

# ¿Donde está? – Surveying Local Search in Honduras

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## ABSTRACT

We present a user survey on the use of location-based search in Honduras, a developing country in Latin America. Our goal is to understand the current state of local search and the tasks people are trying to accomplish and gather insights into information seeking behavior. We survey early adopters in the form of students and staff of a university. The results suggest that due to specific characteristics, local search is rather underdeveloped in Honduras and people rely heavily on their social circle to gather geospatial information. This trend continues in a still weak local Web search that is focused on planning aspects and includes social networks as major sources.

## Author Keywords

Location-based search, user study, mobility, design implications, information seeking, Latin America

## ACM Classification Keywords

H.5.m. Information Interfaces and Presentation:  
Miscellaneous

## General Terms

Human Factors; Design

## INTRODUCTION

Location plays an important role for users in many Web search tasks. While many studies and qualitative analyses exist for the use of local search in highly developed countries, there is little information on this task for developing countries. For a geospatial search engine we are developing [1], we want to understand underlying user information needs and the current state of local search as well as user practices in the Latin American country of Honduras. All the more so since the principal investigator is a foreigner to the country and should minimize his cultural biases. Therefore the user study will develop an initial understanding and a basic overview about how people use location-based services and search. As initial informal discussions and inquiries suggested different behavior than noted in the literature, we set out to initiate a formal study to understand these differences. Honduras is a

rather poor developing country with a distinct digital divide. In this study we focus on the part of the population that already uses the Internet since these early adopters are the first to use location-based services and enable us to anticipate future usage. Most existing studies have been done in highly developed countries. Based on cultural differences, varying adoption rates and usage patterns, they cannot simply be applied directly to developing countries. We therefore examine their assumptions and results to arrive at a survey tailored to Honduras. This allows us to take hints from previous work but generate country-specific conclusions.

The Honduran characteristics of information on the Web and the real world it is supposed to describe as well as cultural and social backgrounds present many challenges that we assume to directly influence the way people gather information. We have previously identified specific challenges for a Honduran local search engine [1] and we revisit those that are relevant to this study. One major obstacle is the lack of Web coverage for Honduras resulting in only very little information available on the Web at all. For the country of 8 million inhabitants, we found less than 1.500 active .hn domains and we roughly estimate, including generic domains, less than 20.000 relevant to the country [2]. Additionally, there is also a very low information density in points of interest (POI) databases or at various location-based services. Furthermore, locations found on Web pages are often rather imprecise and might only mention a broad neighborhood or a boulevard that crosses the city which makes it almost impossible to pinpoint the location.

This granularity issue simply mimics the very imprecise addressing system found in the real world which sometimes only can identify broad regions. Many streets do not have names, sometimes whole areas remain without street names and street signs are also rare. House numbers are virtually unused. In old city centers, a grid system of rectangular *avenidas* and *calles* allows for block addressing, but for the capital, this covers less than 5% of the city. People also have severe privacy and safety considerations due to high crime rates and many dangerous areas. Transportation is mostly by motor vehicles. Often, small shops try to deliberately maintain a low profile to not be the victim of racketeering. All this seriously impedes Hondurans' ability to retrieve and use reliable location-based information. We expect this to considerably influence the content and context of their local searches.

## Social background

To better understand the expected background and population for Honduras, we first look at some socio-economic statis-

tics. Honduras is a developing country which ranks 121st in the Human Development Index worldwide, and is the sixth-poorest country in Latin America<sup>1</sup> with 60% of the population below the national poverty line<sup>2</sup>.

Despite these numbers, Internet use is rising fast, with 11% of Internet users in the population in 2010 up from 1% in 2000<sup>3</sup>. Yet actual computer ownership is at only 2.5%, making this still an unaffordable luxury for most. However, peoples' mobile cellular subscriptions are much more promising. From 3% in 2000, they have surpassed 100% in 2008 and were at 125% in 2010. This oversaturation can be explained by the practice of having mobile phones for different providers to take advantage of lower calling cost within each provider network. More reliable is the number of people actually owning a mobile phone, which was at 75% in 2010<sup>4</sup>, but does not include the use of shared phones. Unfortunately, we could not find numbers about the share of smartphones with Internet access, but informal estimates are around 10%, which hints that a lot of Internet use happens on mobile devices.

