A Case For Supporting Translanguaging in Technology

Michael Han
San Francisco State University
San Francisco, USA
mhan2@sfsu.edu

Aakash Gautam
San Francisco State University
San Francisco, USA
aakash@sfsu.edu

ABSTRACT

Monolingual ideology prevails in technology. It is further dominated by the English language. The problem arising from monolingual ideology in technology is pronounced for individuals with limited digital literacy and English familiarity. We present a case study of two pairs of first-generation migrants and their children who completed a series of web and mobile-based tasks in their home language, English, and a different language. We highlight the various roles the children played in helping their parents use technology and the ways in which the pairs moved between languages to seek and provide help. We make a case to move away from monolingual ideologies in technology towards translanguaging, taking into account the rich language repository available to bilingual and multilingual users. We conclude by drawing three design considerations to nurture translanguaging practices.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; *User studies.*

KEYWORDS

translanguaging, inclusive design, migrant parents, multilingual, help-seeking behavior; tech use

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1 INTRODUCTION

Non-native English speakers face a myriad of challenges when using technology [12]. A significant problem stems from the prevailing monoglossic ideology embedded in technology design, which assumes that users are fluent in one language and bilingual or multilingual users compartmentalize their language repertoire when using technology [11]. This is especially problematic given that a large portion of technology remains English-centric.

The problem arising from monolingual assumption in technology design is particularly pronounced for individuals with limited digital literacy *and* English familiarity, such as first-generation migrants living in an English-speaking region [2]. These individuals are frequently forced to rely on systems such as website auto-translation or query translation aids that can be difficult to use and produce inconsistent or unexpected results. Further, when seeking help from their second-generation migrant children, the linguistic disconnect can lead to complications in help-seeking and help-providing practices. Moreover, we perceive a missed potential for design to encourage empowered technology use by elevating users' rich reservoir of languages as a useful asset [17]. This requires support translanguaging, a practice that views multilingual as having one unitary linguistic repertoire rather than segregated ones for each language [5].

In this work, we aim to understand the challenges and opportunities of technology design for bilingual and multilingual users. We present a case study of two migrant parents who were paired with their adult children[1] while they completed a series of web and mobile-based activities. We discuss the roles children played in helping, highlighting the linguistic movements that they needed to undertake in order to provide help. Acknowledging that translanguaging involves making use of "different social features in a seamless and complex network of semiotic signs" [7], we argue that technological design needs to consider the movements between languages and draw out three design considerations to nurture translanguaging: augmenting visual elements with multilingual descriptions to provide additional guidance, facilitating collaboration by supporting multilingual interaction, and reducing delegation using community-based overlaid tutorials. We offer this work as a starting point for a discussion within the HCI community on supporting translanguaging through design.

2 LITERATURE REVIEW: MONOGLOSSIC IDEOLOGY IN TECHNOLOGY AND LEARNING

Despite estimates that over half of the world's population is proficient in more than one language, the underlying design of technology products and interfaces has largely only focused on supporting monolingual interaction [12]. This has led to problems such as spell checkers marking words that are not from the main system language as spelling errors when multilingual users message using words from multiple languages [11].

García [5] proposed *translanguaging*, which recognizes that multilingual individuals have unified linguistic knowledge rather than compartmentalized proficiency in multiple languages. It regards multilingual individuals' use of multiple named languages as a practice that goes beyond these socially constructed language boundaries, so that instead of being limited to only one language at a

[1]We refer to them as "children" in relation to their parents. The "children" are adults who are currently in college.

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time, multilingual individuals can seamlessly make use of a complex network of language repertoire to attend to different tasks [5, 7]. Recent work has examined translanguaging practices as a resource in learning, such as in developing computational literacy [3, 14].

Translanguaging inherently aligns with the social use of technology, enabling people to leverage their diverse linguistic resources to make meaning, both individually and collectively. We believe that facilitating translanguaging practices can help multilingual adults develop their digital and language literacy. We see an opportunity to build on prior work that examined the role of family members in fostering digital literacy (e.g., [1, 2, 8]). Barron et al. [1] highlight the various roles parents play in supporting their children's computer literacy development, including playing a role as a teacher, project collaborator, consultant, and resource provider. We build on these scholarships by bringing together pairs of parents and their children and examining how they navigate through a series of web and mobile-based activities. We seek to understand the barriers parents face when using technology, as well as how parents and their children seek and provide help. In doing so, we explore the opportunities for technology design to move away from monoglossic ideologies and support translanguaging practices.

