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# User-Centered Mobile Navigation: Evaluating Local Usability for Improved UX

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**Abstract**; *Mobile navigation interfaces continue to be plagued by a key usability problem, particularly when widely accepted design traditions fail to address the specific requirements and mental models of local user populations. This research addresses this significant limitation by using a comprehensive user-focused measurement framework to identify and investigate context-dependent navigation problems in mobile applications. The research employed a multi-method qualitative approach, using in-depth questionnaires, semi-structured interviews, and laboratory-based usability testing of 15 participants on an interactive Figma prototype that simulated real-world navigation tasks. Our analysis, step by step, revealed significant navigation issues in the local context, as evidenced by a 73% task-completion rate and an average participant error of 2.8 across the core navigation tasks. The most significant usability issues were ambiguous iconography, inconsistent application of platform design patterns, and insufficient system feedback mechanisms. The results conclusively demonstrate that localized usability testing is not merely beneficial but necessary while creating genuinely good and accessible mobile experiences. The study provides a replicable, practical context-aware evaluation approach and tangible, right-now-applicable design recommendations, for example, the need to enhance icons with descriptive text labels and to use instant visual feedback mechanisms. The study provides developers and designers with tangible takeaways for significantly enhancing navigation user experience without sacrificing methodological availability or implementation convenience across different development environments.*
**Keywords**: *User-Centered Design, Mobile Navigation, Usability Evaluation, User Experience (UX), Local Context.*

## I. INTRODUCTION

The ubiquity of mobile apps in everyday life has significantly changed how people access information, make transactions, and navigate online spaces. This global nature of the digital revolution, however, is realized differently across specific contexts, where literacy rates, levels of technology exposure, and cultural nuances all significantly influence user behavior. Success with an application is no longer dependent on its utilitarian features. However, it is ultimately determined by the degree of User Experience (UX) it offers, particularly through its easy-to-follow navigation. In the words of (Quaresma et al., 2022)This shift from early usability to a ubiquitous UX design philosophy aimed at developing interfaces that were not only effective but also meaningful and enjoyable for users. This became especially important in a time when user retention would be directly a function of interaction design simplicity, and usability in navigation would be the key to successful mobile app development.

While world design principles such as Nielsen's heuristics are available, one of the most pressing concerns is how to implement them for multiple users. Different smartphone applications implement navigation models that are technically correct but disorienting or unintuitive for specific local user populations. These kinds of disconnections put users in trouble while trying to accomplish simple tasks, leading to frustration, inefficiency, and ultimately app abandonment. It has been found through research, such as (Abuaddous et al., 2022)That automated UX testing, although helpful, will overlook the softer, context-specific problems real users encounter at home. The problem is compounded in the vast majority of local contexts, where one-size-fits-all navigation design all too often ignores individual local tastes and cognitive models, creating an effective gap between global guidelines and local usability.

A review of the literature confirms a research gap in localized, user-based assessment of mobile navigation. Despite the plethora of research on UX and usability testing in general (MacDonald et al., 2022; Perrig et al., 2024)Some studies utilize User-Centered Design in a specific domain, such as healthcare. (Bonet-Olivencia et al., 2024) and e-commerce (Gunawan et al., 2021)

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Moreover, empirical studies on the usability of mobile navigation targeting a specific local population do not yet exist. Past work has demonstrated the application of UCD in system development, but typically extends only to implementation and lacks a fine-grained focus on a complete evaluation of a specific interaction factor, such as navigation. This research attempts to do the same, focusing on navigation usability in a single local environment through a close-grained examination that may evade broader application evaluations.

The primary objective of this research is to uncover and examine specific usability problems in the mobile navigation of a locally impactful application from a physical user's perspective. Employing a simple, qualitative method comprising questionnaires, interviews, and brief usability testing with a clickable mock-up, this research aims to deliver pragmatic, solution-oriented conclusions for developers and designers. Our contribution consists of two parts. We provide empirical, context-sensitive information on the interests and challenges of wayfinding for one group of local users, a group that may be underrepresented in mass-scale, worldwide HCI research. Secondly, we establish the efficiency of a lean, streamlined UCD process for conducting effective UX research without the need for a large-scale experimental setup, thereby creating a step-by-step guidebook for development teams to follow to create more usable, culturally appropriate mobile apps. The remainder of the paper will introduce the theoretical foundations of Nielsen's heuristics and UCD, detail the methodology with qualitative control, introduce thematic analysis of the findings, and detail their implications for informatics research and design practice in the future. The presentation aims to guide the reader step by step from a problem space statement through to actionable, context-sensitive guidance.