While the very unevenly distributed use of communication technology denotes a strong digital divide in Honduras, mobile phone and Internet use is rising. This is reflected in the strategies of mobile phone providers, who aim to cater to the bimodal use by offering initial smartphone solutions, but chiefly providing texting and USSD (menu-based dialogs) services. Overall, this means that Honduras is a latecomer but is quickly catching up, which makes local search a viable option for future applications.

## RELATED WORK

The use of local search by users in the developed world, especially the US and Europe, has been already studied intensively. Questions include what people search for and when, where, and why do they perform location-based search. The investigations range from the analysis of massive amounts of search data to specific in-depth surveys of few people.

Various studies have used search engine log analysis to look into the intention behind local queries and show that these cover a wide area of topics [11, 13, 18]. [12] give an overview of spatial information needs. A investigation into European mobile searchers from the unique point of view of a provider is done by [7]. The approach allows them to analyze queries to many different search engines including specialized or operator-based search, which gives insight into user's complete search behavior.

On the other hand of the spectrum are detailed studies of individual users to understand their personal contexts. For example, [6] performed a diary study to capture all information needs of their participants and collect their mobile, social, and location contexts and user's intent. Another approach is the

logging of searches on a mobile device with daily diary entries for the searches of that day. [3] performed this detailed diary study in London to examine the motivation and context for individual searches.

Some general results on how the mobile Web is used were given by, e.g., [9] who did contextual interviews to revisit and refine an activity taxonomy. [16] performed interviews with people who just switched to a new 3G smart phone to understand why and how people use them.

For developing countries, the most comprehensive overview on mobile phone use was done in a literature study [10] that reviews about 200 studies. It identifies as the main topics of research mobile adoption, mobile impact, and mobile inter-relationships and discusses exemplary use cases. An ethnographic study of 26 participants by means of interview and shadowing was done to examine the use of mobile phones to maintain a social network for migrant workers in cities in China [15]. It was noted that social interactions happen throughout the day, with little distinction between work and spare time, for non-factory workers. The use of mobile phones can be understood as a method of empowerment in developing nations. [4] analyzed patterns of mobile phone use in Rwanda with a joint approach of using demographic surveys and call detail records analysis of a mobile operator, additionally discussing other surveys done in the developing world.

## METHODOLOGY

The aim of the study is to understand how people in Honduras use location-based services and especially location-based search. We use a survey to quickly gain insights without high technological effort [14]. We therefore iteratively develop a paper-based questionnaire with a list of questions designed to understand use patterns for local search.

### Survey Design

Apart from very broad mobile phone ownership data and Internet use statistics discussed above, only very little is known about the actual usage patterns in Honduras. We therefore use an iterative approach to develop the questionnaire.

In a first step, open interviews were performed with three staff members and students of the university. The aim was to develop an understanding of meaningful questions and answers and to identify cultural biases that might result from the investigators' assumptions about the use of technology and the Web. This informed the development of the prototype questionnaire. In a second step, we conducted structured interviews with 3 employees and 2 students to refine the developed questionnaire by uncovering misunderstandings and ambiguities.

Given the special circumstances in Honduras, the development of the questions and answer options was informed by literature, by the preliminary informal non-structured interviews, and with an eye towards relevance and importance for the study's goal. We organized the questionnaire along the following questions: "How do people find out about places in

<sup>1</sup><http://hdrstats.undp.org/en/countries/profiles/HND.html>

<sup>2</sup><http://data.un.org/Data.aspx?d=MDG&f=seriesRowID%3A581>

<sup>3</sup>[http://devdata.worldbank.org/ict/hnd\\_ict.pdf](http://devdata.worldbank.org/ict/hnd_ict.pdf)

<sup>4</sup><http://www.latinobarometro.org/>

general?”, “What sort of local information are people searching for, and what are sources they use?” “What are spatial or temporal assumptions and contexts for searching?”, “What are perceived shortcomings?”, “How does the data situation influence local search behavior?”, “How do people deal with often very coarse or imprecise location references?”. We also ask for perceived shortcomings and ideas for improvements. In the last part of the questionnaire we ask participants to provide demographic information, describe the mobile phone they use, and request information about their background.

