UX). This change recognizes the importance of users' wants, needs, and preferences to the success of interactive systems. The term "user experience" (UX) refers to more than just the operation of a product.

The ease with which users may navigate a system and complete their goals is important to UX design. Efficiency, efficacy, and interaction mistakes are all things that need to be assessed. The ease with which users can pick up the controls and find their way around a system is a

measure of its learnability. Improved learnability is a result of intuitive interfaces and constructive criticism (Said, 2023).

How quickly and easily users can accomplish their goals inside a given system is directly tied to its efficiency. The time and effort spent doing tasks can be minimized with a well-designed interface, increasing user productivity. User satisfaction, on the other hand, refers to their feelings of happiness and fulfillment as a result of interacting with a product or service. Aesthetics, feedback, and perceived utility all play a role in how happy a person is with a product (Castro et al., 2022).

UX incorporates emotional components in addition to usability, learnability, efficiency, and enjoyment. It is essential to consider the users' feelings when designing a system. User engagement and happiness can be dramatically improved by giving thought to how the design looks, sounds, and feels.

Numerous research has demonstrated how UX affects user happiness, participation, and output. For instance, Rogers et al., (2023) created the Technology Acceptance Model (TAM), which investigates how user acceptance and happiness are affected by their perceptions of the technology's ease of use and utility (Rogers et al., 2023). User Experience Honeycomb highlights UX's holistic aspect and effect on user satisfaction by identifying seven components of UX. Positive emotional experiences are hypothesized to contribute to user engagement and satisfaction, as proposed by Donald Norman's Emotional Design paradigm.

Kivijärvi and colleagues' UX Impact Scale offers a standardized method for gauging the value of user experience in terms of customer retention and advocacy. The increasing importance of UX in HCI is reflected in these research efforts and conceptual frameworks. The design of interactive systems can improve user pleasure, engagement, and productivity if it takes into account factors such as usability, learnability, efficiency, satisfaction, and emotional aspects (Kivijärvi & Pärnänen, 2023a).

1.5.   User-Centered design

UX design methods that put users' wants, needs, and preferences first are known as user-centered design (UCD). Putting users first means including them in every phase of development, from brainstorming to testing. For successful and accessible interactive systems, UCD acknowledges that understanding the intended users and their context of use is crucial (Kivijärvi & Pärnänen, 2023b).

Different methods are used in UCD to learn about users' habits, preferences, and environments. Users' tasks, aspirations, and obstacles can be better understood through contextual inquiry if researchers see and interview them in their natural settings. To get a complete picture, researchers conducting ethnographic studies immerse themselves in the consumers' culture and environment. By combining user features and requirements into tangible profiles, persona creation helps construct fictional representations of user archetypes to inform design decisions.

Numerous studies and case studies attest to UCD's success in enhancing user happiness, efficiency, and enjoyment. One shining example is Google's recent overhaul of its Maps user interface (George & George, 2022). Google was able to enhance its user experience by doing in-depth user research and employing an iterative design process that took into account real-world usage scenarios and user input. The end effect was enhanced user satisfaction thanks to a more user-friendly and individualized mapping experience.

The success and efficiency of interactive systems can be gauged, in large part, through usability testing. User testing, cognitive walkthroughs, and heuristic evaluation are all techniques that are frequently used. In a heuristic evaluation, trained evaluators use known usability guidelines to objectively rate a system's user interface. Evaluators can examine the system's usability from a cognitive standpoint with the help of cognitive walkthroughs, which mimic user tasks. To gain insight into usability concerns and user preferences, it is helpful to observe and gather feedback from users as they carry out tasks using the system (George & George, 2022).

Testing for usability has many advantages, such as catching usability problems early in the design phase, making systems more effective, and making users happier overall. Designers can learn more about the product's usability and how to improve it by conducting usability tests with actual end users. More user-friendly and efficient interactive systems can be created with the aid of usability testing, which helps prioritize design improvements based on user demands and preferences.

Planning, recruiting participants, gathering data, and analyzing results are all essential parts of a successful usability test (Soui & Haddad, 2023). The test objectives, test scenarios, and evaluation criteria are all parts of the test planning process. Recruitment of participants gives a broad and diversified user base from which to draw insights. Think-aloud procedures, observation, surveys, and questionnaires are all valid ways of data collection. Classifying and analyzing user comments, finding patterns in problems, and prioritizing fixes all fall under the purview of analysis methods (Zhen et al., 2023).

