

The Household as a Digital Divide: Family Structure and Computational Skills in Mexico, 2024. A demographic and regional approach

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This study analyzes digital literacy among children and youth in Mexico from a demographic and structural perspective, emphasizing the role of household composition in shaping inequalities in computer skills. Using data from the 2024 National Survey on the Availability and Use of Information Technologies in Households (ENDUTIH), it is constructed a Computer Literacy Index (CLI) that synthesizes multiple digital competencies among individuals aged 6 to 24. The central objective of this paper is to determine whether the type of household in which children and young people reside is associated with systematic differences in their level of computational literacy, beyond classical demographic factors such as age and sex.

The theoretical approach is grounded in the broader literature on digital inequality, particularly in multidimensional approaches that conceptualize digital divides as extending beyond mere access to devices or internet connectivity. Drawing on Jan van Dijk's theoretical framework (van Dijk, 2005, 2012; van Dijk and Deursen, Van, 2014; Van Dijk, 2020), the study assumes that material access constitutes only one layer of digital inclusion. Skills, motivation, patterns of use, and the ability to translate technological engagement into tangible educational and economic outcomes are equally important. In this sense, digital literacy is understood not simply as operational familiarity with devices, but as a set of competencies that enable individuals to effectively manage information, create digital content, and potentially participate in knowledge-intensive labor markets.

International organizations such as the International Telecommunication Union (ITU) and UNESCO have emphasized the strategic importance of digital skills, especially among younger generations, often assuming that children and adolescents—frequently described as “digital natives” (Davydov *et al.*, 2020; Suša Vugec and Stjepic, 2022)—naturally acquire technological competencies due to greater exposure. However, empirical evidence challenges this assumption, demonstrating that exposure does not automatically translate into advanced or strategic skills. The present study aligns with this critical perspective by empirically examining the distribution of digital competencies within a nationally representative Mexican sample.

Methodologically, it is developed a Computer Literacy Index (CLI) using Multiple Correspondence Analysis (MCA). The index integrates seven specific digital skills: use of email; downloading digital content; creating text documents, spreadsheets, and presentations; copying files; installing peripheral devices; creating and managing databases; and programming in specialized languages. These competencies reflect a gradient from basic to advanced digital abilities, allowing the index to capture heterogeneity in skill levels. The first factorial dimension extracted through MCA explains approximately 50% of the total

variance, indicating a coherent underlying structure among the observed variables. The resulting scores are normalized using min–max scaling to range from 0 to 100, facilitating intuitive interpretation and subgroup comparisons.

The analysis focuses on three age groups—6–11 years, 12–17 years, and 18–24 years—and incorporates household type as a central explanatory variable. Household categories include two-parent nuclear households, single-parent nuclear households, extended households (including three generations), and other arrangements (such as composite or single-person households). Additional variables include sex, socioeconomic stratum, state of residence, and sex of the household head.

The descriptive results indicate that approximately 19 million individuals aged 6 to 24 use a computer, representing 49% of the total population in this age group. This suggests relatively broad but still incomplete digital access among Mexican children and youth. Computer use is nearly gender-balanced, with women accounting for 52% and men 48% of users, reflecting the narrowing of historical gender gaps in basic technological access.

Age emerges as the most pronounced dimension of inequality. The CLI shows a steep and consistent gradient across age groups. Children aged 6–11 exhibit very low average scores (17.2 points), adolescents aged 12–17 show substantially higher levels (60.3 points), and young adults aged 18–24 reach the highest levels (79.9 points). This pattern reflects cumulative learning processes associated with schooling, cognitive maturation, and increasing autonomy in digital environments. The findings suggest that digital skills are progressively acquired over the life course rather than automatically internalized in early childhood.

In contrast, differences by sex are minimal. Men and women display nearly equivalent average CLI scores (59.9 and 58.0, respectively), indicating that once access barriers are overcome, digital skill acquisition tends to converge across genders. This result aligns with recent international literature suggesting that gender gaps in digital literacy are narrowing, particularly in younger cohorts.

Socioeconomic stratification reveals a clear and ascending pattern. Individuals in the highest socioeconomic stratum achieve significantly higher CLI scores (78.5 points) compared to those in the very low stratum (57.5 points). The gradient is monotonic, underscoring the persistence of structural economic inequalities in shaping digital skill development. Higher-income households likely provide better-quality devices, stable connectivity, more conducive learning environments, and higher parental educational levels, all of which facilitate skill acquisition. These findings reinforce the argument that digital divides remain embedded within broader systems of socioeconomic stratification.

The core contribution of the study lies in its analysis of household type. The results show that young individuals residing in single-parent households exhibit higher average CLI scores (63.4 points) than those in two-parent households (58.4 points) and extended households (56.6 points). At first glance, this finding challenges assumptions that greater adult presence or larger family structures necessarily enhance educational support. However, the relationship becomes more nuanced when the sex of the household head is considered.

Disaggregating by headship reveals that two-parent households headed by women display higher CLI scores than those headed by men. Moreover, single-parent households headed by men achieve the highest values among all configurations. Single-parent households headed by women also perform better than extended households and male-headed two-parent households. These findings suggest that internal household dynamics—such as decision-making processes, allocation of educational resources, and prioritization of technological investment—may play a more decisive role than structural composition alone.

Extended households, characterized by multigenerational co-residence, register the lowest levels of digital literacy and show limited variation by sex of the household head. The greater complexity of these arrangements may dilute resources, create intergenerational technological gaps, or impose competing demands on time and attention. The results imply that digital skill development does not increase proportionally with the number of adults in the household, but rather depends on how resources and responsibilities are organized internally.

The territorial analysis further highlights spatial inequalities. Mexico City and Tlaxcala report the highest average CLI scores, ranging between 72 and 81 points. A broader regional pattern emerges, with states in the Central–Bajío corridor and the Northern Border exhibiting comparatively high digital literacy levels. In contrast, lower averages are observed along both coasts and in southern states such as Guerrero. These patterns reflect longstanding regional disparities in economic development, educational infrastructure, and technological diffusion.

Age-specific territorial maps reveal shifting regional strengths. For children aged 6–11, overall CLI levels remain low across most states, consistent with developmental expectations. Among adolescents aged 12–17, the pattern becomes more heterogeneous, with southern and central-northern regions showing intermediate levels. For young adults aged 18–24, several states—including Jalisco, Michoacán, Campeche, Mexico City, and Tlaxcala—reach scores between 86 and 91 points, indicating significant territorial variation in advanced digital competencies.

Overall, the findings suggest that the most significant inequalities in digital literacy among Mexican children and youth are structured by age and socioeconomic status, while household type introduces meaningful but moderate differentiation. The evidence challenges deterministic assumptions about family structure, indicating that digital skill development depends less on the number of parents or generational composition and more on internal household organization, educational priorities, and resource allocation strategies.

From a policy perspective, the study underscores the need to move beyond connectivity expansion as the primary metric of digital inclusion. While access remains necessary, it is insufficient for ensuring equitable digital skill acquisition. Public interventions should prioritize early skill formation, particularly among younger children and those in lower socioeconomic strata, and should consider the heterogeneity of household arrangements when designing educational support programs.

In conclusion, this research contributes to the understanding of digital literacy as a socially embedded process shaped by demographic structures, socioeconomic inequalities, and

territorial disparities. By incorporating household composition into the analysis, the study expands the demographic perspective on digital divides and provides empirical evidence relevant for the design of targeted public policies aimed at fostering equitable participation in the digital economy.

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