## II. LITERATURE REVIEW

User-Centered Design is a design approach in which users' needs and limitations guide every aspect of design through interactive prototypes and verification loops. The process guarantees products at the point of completion are user-capability matched to fulfilling experiences and functionality. As defined by (Quaresma et al., 2022)UX is the full range of user experience and reactions that are evoked by product use. The philosophy of placing users at the center of design processes finds support across various domains, including digital healthcare, where patient-centric approaches have shown a significant impact (Gilbert, 2022). The application of UCD is necessary in this study, being the methodological foundation for investigating mobile navigation within local user attitudes and environments. Such a theoretical stance is substantiated through the research work of (Bonet-Olivencia et al., 2024), having applied UCD in at-risk populations, and (Wira et al., 2024), demonstrating in-use efficacy for mobile application contexts.

Whereas UCD provides the overall process, usability principles provide concrete evaluation criteria in five broad components: learnability, efficiency, memorability, error prevention, and subjective satisfaction. Nielsen's Heuristics present ten general interactive design rules that specifically address usability issues in navigation design. The heuristics address some of the most notable issues, including visibility of system status, correspondence with the real world, and user control, all of which are directly applicable to mobile navigation testing. This study employs this model analytically, which has been applied before to complex health systems. (Azizi et al., 2021) and government websites (Ilyas et al., 2022), but here applied specifically to local navigation contexts. The strength of the framework lies in its ability to decompose user interactions and identify specific points of friction that broader evaluations will overlook.

A sweep of the empirical literature reveals a well-established field of usability testing, but one that is especially prone to overlooking the powerful influence of local user context. (Abuaddous et al., 2022) Research offers valuable insights into automated UX testing, but, most importantly, documents its inability to address the problematic, real-world issues users face in targeted groups, a phenomenon that strongly supports the qualitative, human-centered method employed by the current study. Some researchers have even discovered the use of UCD methodologies in other domains; e.g., Aldi & Wahyuddin (2022) and Hamdanuddinsyah et al. (2023) have described the method's use in transactional system design and mobile commerce application design. These studies were more globally oriented to the application of UCD across the design and development process as a whole, rather than a narrow evaluative focus on a particular interaction aspect, such

as navigation, for a specific group. That is indicative of an advanced application of the methodology, but it still lacks a restricted evaluative scope focused on essential UI components. This kind of specialized research also places that into perspective.

Studies like (Mubeen et al., 2021) in medical use cases and (Hamid et al., 2022) In financial use cases in developing markets, verify aggregate demand for usability. Studies on specialized applications, such as student information systems (Al-Hunaiyyan et al., 2021) and healthcare platforms for elderly users (Wang et al., 2022), further demonstrate the critical importance of domain-specific usability considerations. However, they will most likely aggregate results into broad user groups like "patients" or "banking customers," which could unintentionally bury culturally and contextually rooted interaction patterns. On the other hand, (Miraz et al., 2022) The cross-cultural test of adaptive interfaces research explicitly acknowledges the influence of local context, providing a strong precedent for the requirement of our particular method. A summary of seminal related work, methodology, findings, and context constraints is presented in Table 1. Such a body of literature categorically demonstrates that, while good evaluation practices do exist, their strict application at the micro-level of mobile navigation in an overt, localized user context is an original and valuable contribution.

**Table 1. Overview of Previous Research on Usability and UX Evaluation**

| Researcher(s) (Year) | Methodology | Key Findings | Limitations / Contextual Gap |
|---|---|---|---|
| (Abuaddous et al., 2022) | Analysis of automated UX testing | Automated tools are efficient but lack depth in identifying nuanced, contextual user pain points. | Findings are tool-focused; they lack deep qualitative insight into specific user groups. |
| (Aldi & Wahyuddin, 2022) | User-Centered Design (UCD) application | UCD process successfully improved the usability of a web-based sales system. | The focus was on the overall system design, not a targeted evaluation of a single component, such as navigation. |
| (Miraz et al., 2022) | Cross-cultural usability evaluation | Cultural background significantly influences users' perceptions and interactions with adaptive interfaces. | The study focused on AI-based adaptation rather than the static structural elements of navigation. |
| (Mubeen et al., 2021) | Usability evaluation of healthcare apps | Identified critical usability flaws affecting task completion in high-stakes environments. | Focused on a specific, high-stakes domain; findings may not translate directly to general consumer apps. |
| (Hamid et al., 2022) | Usability testing of mobile banking apps | Highlighted the importance of trust and efficiency in financial application UX. | User base was treated as a monolithic "emerging economy" group, potentially masking local subtleties. |