The questionnaire was made available in English and Spanish. For the analysis we translated Spanish answers to English. For questions about frequency or places of use, success or failure in searching etc. we use 5-point Likert scales. For other questions, we use multiple choice including an option for an open answer. In selected cases, we duplicate the multiple choice answers to also poll the primary choice. Qualitative data is collected using open questions to enable participants to explain their answers.

### Participants

The very strong social divide in Honduras leaves a skewed technology distribution in the population. A main part is the rather poor population that uses basic mobile phone services and texting services. They only slowly adopt additional services. The second part is the more technology-savvy population, who already use the mobile Web and expect more additional services, for example location-based search. It can be expected that the majority of the former does not use location-based services at the moment. To investigate current practices we therefore focus on early adopters. As, e.g., [16] noted, such users provide a good opportunity to investigate usage patterns ahead of time of broad use. Therefore, we survey students and staff of the Unitec university.

36 participants took part in the study. 23 males and 12 females filled the questionnaire during April 2012. One participant did not provide information about his or her gender. 30 participants were students and 6 staff, aged from 18–39 years ( $M=22.6$ ,  $SD=3.7$ ). Students were asked to participate in the cafeteria. We did not ask their major nor controlled for it. Staff members were approached during the day at their desks.

## RESULTS

Even though we made it clear that participation was voluntary and any question could be left blank, in only one case the personal information was not filled out. In a few other cases, parts of questions were left open, such as indicating the primary choice, which seemed rather like a mistake than a deliberate omission. Questions about their last local search, difficult queries, and ideas for improvement were the only other parts that were left blank in a few cases.

### Information gathering

Participants mainly search for local places and locations such as restaurants and bars, cinemas, shopping, and hotels (Fig. 1). About a third is looking for nature or parks, events, and sports. Around 20% are also looking for geographic information such as maps, directions, and traffic information.

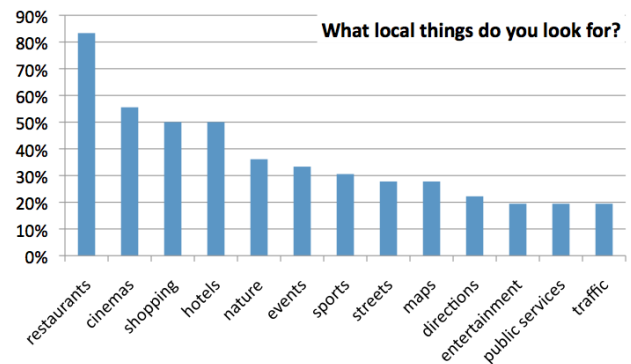


Figure 1. Percentages of answers that have been named more than once to the question “What local things are you looking for?”.

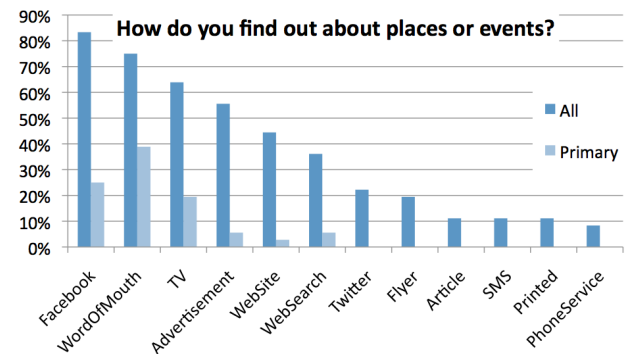


Figure 2. Percentages of answers that have been named more than once to the question “How do you find out about local things?”.

Asking for the *mode of discovery* for local information (see Fig. 2), we see a high number of mentions for word-of-mouth, for Facebook, and also for TV. These are also the most often used primary choices with few others mentioned. Word-of-mouth is stated as the primary means to receive information by almost 40%. Also advertisements in newspapers play an important role, followed by specific Web sites and Web search engines. This shows that a lot of discovery is happening outside the Web.

### Local Web Search

When we look more detailed at only *Web sources* used for local search, almost all participants use social networks (92%), followed by general (81%) and local (67%) Web search engines. However, the primary use is general Web search engines (50%), followed by local search (28%) and social networks (17%).

