Mexico Connectado

Evaluating public internet access in Oaxaca, Mexico

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Background

Mexico Connectado is a public works program run by the Mexican federal government with the ultimate goal of reducing the “digital divide” across the country and simultaneously fulfilling the constitutional guarantee to broadband Internet for all Mexican citizens. The program seeks to provide internet connectivity in public locations including schools, medical centers, libraries, community centers, and parks. The program involves not only constructing computer workstations in dozens of schools but also installing WiFi routers in a variety of public spaces to allow for free internet access in these areas.

This project explores the current status of Mexico Connectado and other publicly available internet connection points in the capital city of Oaxaca de Juárez (referred to simply as Oaxaca) in the state of Oaxaca, Mexico. The goal is not only to determine which areas of the city and its surrounding towns have the greatest access to public internet, but also to evaluate potential new locations for connection points in areas that are far from existing connection points and that would serve the greatest number of people. Assuming that the target population of greater interest, most likely lower-income populations who may not be able to afford a computer or internet service, would walk to a connection point from their homes, this project analyzes distances over land to be traversable and those under 1km accessible with shorter distances being more preferable.

Methods

Data and shape files were downloaded from the National Institute of Statistics and Geography (INEGI), National School Information System (SNI), and from the Ministry of Communications and Transport (SCCT). Geographic and population data were current as of the 2010 national census. Elementary and secondary school locations and information were taken from national records for the 2014–2015 school year. Precise coordinates and type (Wi-Fi access point) of internet connection points installed through Mexico Connectado were available from the SCT and were current as of April 2014.

To illustrate the accessibility of public internet points, the Euclidean distance from current Mexico Connectado points and schools with internet was calculated. These distances were calculated to see the distance to the nearest connection point for higher scores, with areas outside of a 250m walking distance given a score of zero (1-2.5km or >2.5km or further). A final weighted score was calculated from these scores with Wi-Fi scores given (since the weightiness of the greater immediate accessibility to WiFi networks for both mobile devices as well as laptops and other portable electronics). The map of internet accessibility (lower left) represents areas with the shortest Euclidean distance to any connection point greater access, highest scores in dark green, while areas with the longest linear distance to connection points (lowest access, lowest score) are shown in dark red.

The same method was applied to the map of potential new Mexico Connectado locations, except that scores were reversed so that higher scores were given to areas further away from internet points but closer to schools without internet, as these areas would benefit most from additional public internet connection points. The overall score was then multiplied by population density for the block in the block with a higher population density would be weighted more heavily.

Results

The final map highlights green areas that would benefit most from additional public internet connection points. The insets below highlight an sample area that would be a good area for planners in Mexico Connectado to investigate further, as this area has many concentrated blocks of high population density but low internet accessibility. The third inset highlights a potential location for a new WiFi router within this study area: a small park that is surrounded by green blocks and is not close to other internet connection points. A different, more precise model would be needed to assess the ideal scores location for an additional location point and in impact on accessibility to this area.

This model aims to illustrate potential locations based on estimated linear distances to internet connection points and does not take into account other elements of accessibility such as road conditions, walkability, or use of other modes of transport. It also does not consider the capacity for connection at each point, for example, there are a finite number of computers at non-WiFi points, the range of WiFi networks, or internet cafes and other places where internet is available for a fee. While data on schools and Mexico Connectado points are current as of 2010, geographic and demographic information is from the 2010 census and may not reflect current or future block distribution or population numbers.

Despite these limitations, this model is still well suited to identify locations that are worth.

Sources

Geographic boundaries, streets, natural resources, and public buildings


Schools


Population density

The sample area has a very high population density by block, as indicated by the darker colors.

Potential new locations by block

Even though there are several publicly accessible internet points within the sample area, the model indicates that more public internet connection points would be highly beneficial, likely due to the very high population density of these blocks shown at left.

This photo, taken from Google Street View, is of a small park within the study area highlighted in dark green. While the park is well located within the block, the high population density coupled with the absence of internet access would make the park a strong candidate for a new WiFi location.

Conclusion

The potential for utilizing existing infrastructure to provide free internet access across Oaxaca de Juárez is clear. The model indicates that several areas could benefit from new internet access points. However, additional research is needed to determine the capacity for connection at each point, as well as the range of WiFi networks and other places where internet is available for a fee. Despite these limitations, the model is still well suited to identify locations that are worth investigating for new WiFi routers.