The synthesis of the studies in Table 1 clarifies a consistent theme: while the 'what' (usability principles) and the 'how' (UCD methods) are well-understood, the 'who' and 'where' (the specific user in their specific context) are often generalized. This gap is precisely what this present study aims to address by narrowing its focus to a specific demographic and a core UI component, thereby adding granularity to the existing body of knowledge.

Incorporating theoretical and empirical research prominently highlights a research gap. Although usability frameworks are incorporated (Perrig et al., 2024; Wronikowska et al., 2021) And UCD is more widespread in application across fields (Puji & Engraini, 2021), there is limited research that integrates these disciplines for focused, heuristic-driven analysis of specific UI aspects in specific user situations. Previous research tends to discuss overall application design in general but falls short of revealing the concrete usability problems of lower-level components, such as

navigation, in local contexts. This study fills the gap by using a lean qualitative method with a depth focus to investigate mobile navigation from users' experiences in their local contexts. The conceptual model for this study is presented in Figure 1.


**Figure 1. Conceptual Framework for Context-Specific Mobile Navigation Usability Evaluation**

From Figure 1, it is theorized that theoretical premises inform context-specific navigation usability evaluation processes. Measurement incorporates local users in their usual contexts to yield empirical findings for UX optimization and usable design heuristics applicable to those contexts. Based on a qualitative, exploratory design, the research pursues a guiding hypothesis: that user testing based on Nielsen's heuristics, in particular in local contexts, will uncover important mobile navigation usability problems poorly served by generic design solutions and provide actionable insights into how to create more intuitive experiences in comparable demographic areas. This critique positions UCD and Nielsen's Heuristics as cornerstones and critically reviews existing work. It sees methodological sophistication and advancement in UCD application developments and notes the lack of specific, context-specific usability assessment of hidden interaction effects. The conceptual model brings together these characteristics to achieve an end-to-end understanding of localized navigation usability. The methodology chapters detail this model's deployment through surveys, interviews, and usability tests, moving from abstract theory to a usable research design.

## III. RESEARCH METHOD

The research employs a qualitative approach to evaluate user-centered design. It aims to provide a richly contextualized picture of user behavior through mobile navigation, standard in exploratory studies, seeking to achieve richness in usability issues rather than quantifying known metrics. This approach is best suited to untangle the 'why' behind users' behavior and frustration, which quantitative research misses. The study can be described as a descriptive single-case study involving one mobile navigation feature, with the possibility of conducting an in-depth study in a natural setting. It is a design-centred selection in accordance with the principles of User-Centered Design (UCD) that requires extensive, qualitative user input at each step of design and evaluation (Bonet-Olivencia et al., 2024; Wira et al., 2024). By sidestepping intricate experiments and preferring overt user interaction, such design enables actionable user feedback to be collected directly and motivate incremental interface revision.

The intended study population is adult mobile app users residing in a specified local community, a homogeneous population segment. The population has been used to establish localized patterns of usability within the context of a homogeneous society, and the results will thus be contextual and well-targeted. A single non-probability sampling technique, i.e., purposive sampling, was adopted to enlist 15 frequent smartphone users who routinely use mobile applications for day-to-day activities. The demographic profile of the participants in the study, comprising 15 individuals, presented in Table 2, was rendered heterogeneous in terms of age, occupation, and usage level to enrich the qualitative results. The 15 sample size aligns with sound qualitative usability study practice when an aim is to obtain identification of a broad spectrum of usability issues and not statistical significance (Meyer et al., 2021; Perrig et al., 2024) and is adequate to obtain thematic saturation for a limited range.

