Searching For Nigeria: A Framework for Barriers to Information Seeking

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ABSTRACT

Mobile information seeking often involves search engines that are designed by Western cultures, but are used across the world. As we strive for a more global design, we have a need to evaluate the information seeking journey across different segments of the population in a structured and programmatic process. In this study we focus on qualitative insights from 84 participants to understand mobile information seeking patterns and barriers for users in Nigeria while developing a framework that can be used to assess information seeking across different regions. As this effort continues to evolve and scale, we can iterate on the framework with the intent of improving search engines for non-Western cultures. The framework has five domains: 1) Perception, 2) Infrastructure, 3) Input and output format, 4) Content and 5) Context.

CCS CONCEPTS

Human-centered computing~HCI design and evaluation methods • Human-centered computing~Field studies

KEYWORDS

Information seeking; Nigeria; HCI; search engine.

1 BACKGROUND

Access to information has implications on the experiences and quality of life. Many search engines were designed by Western culture for desktop, but are used globally on mobile devices and may overlook cultural or regional nuances for information seeking. Designing a search engine for global use with the expectation for it to work well for everyone is non-trivial given the varying degrees of information needs, cultural consideration, technology savviness, literacy, hardware, and internet infrastructure.

A significant amount of work has gone into researching and advancing the design of search engines resulting in improved algorithms or design best practices for user interfaces [1, 5]. Less research has been invested in developing a framework for evaluating search engines across regional segments of the population. Another aspect with limited development is the entire search journey that happens before interacting with the search engine, as most previous research focuses on the direct interaction and limitations with the search engine itself.

1.1 Related work

Substantial research efforts have pushed the design and technology of search engines including the user experience by improving mental models overtime [2]. However, there is a steep learning curve as users still struggle with query formulation and this is a fundamental aspect of the design [1, 2]. Even among Nigerian graduate students who reported being "somewhat confident" in their ability to use search engines, awareness of advanced search features is low [7].

Language and literacy are often barriers to information seeking. As seen in traditional libraries, we find limited content in local languages for Nigerians [3]. This challenge carries over to the internet as well, as most of the web content available in Africa is in English. As a result, people may be turning to other sources of information, such as social media where it is easier to create and post content in local languages. The social search trend has increased for other reasons as well, including use of local language, personalized answers, fun factor, timeliness, and local information [4, 6].

2 METHOD

We collected qualitative insights from 84 participants in Lagos and Ikaram, Nigeria. Lagos, has approximately 21 million people whereas Ikaram has an estimated population of 20,000 and is approximately 248 miles from Lagos. We included these regions to obtain a mixture of diverse perspectives.

This was a mixed-method research project with a remote diary study, in-depth interviews, and usability evaluation (see Table 1). The participant sample was a mix of gender and ages between 18-30 years old (see Table 2).

The diary study and in-person interviews were conducted in English. For the interviews, we had local members from a research

Method sample sizes	Lagos (n= 47)	Ikaram (n=37)
Diary study (7 days)	28	22
Home visits (120 min)	5 (paired)	4 (paired)
Usability sessions (45 min)	6	4
Expert interviews (120 min)	4	4
Intercept interviews (15 min)	6	7
Business owner interviews (120 min)	3	0
App developer interviews (120 min)	3	0

Table 1: Details for the 84 total participants. Note a subset of the diary participants were in the home or business owner interviews. The intercepts in Lagos were at a university, while the intercepts in Ikaram were at a local market.

Participant demographics	
Gender	37 female and 42 male
Socio-economic Class (SEC)	10 upper A/B class 36 middle C class 34 lower D class
Age	18-30 years old

Table 2: Participants had a mix of backgrounds. While all participants could speak in local dialects, interviews were conducted in English. Participants from the diary study, usability sessions, home and expert interviews were recruited and incentivized by a research organization.

Example of diary questions
Did you show someone how to do something today?
Did you manage your finances today?
Did you look up anything school or work related today?
What was the most useful information you were given today?
Did you seek any health information today?

Table 3: Example of open ended diary study questions.

agency attend for translation purposes and this was typically for clarification of technical terms for mobile devices, internet services, and colloquialisms.

The remote diary study gathered insights to best understand the broader information seeking and creation of information sources. The diary study involved a daily survey sent via email asking about mobile usage and common tasks (see Table 3). Insights were used to identify participants of interest, provide a sense of lifestyle, and surface scenarios of information needs and sources. In-depth interviews focused on examples of information needs, sources, and content creation.

Home interviews were conducted in friendship pairs which focused on examples of recent information needs and journeys. Expert interviews were held with tech-savvy locals that influence their community (i.e. internet café owner, mobile phone distributor, etc.). Interviews with small-medium business owners provided insights on how local services post business content online (i.e. Tailor shop, Fabric seller, etc.). App developer interviews were completed at Co-Creation Hub and provided perspective on local developer tools, content creation, and awareness of HCI processes.

Usability sessions were with mobile internet users and non-internet users. Sessions were in a 1:1 format at a rented facility. Participants reflected on recent information needs and carried out queries as part of the evaluation. Intercept interviews helped to capture a diverse perspective of participants that were not recruited from a database. These interviews focused on information needs and sources.

Insights were analyzed through a multi-day workshop with exercises including affinity diagrams, journey mapping, and thematic categorization.