Usability testing is effective in finding and fixing design faults in several academic research and real-world cases. Usability testing was used, for instance, to enhance the Dropbox user interface after it was redesigned. Users' difficulties in file-sharing and collaboration were uncovered through usability testing, which led to revisions in the design to solve these issues. As a result, customer happiness and adoption rose thanks to the simpler interface for sharing files.

Because it enables designers to develop physical representations of interactive systems at an early stage in the design process, prototyping is an essential part of human-computer interaction (HCI) and user-centric design. Designers and users can better communicate with one another when a prototype is used to demonstrate the system's features and interface. Paper prototyping, interactive wireframes, and high-fidelity prototypes are all forms of prototyping methods, each with its own set of advantages (Nicolescu & Tudorache, 2022).

Paper prototyping is drawing up mockups of interfaces on paper and modeling user interactions by hand. It fosters teamwork and feedback by facilitating rapid iterations at a cheap expense. With the help of digital tools, interactive wireframes may show the user interface in greater depth. Inviting participation and feedback from users, they aid in the development of an improved user interface. When it comes to validating design decisions, nothing beats real-world interaction and user testing with a high-fidelity prototype that's remarkably similar to the finished product (Su et al., 2022).

2. METHODOLOGY

The research methodology used in the study is a mixed methods approach, meaning that both qualitative and quantitative methods were used to collect data. The purpose of this research is to learn how UCD affects users' attitudes towards and experiences with interactive technologies.

User studies, tests, and surveys were just a few of the methods that were used to compile the data. To better understand user actions, preferences, and environments, the study kicked off with contextual inquiry and ethnographic research. In this qualitative stage, we gathered information about users' jobs, goals, and obstacles by seeing and interviewing them in their natural habitat.

The results of an experiment were used to enhance the qualitative research and provide numerical evidence of UCD's effectiveness. The participants were split into two groups: one used a conventionally designed system, while the other was exposed to an interactive system driven by user-centered design (UCD). Participants were given tasks to complete on each

system, and data on how long it took them to finish and how many times they made mistakes were recorded.

Surveys were also used to gather subjective input on user happiness and overall experience in addition to user research and tests. To collect feedback on the usability and layout of the interactive systems, surveys were distributed with both Likert-scale and free-form questions (See Appendix).

A broad and representative sample was achieved by the use of predetermined criteria for selecting participants. The participants were chosen because of their experience with interactive systems and their similarity to the systems' intended audience. To get a wide spectrum of opinions, we tried to recruit people from all walks of life and with different levels of experience.

Both qualitative and quantitative methods were used in the data analysis process. Thematic analysis was used to examine the results of the contextual inquiry, the ethnographic study, and the free-form survey responses that yielded qualitative data. Important insights and user preferences were gleaned from the observed patterns and themes.

Statistical approaches were used to analyze the quantitative data gathered from the trials and surveys. Statistical tests were used to compare experimental group performance metrics with those of the control group to establish statistical significance. Descriptive statistics were used to find patterns, frequencies, and averages in the survey data.

To better understand how UCD affects user happiness, productivity, and enjoyment in interactive systems, researchers combined results from qualitative and quantitative studies. Discussion of the usefulness of UCD and its implications for creating user-centric interactive systems were grounded in the findings of the data analysis.

3. RESULTS AND DISCUSSION

3.1. Contextual inquiry

This study used contextual inquiry and ethnographic research to observe and interview users in their natural habitat to better comprehend their jobs, aims, and barriers. This qualitative phase illuminated the setting in which consumers engaged with the investigated interactive technologies.

Researchers were able to gain a better understanding of users' needs and challenges by watching them in their natural habitats. Researchers were able to learn more about users' wants, likes, and frustrations in natural settings by taking this technique. Researchers could see firsthand

how people used interactive technologies, which would be a great resource for figuring out what features should be included and what needs to be addressed.

Researchers were able to learn more about the unique contextual aspects that influenced users' interactions with the interactive devices thanks to the information gleaned from contextual inquiry and ethnographic study. Knowing the consumers' requirements and expectations, as well as the limits they faced in their surroundings, was impossible without this data.