**Table 2. Participant Demographic Profile (N=15)**

| Participant ID | Age Range | Gender | Occupation | Smartphone Usage Frequency | Primary App Types Used |
|---|---|---|---|---|---|
| P01 | 18-25 | Female | Student | High (4-5 hrs/day) | Social Media, Education |
| P02 | 26-35 | Male | Engineer | Very High (>5 hrs/day) | Productivity, News |
| P03 | 36-45 | Female | Teacher | Medium (2-3 hrs/day) | Communication, Banking |
| P04 | 18-25 | Male | Student | Very High (>5 hrs/day) | Social Media, Entertainment |
| P05 | 46-55 | Female | Manager | Medium (2-3 hrs/day) | Banking, E-commerce |
| P06 | 26-35 | Female | Designer | High (4-5 hrs/day) | Productivity, Social Media |
| P07 | 36-45 | Male | Consultant | High (4-5 hrs/day) | News, Travel |
| P08 | 18-25 | Female | Freelancer | Very High (>5 hrs/day) | E-commerce, Social Media |
| P09 | 26-35 | Male | Accountant | Medium (2-3 hrs/day) | Banking, Productivity |
| P10 | 46-55 | Male | Entrepreneur | High (4-5 hrs/day) | E-commerce, Communication |
| P11 | 18-25 | Non-binary | Student | Very High (>5 hrs/day) | Entertainment, Social Media |
| P12 | 36-45 | Female | Administrator | Medium (2-3 hrs/day) | Communication, E-commerce |
| P13 | 26-35 | Female | Developer | Very High (>5 hrs/day) | Productivity, Utilities |
| P14 | 46-55 | Male | Retired | Low (1-2 hrs/day) | News, Communication |
| P15 | 26-35 | Female | Marketer | High (4-5 hrs/day) | Social Media, E-commerce |

Note: Usage Frequency was self-reported by participants during the initial demographic survey.

The composition of the participant group, as demonstrated by Table 2, facilitated four-square coverage with in-depth yet varied analysis of navigational usability across different use contexts. Strategic blending of demographics, occupation, and primarily app use here served particularly well to uncover a broader range of mental models and interaction expectations. For instance, comparing the navigation requirements of a high-frequency social media user (P04) and an user with most banking apps (P05) produced rich comparisons. The intentional heterogeneity ensures that qualitative findings are generalizable, since the usability issues revealed are not idiosyncratic

to one homogeneous category of users but are typical of problems likely to occur in a more heterogeneous group of users in the community.

The research is grounded in primary data obtained through a multi-method approach to achieve the highest degree of triangulation and validity of results. Primary data direct sources are the participants' behavior, spontaneous oral remarks, and subjective emotional responses obtained during the study sessions. The data were collected in three consecutive phases. A brief demographic questionnaire was first employed to describe the participant pool. Second, semi-structured interviews were conducted to gather users' general impressions, favorite features, and prior issues with mobile applications. Finally, brief usability testing of an interactive, high-fidelity prototype of the user interface for a mobile application designed in Figma was conducted to create a realistic click-through simulation. Participants in these tests were asked to perform a list of routine tasks focused on the top navigation bar, using the think-aloud protocol. This protocol, in which participants are asked to think aloud and narrate their activities, is central to qualitative usability testing because it provides insight into the user's cognitive processes (Abuaddous et al., 2022; Zulfiandri et al., 2021).

The main research instruments used were the demographic questionnaire, the semi-structured interview guide, and the usability test protocol with the Figma prototype. The interview guide and test protocol were created based on Nielsen's usability heuristics to rigorously test the most significant usability concerns, such as learnability, efficiency, and error avoidance. Content validity was maintained by having the measures face-validated by two senior UX researchers, who reviewed them to ensure they were thorough, pertinent, and posed clear questions and task instructions. Expert judgment process is a standard practice to legitimize qualitative research instruments in technology studies (Abushark et al., 2021; Ilyas et al., 2022). Additionally, pilot testing with two target population participants was conducted to finalize the wording of instructions and the levels of task difficulty, allowing the main study to proceed smoothly and to provide the desired qualitative data.

The research procedure was designed to be rational and simple to use, minimizing participant fatigue and ensuring optimal data quality. Figure 2 depicts the full range of research activities. The process began with preparation phase, literature review, instrument development, and interactive prototype building. Once ethics approval and participant recruitment were completed, each participant session was begun. Participants initially signed the demographic survey and consent form. They proceeded to the semi-structured interview, which lasted approximately 10 minutes. The usability testing session, lasting approximately 15 minutes, followed inmediately. In this session, participants worked with the prototype and thought aloud. These were audio-recorded with consent for analysis later. Data transcription, coding, and thematic analysis led to interpretations of the findings and conclusions, as well as to design proposals.