3 FINDINGS
A framework for evaluating mobile information sources emerged from user scenarios throughout the search journey. There are five categories of barriers.

3.1 User perception
People need to see the potential of a search engine and a simple text field does not convey that. Due to the learning curve of search engines, exposure to meaningful information seeking may be limited to specific use cases like a research tool for academia.

Awareness of search engine capabilities were limited. Existing smartphone users were aware of basic search functionalities, but perceived search engines to have limited capabilities.

"Google is a website where we search for meaning of some words, and any assignment given to us in English." (P13- Teacher)

"I teach how to use Google so they can study better and be empowered." (P42- Internet café owner)

Expectations were defined by previous internet and search engine experiences. For first time internet users, there were no well-defined expectations so users were not sure what they could search for.

"[The internet] I heard it is where you can find anything." (P37- First time internet user)

3.2 Infrastructure of internet and hardware devices
Fast and reliable internet was not feasible for most participants. For this reason, many relied on lite apps with reasonable latency (i.e.Opera Mini, Facebook Lite).

Affordable internet access was a challenge with data costs being relatively high in Nigeria and limited broadband access in homes. This has led to high data consciousness around usage and management.

"Data is very expensive, but I get 1MB free for buying talk time every week. I use this to see Facebook. I get about 2 minutes of Facebook." (P21-Shoe shop owner)

Device constraints were high due to older Android devices with smaller screens making search navigation harder, limited RAM slowing down application usage, and minimal storage availability bogging down the operating system. Some users incorporated device management tasks that hinder access and notifications.

"The main problems are the battery and the network signal. the battery problem is due to the fact that the phone is old and the network signal in this community is weak." (P2-Homemaker)

"I turn data off. I don't just leave it on because it drains my battery." (P38- Office worker)

3.3 Input and output format
Input presented mild friction. New internet users struggled with typing due to low familiarity with the QWERTY keyboard format. Most pain points with typing input were related to older devices that lag. In these cases, alternatives like voice input is viable but users were not aware of this option due to low discoverability and interpretation of the mic icon used to trigger voice.

Engaging formats like videos and images were the expected formats due to other information sources like Facebook or Instagram which are very visual. Web search provided text heavy content that did not enrich the experience in the same manner.

"[Search engine] It is okay. It gives me the information I need. It's neither interesting nor bad." (P25- Student)

"[Queried: uniforms of military men] I have never seen pictures like this, only what I get in the newspapers." (P16- Self-employed)

3.4 Content quality of information provided
Language of results were typically in English, but were often irrelevant because content was from other English-speaking nations. For some local needs, users preferred to search in a regional language like Hausa, Igbo, or Yoruba, but knew from prior experiences that this will yield limited or poor results.

"I was searching for this sewing machine model for my business, but the only site selling it was in UK. I found one at the market and that is where I bought it." (P12- Seamstress)

Fresh content was limited to social media. While search engines provide a lot of information, it was not known as a source for recent news or local information.

"[How do you stay up to date on things?] I would find the latest from Linda Ikeji [Blogger]." (P4- Shopkeeper)

"[How would you check the status of the local political polls?] It's on Snapchat." (P17- University student)

Ecosystem of the local internet content will be imperative for the quality of results. Many users tried searching for local business information, such as hours of operation but were not able to find this online. Business owners were not familiar with how to create a website so they created a page on social media for their company as this was a familiar concept.

"[How are these search results created?] By programming." (P19- Restaurant owner)

(P4- Shopkeeper)

"I don't know but most information are produced by Google." (P35- Shopkeeper)

3.5 Context of information needs and overall journey
Repeat information needs like weather are simple and should be easily accessed with as few steps as possible and have potential to be surfaced proactively in feeds or notifications. Currently users must go through the mundane task of re-searching every routine need.

Multi-step information needs are journeys that require several steps to obtain the required information. For example, a mother seeking information about a balanced diet for her children searched online through a search engine and Instagram. Then she wanted to cook different recipes that contained all these ingredients by watching how-to videos on Snapchat and YouTube.

This took several queries on different apps and is likely a common need. Needs like this could be improved on by structuring information in a concise and relevant way based on information seeking trends.

> "I cook different recipes that contain all the classes of food to ensure my children eat a balanced diet." (P43-Businesswoman)

4 DISCUSSION

This framework allows us to programmatically evaluate the user experience beyond existing means, like task-based usability or log analysis, because these methods focused explicitly within the product interactions. This lacks an understanding of the user experience prior to the actual engagement with a search engine.

This framework approach captures the entire information seeking journey from perception and infrastructure, to the repeat search engine experience and allows us to understand barriers along the way. When building a search engine, we must fully evaluate the user experience.

In order to provide information access equally to all users, we need to ensure that users are aware of broader search engine functionalities, have options for limited device performance or data connectivity, are comfortable with the input options provided, can consume information in an engaging format, can find locally relevant content, can get all the material they need to complete their information journey, and are not inconvenienced by redundancies or additional steps.

5 CONCLUSION

Information seeking is a universal need, but the tools used for this need are not designed with a global perspective. As we've identified themes in barriers for users in Nigeria, we see an opportunity to address these hurdles while also finding a way forward to help us grow this effort to be inclusive of other regional perspectives by applying this framework in our process for future work.

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