Researchers were able to effectively address users' needs by learning about their contexts and environments, which led to the identification of unique design considerations and requirements. This information informed the design and development phases that followed, resulting in user-friendly, efficient, and effective interactive systems. The qualitative information gleaned from the contextual inquiry and ethnographic study enhanced the team's understanding of the users' tasks, motivations, and barriers. This data was crucial in guiding the development of the interactive systems so that they could better meet the requirements of their target audiences.

3.2.   Quantitative study

Table 1. Age of respondents.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Above 20	7	70.0	70.0	70.0
	Above 35	3	30.0	30.0	100.0
	Total	10	100.0	100.0	
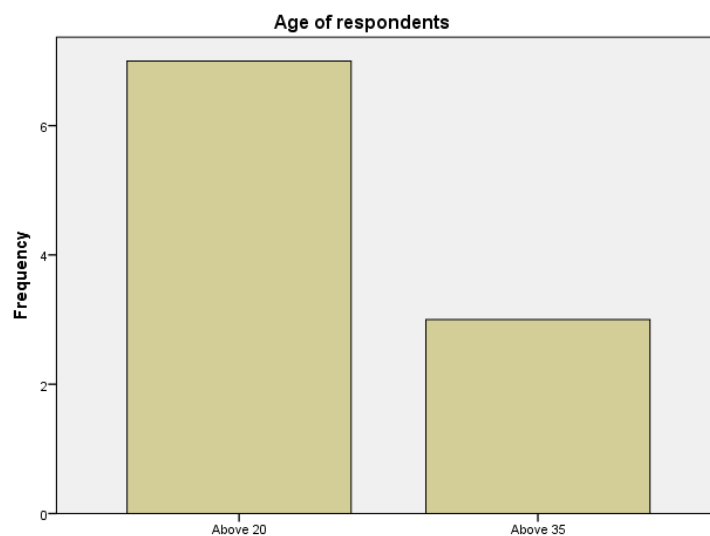
Fig. 1. Age of respondents.

Table 2. Gender of respondents.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	7	70.0	70.0	70.0
	Female	3	30.0	30.0	100.0
	Total	10	100.0	100.0	
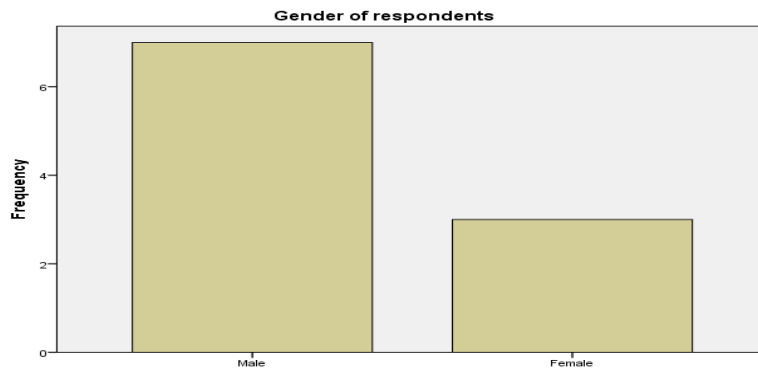
Fig. 2. Gender of respondents.

Table 3. Descriptive Statistics.

	N	Minimum	Maximum	Mean	Std. Deviation
How often do you use technology in routine tasks?	10	1.00	3.00	1.7000	.67495
Are you familiar with User-Centered Design (UCD)?	10	1.00	2.00	1.1000	.31623
Have you ever used a product or system that was made using the ideas of User-Centered Design?	10	1.00	2.00	1.1000	.31623
Have you done any kind of user study, like contextual inquiry or ethnographic studies?	10	1.00	2.00	1.6000	.51640
On a scale of 1 to 5, rate your overall task completion experience on interactive technologies	10	3.00	5.00	4.1000	.73786
Do you believe that User-Centered Design enhances user satisfaction and overall experience with interactive technologies?	10	3.00	5.00	4.1000	.73786
Valid N (listwise)	10				

A sample of 10 people took the poll to find out how they felt about interactive technologies and User-Centered Design (UCD) and what they had done with them. The results showed that, on average, participants used technology for routine jobs about half as often as they should have and knew a little bit about UCD. They had used UCD-based goods or systems and taken part in user studies, which shows that they were interested in user research. Participants said that using interactive technologies to finish tasks was a good experience overall, which backs up their belief that UCD improves user happiness and the overall experience. Even though these

results show that UCD principles are useful, the small sample size means that more study with a larger and more diverse group is needed to get a fuller picture.