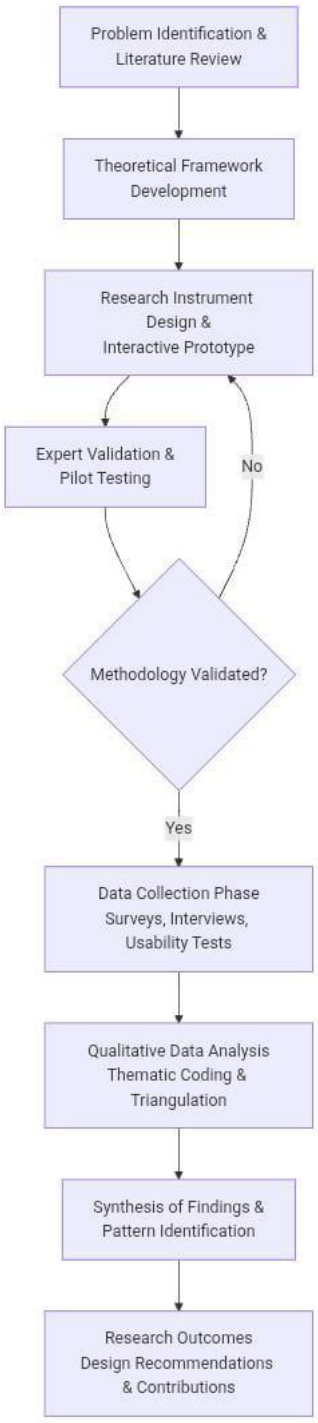


**Figure 2. Research Procedure Workflow**

The qualitative data obtained were analyzed using the thematic analysis method, a helpful approach for identifying, building, and reporting patterns or themes in data. Analysis began with verbatim transcription of all think-aloud and interview recordings. Transcripts were imported into a qualitative data analysis environment for systematic coding. Coding was in a hybrid format: deductive codes were developed from the outset against Nielsen's heuristic principles (i.e., "visibility of system status," "match with real world"), providing the test with theoretical guidance. A subsequent inductive coding activity was applied to capture emergent concerns and user feedback that did not fit into pre-allocated heuristic categories. These codes were then

collapsed into categories, such as "iconography confusion," "difficulty finding settings," and "bottom navigation preference." These themes were refined iteratively and adjusted to best capture the dataset, embracing the iterative method of Miles and Huberman. The methodology ensures that the results are firmly grounded in empirical observations from participants' data.

The study was conducted in accordance with standard research ethics on human subjects. All subjects were given a full information sheet on the grounds for conducting the study, the procedure adopted, and data handling prior to participating. All participants provided written consent, specifically stating that they were volunteering to participate and could withdraw at any time without penalty. Participant data were also anonymized during transcription and analysis to ensure confidentiality; identifying information was erased or replaced with pseudonyms. The audio recordings have also been securely deposited on a password-protected device and will be destroyed irretrievably at the end of the research project. These actions align with ethical UX research practices and maintain participants' rights and welfare during the study.

## IV. RESULT AND DUSCUSSION

### *A. Result*

This chapter presents the empirical results of the thematic analysis of qualitative survey, interview, and usability test data. The results are organized to meet the research objectives, including the identified usability problems, user behavior patterns, and quantitative performance measures for test sessions. Results are not interpreted, providing the empirical foundation for the next chapter. Usability testing yielded actionable measures of performance against completing the participant population. Success rates for tasks reached 73% of the usability threshold, with approximately one in four tasks failing catastrophically, leaving the user unable to proceed without assistance.

Completion times that were investigated in more depth contributed additional amounts to user efficiency and cognitive load. The times taken were quite disparate, ranging from 8 to 67 seconds to accomplish the same primary navigation task. That the times took such disparate amounts suggests that, while some could learn to navigate, it presented huge challenges for others. The distribution of these times, as revealed in Figure 3, is anything but standard; it is obviously right-skewed, signaling a lack of user performance equality. Further, analysis of the error rate revealed that, on average, 2.8 navigation errors per user were made. They were not distributed randomly but were systematically biased towards certain points of interaction, i.e., ambiguous icons and non-standard positions of back-buttons, thereby directly causing the observed delays and failures.