Participants’ desired *location of results* is mostly their own surroundings (60%), while the own house, the place of work, a route or just the whole city are similar at each 20% and the whole country at only 8%. Asked if they search for new or known places, participants on average state that they search for both almost equally ( $M=2.97$ ,  $SD=0.9$  on a five point scale from only new places to only known places). 47% of the participants mainly search for results that are relevant in the *time frame* of a week. 22% mainly search for results that are relevant in next hour or the current day. 30% mainly search for

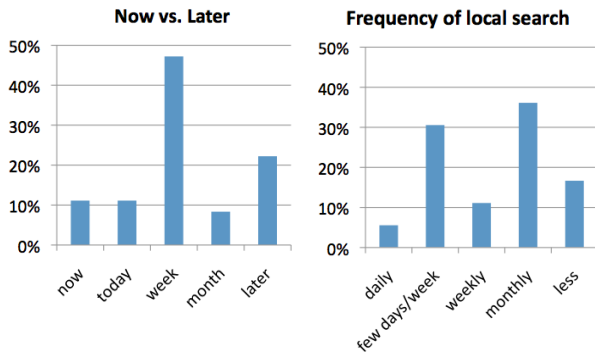


Figure 3. Percentages of answers to the question "Do you search for now or for later?" and "How often do you use local search?".

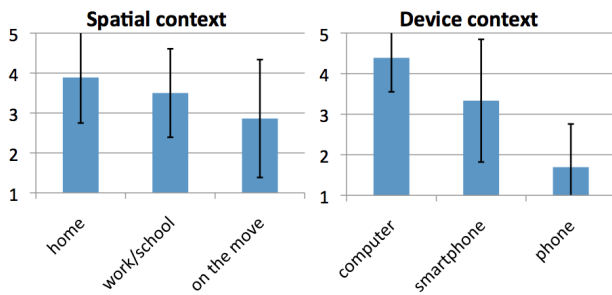


Figure 4. Frequency answers to the question "Where do you do local search?" and "On which device do you search?" broken down by Likert-scale frequency with error bars of the variance.

results that will be relevant in a month or even later. Fig. 3 also shows *how often* participants use local search. Most participants use it monthly (36%) or a few days per week (30%).

Looking at *where* people perform local search, it shows a preference for work or at home, while searching on the move is less prominent. Participants average rating on a five point scale (1=never to 5=very often) is shown in Fig. 4. There is virtually no correlation between searching at home and searching at work/school ( $r=-.07$ ) or searching on the move ( $r=-.06$ ). There is, however, a medium correlation ( $r=.34$ ) between searching at work and searching on the move. This means that participants using local search at work tend to also use local search on the move. The *devices* used for local search (see Figure 4) show that participants use computers most often, followed by smartphones and normal mobile phones. Landlines were not mentioned. A negative correlation between using a computer and using a smartphone ( $r=.42$ ) suggest that smartphone use is eating into computer use. There are virtual no correlations between searching on a mobile phone and searching on a computer ( $r=.01$ ) or a smartphone ( $r=.10$ ). The design of the survey does not allow for more substantiated insights into the rationale of device selection. Some respondents remarked that they often perform searches while at their workplace because they have a better Internet connection there or do not have Internet at home. Regarding the previous questions of searched locations, temporal aspects etc., there seem to be no significant differences between mobile or desktop local search. Considering the used devices, above 80% were using a smartphone, 70% of these

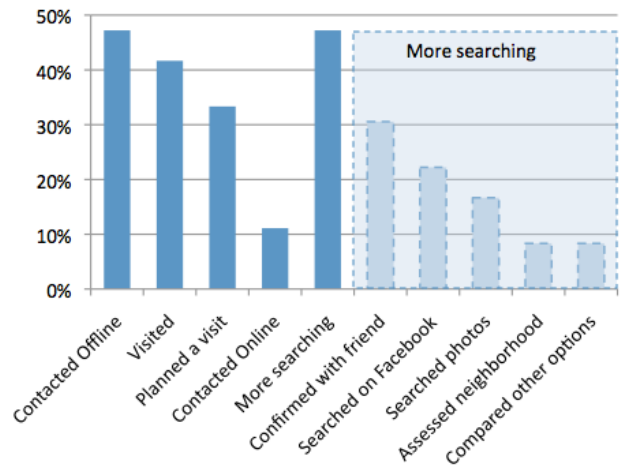


Figure 5. Percentages of multiple answers for "What do you do after a successful search?".

a Blackberry, the yet leading smartphone in the country, 13% an iPhone and 17% an Android device.