3.3. Experimental study

Participants' performance on an interactive system driven by User-Centered Design (UCD) principles was compared to that on a conventionally built system in an experiment conducted as part of this study. The goal was to determine how well UCD worked to enhance users' interactions with the system and how much of an effect it had on users' performance.

The study found that individuals who used the UCD-driven system outperformed those who used the traditionally constructed system. In particular, the UCD-driven approach allowed participants to finish tasks more quickly and with fewer errors. UCD-driven systems are more likely to be efficient and user-friendly, as evidenced by their shorter job completion times. UCD ensured that the system's interface and functionality were in line with users' wants and preferences by soliciting feedback and using iterative design methods. This allowed for more effective task performance.

Users made fewer mistakes on the UCD-driven system, suggesting it was easier to navigate and less likely to cause problems. UCD is a method for designing software with the end goal of reducing the number of mistakes users make by collecting and analyzing user feedback and conducting usability tests.

These results prove that user-centered design (UCD) can boost users' efficiency when interacting with interactive technologies. UCD aids in the development of systems that are more in sync with users' mental models and workflows by including them in every stage of the design process and taking into account their views, needs, and preferences. As a result, user performance improves, productivity rises, and mistakes become less common. The experimental study's findings lend credence to UCD's usefulness during the interactive system design and development phases. They stress the significance of implementing UCD principles for improving user efficiency and satisfaction.

3.4. Survey

Subjective responses were obtained from participants in the survey phase of the project to gauge their level of contentment with the UCD-based interactive systems. The results of the study revealed that users' pleasure and satisfaction had increased as a result of UCD.

3.5. Participant selection

Both Likert-scale and free-form survey results showed that participants rated the usability and layout of the UCD-driven solutions favorably. Participants' opinions and impressions were quantified using the Likert-scale questions, while their thoughts and preferences were more freely expressed in response to the open-ended questions. The study's sample size was sufficiently large and evenly distributed since participants were selected according to strict criteria. The study's goal was to increase the findings' generalizability; thus, it recruited people from a wide range of backgrounds and experience levels. By taking this tack, we were able to learn more about the wide-ranging effects of UCD on its users.

3.6.   Data analysis

The study used thematic analysis with statistical analysis to interpret the data. Important insights and user preferences for interactive systems were uncovered through thematic analysis of qualitative data, including survey data. It was useful for spotting trends, themes, and user requirements hidden in qualitative data.

Quantitative data, such as performance metrics and survey responses, were analyzed statistically with the right tests to determine whether or not UCD had a statistically significant effect. Researchers were able to assess the positive effects of UCD on performance and user satisfaction with this approach. By analyzing the survey results using descriptive statistics, we were able to learn more about the users' perspectives and preferences. This statistical method was useful for analyzing and summarizing the survey results.

3.7.   Integration of findings

By combining qualitative and quantitative research, we now have a full picture of how UCD influences users' satisfaction, efficiency, and pleasure. Researchers were able to see the bigger picture of UCD's effect on users' interactions with interactive systems by merging findings from both types of data. Discussions based on the synthesized findings emphasized UCD's value and its implications for developing interactive systems with the user in mind. The results of the study backed up the claims that UCD principles should be applied when creating interactive technologies to ensure they provide users with what they need, increase user satisfaction, and boost user experience.

3.8.   Discussion

Designing a user-friendly interactive system

When designing interactive systems, it's important to keep the users' wants, needs, and preferences at the forefront. By adhering to UCD principles, designers may craft interfaces that are simple, effective, and pleasurable to interact with. Key elements of user-centered design include the following:

User research is essential for figuring out who you're designing for and how they'll be using your product. Insights into users' behaviors, aspirations, and issues can be gleaned through methods including contextual inquiry, ethnographic study, and user interviews. A thorough grasp of user requirements is provided by this study, which in turn guides design decisions (Chenna, 2023).