3 METHODOLOGY

After IRB approval, parent-children pairs were invited to complete two sets of familiar technology-based activities. We aimed to observe dynamics in scenarios where the help-seekers had a language advantage, the help-providers had language familiarity (English), or when there was no gap in language skills. So, the first set of activities consisted of online shopping in three languages: English, the parent's primary language, and a language that neither the parent nor children knew. The second set included tasks on a mobile prototype simulating iOS or Android operations in English and their home language. We did not assign them to operate the mobile prototypes in an unknown language because it had the risk of overwhelming them. Both pairs used iOS prototypes since both parents owned iOS devices. The activities were based on a prior study on mobile use among individuals with limited digital literacy [4]. Each set of activities consisted of the same tasks that were repeated across different languages, with the order randomized. The two sets of activities were divided into two sessions and took place on separate days. We interviewed the pairs at the end of the sessions. These activities functioned as probes to scaffold critical reflection on their daily technology use [16]. The parent-children pair completed the activities from their home. All of the interactions were recorded via Zoom.

We conducted multiple iterations of data analysis. First, we noted critical incidents. We showed those incidents to the participants and inquired about their thought processes and the interaction that transpired. We transcribed the recordings. We then began with an initial round of open coding followed by an iterative affinity diagramming, eventually converging on 33 higher-level codes.

We present findings from two parent-children pairs: a father-daughter pair who predominantly communicate in Taishanese (henceforth referred as P1 and C1 respectively) and a mother-son pair who primarily interact in Spanish (P2 and C2). Both the children (C1 and C2) are college students who grew up in the United States, primarily communicate in English outside the home, and expressed a lower level of comfort in their home language.

4 FINDINGS

Overall, the activities we designed for the study resonated with the participants' everyday experiences with technology. C1 confirmed that the activities mirrored everyday use, recalling that she typically helps P1 with "buying stuff from online store". Similarly, before adding items to cart, P2 browsed a few listings before picking an item exclaiming "I like this one" in English or Spanish. When asked about this, P2 responded, "I thought it was real. I wanted to buy this stuff!"

4.1 Language Movement When Providing Help

In assisting their parents with technology, children played multiple roles, including providing guidance and reassurance, collaborating, and accomplishing delegated tasks. Irrespective of the role, they moved between languages.

4.1.1 ***Building on home language to provide guidance.*** We noted that the children were helping by guiding akin to that of a teacher [1]. For example, when P1 was working on the task to add a LEGO item to his cart on Bestbuy.com, C1 guided P1 in Taishanese but also spelled out LEGO in English, scaffolding the exploration and ensuring that P1 was not overwhelmed. The children made use of existing visual elements and relative spatial locations to guide the parents in navigating the technology in non-home languages. For example, when helping P2 with Chinese Amazon page, C2 referred to the "Add to Cart" button as the "yellow rectangular button" in Spanish.

To provide guidance, the children relied on their knowledge of their home language and their knowledge of their parent's interests and technological abilities. P1, for example, copied and pasted words from the instruction sheet to search on all the different language websites they explored. When asked about this, C1 explained that P1 was not accustomed to typing because he primarily used the Chinese handwriting keyboard on his phone to type Chinese characters. Thus, to bridge this gap, C1 instructed P1 to use words from the study instructions as search keywords.

4.1.2 ***Leveraging digital and English familiarity to provide assurance.*** We observed greater instances of children instructing their parents to perform certain actions to progress through tasks, playing the role of a "nontechnical consultant" [1], assuring the parents that they were on the right track. Such assurances were critical, particularly in eliminating the parents' doubts or nudging them in the right direction when they were overwhelmed. For example, P1 was working on deleting a contact from the mobile iOS prototype. On the contact detail page in iOS, there is no delete option; instead, one must navigate through the edit link at the top right. P1, who was familiar with iOS, inquired in his home language if he should select the "Edit" option, and only did so when C1 confirmed.

In some instances, children relied solely on their technical and visual familiarity to assure their parents. For instance, at the beginning of online shopping activity on Chinese Amazon, participants

were required to login using the provided service account credential. Both P2 and C2 were unfamiliar with the site's language. Yet, C2, guided P2 through the login, assuring her that the field on the top was the username and the bottom field was for the password. C2 identified the components displayed on the screen using his knowledge of common design patterns and familiar visual elements. Throughout the interaction, C2 offered assurance to P2 in Spanish, their native language, but guided the activity with technical terms such as "login", "password", "control c", and "control v" in English.