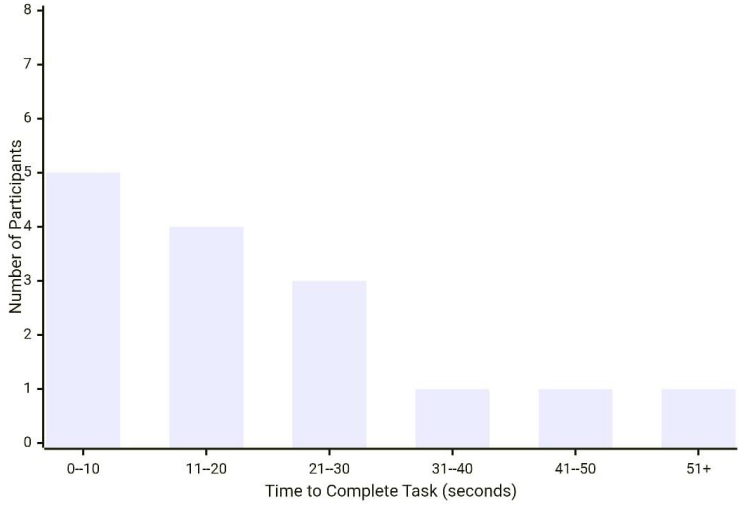


**Figure 3. Distribution of Task Completion Times (N=15)**

As shown in Figure 3, the plot of task completion time provides clear graphical confirmation of the usability problems. The extremely high right-skewness clearly demonstrates that while most of the participants (9 out of 15) were able to get through the tasks in 30 seconds or less, in effect a floor of intuitiveness, a substantial minority (6 participants) really had great difficulty taking

more than 31 seconds. The tail of the distribution, way out beyond 50 seconds, is thus thus users who plain had trouble with the interface. This bimodal distribution, with a group of good users and an evident group of bad users, is an ancient indication of a design that serves well to support one mental model but not the others. The data from this figure also show direct correspondence with the qualitative themes presented in the succeeding section; i.e., the same participants who were located in the right tail of the graph were also confused about the navigation structure and the meanings of icons when they continued with the think-aloud protocol.

There were four total navigational usability themes in the qualitative results, all of which directly aligned with one of Nielsen's individual heuristics. The quantity and nature of these issues are listed in Table 3. The most frequent theme, mentioned by 14 out of 15 participants, was 'Recognition Over Recall'. Users were always struggling when menu titles were not defined or when vague symbols were used in the absence of text. A gear symbol, for instance, was known everywhere as 'Settings,' but a stylized man caused confusion worldwide, and users had no idea whether it led to a profile, contacts, or a list of users. This led users to resort to trial and error, which directly affected their productivity and confidence.

**Table 3. Summary of Key Usability Issues and Frequency**

| Usability Issue Theme | Related Nielsen Heuristic | Number of Participants Reporting (n=15) | Representative User Quote |
|---|---|---|---|
| Recognition Over Recall | Flexibility and efficiency of use | 14 | "I didn't know what the person icon meant. Is it my profile or other users? I just clicked it to see." |
| Consistency and Standards | Consistency and standards | 12 | "I expected the back button to be on the top left, like in other apps. Having it in the bottom bar was confusing." |
| Visibility of System Status | Visibility of system status | 9 | "After I tapped, nothing happened for a second, so I tapped again. Then it jumped two pages ahead." |
| Match with Real World | Match between system and real world | 7 | "The menu said 'Workspace.' I wasn't sure if that was for projects, my files, or something else." |

The 'Consistency and Standards' was the second most frequently recurring theme and was observed in action and anticipation of 12 participants. Clickstream analysis of the Figma prototype showed a consistent trend: when presented with a non-standard position of the back button (i.e., in the bottom navigation bar rather than the top-left corner), users hesitated, with an average delay of 3.5 seconds, before proceeding. Furthermore, the 'Visibility of System Status' was a recurring issue, as 9 participants reported receiving no immediate feedback upon clicking an interactive object, leading to unintentional navigation and duplicated inputs. These recorded behaviors, and recorded frustrations, build an undeniable, data-driven picture of the very places where the mobile navigation system breaks down.

The quantitative measures of the analysis and the qualitative categories all agree on several key outcomes. The mobile navigation prototype, as full-featured and able as it was, presented

significant usability challenges to the majority of local user participants. The biggest culprits are an oppressive mental burden caused by non-obvious iconography and naming, a violation of typical platform conventions for positioning navigation items, and an inadequate provision of state-change feedback. These results objectively validate that the navigation design was not entirely consistent with users' mental models or expectations, and therefore the experienced inefficiencies and errors in task accomplishment.