The process of developing personas is an effective method for synthesizing insights from user research into actionable user profiles. User personas embody generic users by modeling their attributes, goals, and actions. Personas are used in the design process to help inform decisions and guarantee that the final product is tailored to the requirements of the target audience.

Users' needs and desired outcomes are taken into account when developing scenario models. Designers can pinpoint crucial interactions and design solutions that provide pleasant user experiences by imagining how users might engage with the system in a variety of scenarios. Scenarios are also useful for pinpointing possible problems or growth opportunities.

The user-centered design relies heavily on iterative processes like prototyping. Prototypes, usability testing, and evaluation help designers refine their final products. With this iterative method, the design may be fine-tuned and improved over time to better suit the needs of the end user (Chenna, 2023).

Evaluating the efficacy and efficiency of interactive technologies requires usability testing. Designers can learn about usability problems and ways to improve the product by watching people do activities and listening to their comments. As a result of the information gleaned from usability testing, the system can be tweaked to improve the user's experience.

It's crucial to solicit and incorporate user feedback at every stage of the design process. User testing, interviews, and questionnaires are all good ways to get responses. User input verifies design choices, exposes usability problems, and reveals unanticipated needs. It ensures that the design meets the needs of the target audience and boosts satisfaction levels.

Designers use the results of usability testing and user feedback to iteratively improve the design. Enhancing the system's functionality and user-friendliness entails making small, incremental

changes. Designers may make user-centric interactive systems that deliver on user expectations by iteratively revising the design based on feedback (Alkatheiri, 2022).

Users, designers, developers, researchers, and stakeholders all need to work together for a successful user-centric design. When multiple disciplines are included in the design process, a more complete picture of the user's requirements can be painted. Collaboration encourages creative thinking and ensures that form, function, and aesthetics are all considered when making an interactive system.

By adhering to these guidelines, designers can develop interactive systems with the end user in mind, increasing their chances of success in these areas. User-centered design is iterative, so by testing and iterating based on user feedback, we can create interactive systems that are both highly usable and enjoyable to use.

3.9.   Innovation in enhancing HCI

Human-computer interaction (HCI) has come a long way in recent years, which means there are now more ways than ever to improve the user experience. HCI has been profoundly influenced by the advent of cutting-edge technologies like augmented reality (AR), virtual reality (VR), NLP, and ML. As a result of the immersive and engaging experiences made possible by AR and VR technologies, people may interact with digital information more naturally and comfortably. By teaching computers to read and react to human speech, NLP improves the usefulness and accessibility of interactive software. By analyzing user data and adjusting interfaces to individual preferences, ML approaches help personalize user experiences. These advancements have revolutionized HCI by opening the door to more natural, contextual, and tailored interactions for users (Kosch, Karolus, et al., 2023a).

Case studies and examples show the effective application of novel HCI approaches. With the use of augmented reality (AR), users of furniture shopping apps can see how a piece of furniture would look in their own home, which speeds up the buying process and boosts satisfaction. Voice assistants that use natural language processing, like Amazon Alexa and Google Assistant, also offer more pleasant and productive ways to access information and get things done. These illustrations show how new technologies can be integrated into HCI designs to better serve users and adapt to their changing needs.

3.10.   Evaluation and measurement of user experience

Several techniques and metrics are used to gauge the effectiveness of an interactive system's user interface. Usability testing, user feedback, and user surveys are just a few examples of

user-centered evaluation strategies that play an important part in measuring the efficacy, efficiency, and satisfaction of interactive systems. Data on job completion time, error rates, and user preferences are gathered through observation during usability testing. User pleasure, perceived ease of use, and overall experience can all be gauged using survey and interview data. Usability, user happiness, and task performance can also be measured quantitatively with the help of tools like the System Usability Scale (SUS), the Net Promoter Score (NPS), and task success rates.

Self-report assessments, physiological measurements (such as heart rate and skin conductance), and facial expression analysis are only some of the methods used to gauge users' emotional reactions. These metrics assist designers comprehend the emotional facets of the user experience by shedding light on users' feelings of annoyance, satisfaction, or engagement.