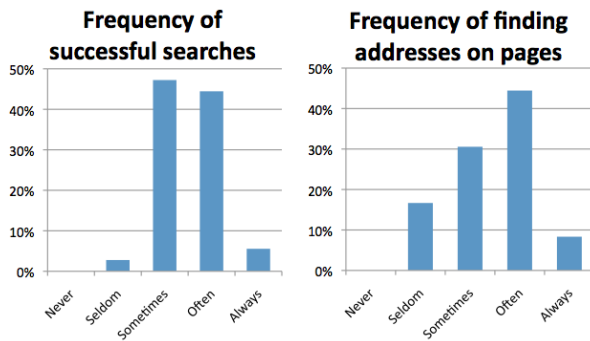
When asked how participants *interact with local search results*, apart from opening the Web page, they mainly contact the place by phone, visit it, or plan a visit (Fig. 5). Another main activity is additional searching to find out more about the place, which we have fanned out to show details such as asking friends, searching the Facebook presence or photos of the place, or assessing the neighborhood for safety.

### External factors

We also wanted to find out how people deal with the *imprecise addressing system*. 46% of the participants strongly agree with the statement that finding directions in Tegucigalpa (the capital) is difficult. On average participants rated the difficulty with 4.1 (SD=1.2) on the five point scale. There was only one participant who found directions easy to find but gave as a reason that he *had a lot of time*. Asked about the reasons for their rating most participants stated the lack of street names and street signs. One participant, for example, describes that *"the city is disorganized"*. The second most frequent reason is that information is often outdated. Asked about how they would *describe a location* to a friend 31 participants explained that they base their description on a well-known place (e.g. a government building, a mall, a church, a crossing). Then they describe the route to the location from there (e.g. *take a right at the gas station, left at the construction site, the small street up the hill opposite a kiosk, find the big yellow building with white doors*). Two other participants stated that they provide their friend with a position on Google Maps and one used both ways. The remaining three participants provided no answer.

We were also interested in how *safe* people feel about giving out their own location to local services. On a five-point scale from very unsafe to very safe, we received an average of 2.4 (SD=1.2). Reducing it to a three-point scale, 60% felt unsafe, 20% neutral and 20% felt safe.

Regarding the *data source* situation, we asked how often



**Figure 6.** Percentages of answers to the question "How often can you find what you are looking for?" and "How often can you find a location on a Web page?"

people can find what they are looking for. On a five point scale from never to always they rated it on average with 3.1 (SD=0.5) as shown in Fig. 6. Asked how often they can find an actual address on a page where they want to know the location they responded on average with "Sometimes" 3.0 (SD=0.7). We also wanted to find out if people might try to switch languages to get at better results. 39% said that they use English sometimes. However, this is mostly considered a backup option or is done for tourism or hotels, which, especially in the Caribbean regions, are mainly in English.

## DISCUSSION

The searched entities of local searches are not very different from other countries [11, 13, 18]. However, we gather from the interviews that most everyday places are known and are not actively searched. This coincides with the low number of overall local searches and the fact that searches for known and new places are rather equal, showing both discovery search and recovery search aspects [8]. Searching therefore seems to happen for rather non-ordinary places. However, still for those, in many cases, people search for places they already know or know a bit of. In many cases, this might only be a name of a place.

Interestingly, local search is currently not prevalent in Honduras. While people prefer their own surroundings for the results, 20% still give preference to just their city. We assume that this is often due to the fact that there are only few results available for the things people are looking for. One participant specifically remarked that he was happy to just find one result and was willing to drive through the whole city to get to it. The results also show that people do not yet use local search often and that if they do, it is spontaneous in only around 20% of all cases. There is little of the *here-and-now* mentality exhibited in developed countries where queries happen most often on the move (c.f. [6]). Yet, the local *here* part is still strong. For very acute information needs, it seems that word-of-mouth dominates the spontaneous search. Local search is more used as a planning tool.