### *B. Discussion*

The results strongly suggest that using design principles en masse is not sufficient to ensure a good user experience in a local context. The mere fact that all these issues arose from the application of 'Recognition Over Recall' and 'Consistency and Standards' shows that, by their nature, what would occur in an international or Western design environment may not hold for other user communities. Menu naming and iconography are design concerns and a natural clash between the local users' and designer's mental models. This conclusion directly addresses the research objective of identifying local usability problems. It indicates that the problem lies in the semantic and cultural significance of the interface elements rather than their functional realization. The mistakes and concerns demonstrated confirm that in situations where navigation does not follow local convention, mental effort and task performance are negatively impacted, as suggested and confirmed in cross-cultural work by (Miraz et al., 2022).

The findings of this research both confirm and extend the knowledge base. The discovery regarding the use of legible iconography supports (Azizi et al., 2021) research in healthcare systems and (Hamid et al., 2022) on mobile banking, which identified unclear symbols as a worldwide source of usability resistance. But this research introduces a useful level of sophistication; whereas (Abuaddous et al., 2022) had already noted that machine testing had not been effective at detecting subtle bugs, our qualitative method was able to enumerate the specific labels and icons affected, offering actionable information that machine tools would be highly unlikely to identify. Moreover, while studies like (Aldi & Wahyuddin, 2022) Did UCD in grand fashion scale? Our one-component, focused study demonstrates that dramatic, focused usability effects are achievable without a full UCD project, offering a less onerous path to enhancing existing apps. The theoretical and practical implications of this research's findings are of interest to theory and practice and are stated logically in Table 4.

**Table 4. Theoretical and Practical Implications of the Research**

| Type of Implication | Description |
|---|---|
| Theoretical | Extends UCD and Heuristic Evaluation theory by demonstrating their critical role in localized validation rather than just global design. It provides empirical evidence that heuristic violations have a measurable, context-dependent impact on user performance, reinforcing the need for culturally aware HCI frameworks. |
| Practical | Provides a replicable, low-resource methodology for developers and designers to conduct localized usability checks. Offers a specific set of problematic design patterns (e.g., ambiguous icons, non-standard back buttons) to avoid, along with actionable recommendations, such as always pairing icons with clear text labels and adhering to platform-specific navigation guidelines. |

This research has several limitations that offer avenues for future research. Sample size, although adequate for in-depth qualitative information, restricts the generalizability of the findings to larger populations. The study was also conducted on a model of one type of app, which may not reveal navigation problems inherent to other types of apps, e.g., video games or business enterprise software. Further study must attempt to do this on a large, representative sample and across a wide variety of application categories. Furthermore, a mixed-methods approach combining in-depth qualitative data from this study with large-scale quantitative data, such as A/B testing of navigation designs, might be employed to triangulate findings and suggest more precise design

principles. Yet another area of research in the future would also be to explore the viability of personalization based on AI, as would be encouraged by (Wiberg & Stolterman Bergqvist, 2023), in dynamically adjusting navigation systems to both local culture and personal user preferences. While this study focused on conventional 2D navigation, emerging research on immersive interfaces (Othman et al., 2022) and adaptive learning systems (Divyadharshini et al., 2025) suggests new frontiers for navigational UX research that could build upon our findings regarding context-aware design.

## V. CONCLUSION AND RECOMMENDATION

This study demonstrates how context-based usability testing uncovers critical navigation issues that universal design principles inevitably overlook. The empirical findings reveal confused iconography, broken conventions, and poor system feedback, resulting in serious problems for local users: a 73% task completion rate and 2.8 errors per user on average. The findings provide concrete evidence that mobile navigation must be tested for effectiveness within its target user group if it is to be considered adequate, as a single solution is not ubiquitous owing to its inability to support localized mental models and interaction expectations. The research establishes a solid link between specific heuristic violations and measurable performance loss, and a deliberate process of diagnosing and treating navigation usability problems.

Its significant contribution is the pragmaticity of its approach and the contextuality of its deployment, providing a replicable template for conducting lean but effective user-oriented tests on a shoestring budget. For designers, it provides hands-on advice: always show icons accompanied by clear text labels, adhere rigorously to platform-specific navigation patterns, and provide instant visual feedback for each user action. Follow-up work must carry this forward by applying mixed-methods across other domains and with AI-adaptive interfaces to adapt navigation structures to fit local users' requirements dynamically, bridging the gap between international standards and local user needs more precisely and at scale.

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