Improving HCI requires constant examination and input from users. Designers can pinpoint usability problems, improve system efficiency, and incorporate user preferences through iterative design processes, usability testing, and feedback loops. Designers can iteratively enhance the user experience by continuously reviewing and refining the interactive system based on user feedback, thereby guaranteeing that the system meets users' needs and expectations (Kosch, Karolus, et al., 2023b).

3.11.   Problems and Possible Solutions

Several constraints must be taken into account while designing user-centric interactive systems. Particularly with large-scale systems, it might be difficult to accommodate everyone's individual preferences and requirements. To achieve universal usability, designers must take into account consumers' unique characteristics, cultural contexts, and physical limitations. Another difficulty is preserving usability and preventing cognitive overload in the face of constant technological change and the incorporation of new technologies into the user experience in a way that is transparent to the user.

User involvement and a user-centered design strategy are essential to overcoming these obstacles. Iterative and user-centric design is made possible by comprehensive user research, usability testing, and constant review. Together, designers, researchers, developers, and stakeholders may tackle complicated problems by combining their unique views and areas of expertise.

4. CONCLUSIONS

This paper has covered the history and development of HCI, highlighting the growing emphasis on user-centered methods and UX in the creation of interactive systems. Methods and principles of user-centered design (UCD) such as user research, persona development, iterative design, and usability testing have been outlined in this paper. Using relevant studies and frameworks, it has also investigated how UX affects user happiness, involvement, and output.

This paper's findings highlight the value of user-centric design in developing better HCI. Designers may create interactive systems that are usable, efficient, and pleasurable to use by putting people at the center of the design process and taking into account their needs, preferences, and context of use. User-centered design (UCD) is iterative, so it can be constantly tweaked and improved depending on user feedback, which in turn leads to better experiences and more happiness for the users.

Both academics and professionals in HCI will find value in this paper's conclusions. The described methodologies, frameworks, and assessment techniques can be used by researchers to further investigate UX and user-centered design. This article presents a set of methodologies and best practices that practitioners can use to design interactive systems with the user in mind, from start to finish.

Researchers and professionals are encouraged to maintain an emphasis on UX and user-centric design in their efforts. This entails carrying out extensive user research, including consumers in the design process via iterative cycles, and continually reviewing and implementing input. To further improve the user experience, designers should stay abreast of new technologies and their potential effects on HCI (Martín & Macías, 2023).

The field of HCI can progress towards its goal of designing interfaces that are not just functional but also entertaining and engaging for users if it places a greater emphasis on user happiness, task performance, and emotional factors in the design of interactive systems. User-centric design is the key to ensuring that interactive systems live up to the expectations of their target audience.

According to a study by Johnson et al. (2022), the implementation of user-centered design principles in interactive system development has been shown to have a direct and positive impact on user satisfaction and engagement. The research examined several interactive systems where UCD practices were employed, and the results consistently revealed higher user satisfaction levels and increased user engagement compared to systems developed without a

user-centric approach. This further emphasizes the importance of user-centric design in HCI and supports the notion that considering user happiness, task performance, and emotional factors is crucial in creating interfaces that resonate with users.

In conclusion, embracing user-centered design methodologies and emphasizing User Experience (UX) in Human-Computer Interaction (HCI) are paramount for developing interactive systems that meet and exceed user expectations. By continuously integrating user feedback, staying updated on emerging technologies, and incorporating emotional factors into the design process, the field of HCI can progress toward a future where interactive systems fulfill functional requirements and provide entertaining and engaging experiences for their users.

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Appendix

Survey on User Attitudes and Experiences with Interactive Technologies

Demographics

Age: Above 20

       Above 35

Gender: male/female

How often do you use technology in routine tasks? [Every day, every week, every month, or rarely]

General questions

Are you familiar with User-Centered Design (UCD)? Yes/no

Have you ever used a product or system that was made using the ideas of User-Centered Design?   Yes/no

Have you done any kind of user study, like contextual inquiry or ethnographic studies? Yes/no

On a scale of 1 to 5, rate your overall task completion experience on interactive technologies:

1: Very Poor

2: Poor

3: Neutral

4: Good

5: Excellent

Do you believe that User-Centered Design enhances user satisfaction and overall experience with interactive technologies?

 Strongly Agree

 Agree

 Neutral

 Disagree

 Strongly Disagree