Both the data source and the address system situation seems to pose problems even for people living in the city. Results strongly suggest a general problem in performing successful searches and almost as much difficulties in finding locations

for information found on the Web. Together with the general difficulty in finding directions within the city, the transition from the results of a search to actually being able to visit the place without additional help seems currently very difficult.

We also find certain trust issues with information found by local search. In many cases, people try to get additional information about places, such as getting the opinion of a friend, finding photos of a place or checking of the neighborhood is safe. This underlines the continuing importance of social confirmation in judging the quality and reliability of places.

## Implications

As our initial motivation was to better understand potential users of a Honduran local search engine, we will discuss implications and use cases along these lines.

A challenging issue is the underdeveloped addressing system leading to exact addresses being rarely used. The usually used form of giving locations is therefore a description involving a commonly known landmark, and then giving directions from there, sometimes including house characteristics such as color or size. One potential use case might be to also generate typical directions starting from well-known landmarks, either for a textual interface, to share a location with other people, or to use a textual descriptions instead of a navigation system. As we have seen, landmark navigation remains the strongest descriptor of places, with only a few people exchanging coordinates on a map.

The results show that people heavily rely on social networks, in particular Facebook, to find places. While one imperative would be the improvement of the data source situation, social networks have some characteristics that are beneficial to the participants. For example, they enable people to get confirmation from peers that a place still exists and is a good choice, which is important in a country where locations are frequently unreliable. In addition, people can confirm that a location is actually safe to visit. Also, they are a primary means of question answering from the social circle [17]. This implies that the integration of social networks is crucial for a local search engine. However, we have not yet investigated their specific limitations. In addition, it is important that users can use their existing social network to get confirmation from peers. This inclusion of social ties can help to improve upon the trust issues. Apart from a search engine, it might also be conceivable to start a crowdsourcing collaborative platform to input own information or annotate places and draw connections to other data sources or give recommendations.

Additionally, since local search has a less spontaneous and more planning characteristic, explicit planning support might be an interesting extension. Regarding the privacy aspect, people feel unsafe giving out their location because they fear robberies and kidnapping. Any service being developed needs to address this issue and allow to suppress any reporting of location activities. To access developed services, we conclude a Web interface is most important. A Web app as well as a mobile Web page would already reach most potential users. For the future, additional SMS-based solutions [5] might be considered as interfaces for the search engine.

### Limitations

The study focuses on early adopters and we used convenience sampling to select participants. As described above we assume that the average Honduran person does not use digital location-based services at the moment. Therefore, asking early adopters is the only viable approach to survey current local search practices. We still assume that our sample is representative for a large population and enables to anticipate future usage patterns.

Some participants did not answer all questions, in particular, open options. As most results collected using open questions are very consistent we assume that this did not result in biased conclusions. Some answers were less prominent in the survey than in the initial interviews and vice versa. It might therefore be possible that we did not include all answers in all cases. However, as the results are reasonably consistent for frequent answers we assume that we did not omit important answers.

### CONCLUSION

In this paper we investigated location-based search for Honduras. Using an iteratively developed questionnaire we analyzed people's current practices, potential users' interests, and requirements for local search engines. Focusing on early adopters the results can be used to predict future usage of the average population.

We found that the need for Honduran local search exists, but cannot be well met by any existing services. Honduras' characteristics influence the way people handle places and location-based information. The preferred information seeking mode remains word-of-mouth or existing knowledge about locations, together with a knowledgeable social circle. Online services have to cope with various shortcomings, but are being used as well, especially social networks, which people use to gather dispersed local knowledge. A successful local search engine will have to follow a hybrid approach and access a variety of data sources to provide a complete and reliable search experience.

This survey was undertaken to gain an initial understanding. It may be extended to the broader population but also include more detailed questions directed at requirements for future systems. We assume that the results can provide insights for other developing countries with a similar socio-economic background as Honduras. In particular, Central American countries have similar characteristics. They share a common history and language and are considered developing countries. Similarly, street names and house numbers are often not very common and people are still adopting to Internet usage. A very encouraging result for this study was that we were greeted with open arms and the participant's tenor was that the local search situation is very bad and any improvement would be greatly appreciated.

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