4.1.3 ***Mutually exploring as collaborators.*** In some instances during the activities, the children did not know of a solution to the issue at hand, which required them to play a collaborator role [1]. The language barriers were more prominent in these instances. These interactions interspersed in home language and English where the English terms were often borrowed from the interface and functioned to scaffold the mutual exploration. For instance, during the activity to shop on the Bestbuy website, C2 relayed to P2 the next set of items that needed to be purchased, a chair and a desk as "un desk y una silla", Spanish for "a desk and a chair". P2 then used the term "desk" as the search keyword. In the same phase when shopping on Mexican Amazon site, C2 communicated the exact same message, but P2 searched the term "escritorio" instead of "desk" which they reported they use interchangeably.

The interchangeable movement in the language is not supported in the current technology ecosystem, which prominently came to the fore when P2 used the English word "chair" to search on the Chinese Amazon website. The query returned results that P2 had not anticipated. These returned items had the word "chair" in their listing title, such as hand-held purses and books. This observation highlights the limitation of monolingual search functionality for bilingual users. Systems designed with monolingual ideologies necessitate users to learn keywords in the specific language, limiting the portion of their language repertoire to interact with the system and reducing their ability to transfer their existing knowledge to different interfaces.

4.1.4 ***Bypassing language barriers by delegating tasks.*** The participants reported that there were instances when parents delegated technology tasks to their children entirely. Language barrier featured as a prominent factor in deciding to delegate tasks. For example, P2 recalled that she frequently asked C2 to attend to her work and doctor email, which were in English. Likewise, C1 recalled that, whenever P1 wanted to purchase items from online stores, P1 would ask C1 to complete his purchase by taking care of the checkout process. The language barrier along with the importance of the emails or the checkout process seem to nudge P1 and P2 to delegate the task entirely to their children.

The role as a delegate was not listed by Barron et al. [1]. We believe that playing a role of a delegate is a double-edged sword. On the one hand, delegating tasks can promote dependency and diminish opportunities for parents to learn technology. At the same time, delegation involves trust and is an act of care, of parent trusting their children to accomplish the task for them. Moreover, in situations where technology feels overwhelming or when parents need to accomplish a task within a constrained time, delegation seems to be the necessary approach to helping. Thus, we argue the need to find a balance such that parents can learn while the task is delegated. With careful scaffolds, help-seekers can see how the help-providers are working on the task and engage with it to the extent that they are comfortable.

5 DISCUSSION: MOVING BEYOND MONOGLOSSIC TECHNOLOGY DESIGN

We noted the various ways in which language barriers posed a significant challenge for the parents in completing the tasks, requiring the children to take various roles and use varied strategies. Regardless of the role or the strategy, the parent-children pairs consistently moved between languages to seek and provide help. Friction arose when the pairs moved between languages, especially due to the insistence in design that multilingual people compartmentalize language and use one language at a time [6]. Multilingualism, in design, is seen as a case of multiple monolingualism.

We argue that such monolingual compartmentalization is problematic. First, with technology development continuing to be English-centric, a monoglossic ideology deprioritizes the development of other languages, particularly those that are in the minority. Indeed, the lack of technology supporting minoritized languages has been identified as one of the factors contributing to the decline of language diversity [9]. Second, a focus on a single language does not enable multilingual individuals to build upon their existing strengths to learn to use technology. In fact, we saw how the expectation of multilingual people to do with each of their languages the same thing as monolinguals created a significant barrier to technology use. For instance, a participant used the English word "chair" on the Chinese Amazon site which returned many unwanted items such as purses or books, all of which contained the letters "c-h-a-i-r" but not the furniture that they were looking for. Since languages are compartmentalized in current search algorithms, they failed to accommodate the language practices of multilingual users, who often use words from different languages to communicate. In this case, the system failed to understand that the search contained terms from a different language altogether.

We noted how supporting multilingualism as one that maintains the multiple languages together such that it supports people in "drawing from the different contexts" [6] can be of value. In the same example, a few results were of chairs but they appeared in the search result because the merchant used the term "chair" along with the Chinese description to describe their product. The participants were able to find what they were looking for because sellers may have included the word "chair" to increase visibility, but the system itself failed to properly understand and interpret the search input.

5.1 Nurturing Translanguaging Through Technology Design

Reflecting on the interactions between the parent-child pairs and the social interaction that ensued between them while using technology, we draw out three design considerations to nurture translanguaging practices.

5.1.1 ***Augmenting visual elements with multilingual descriptions to provide guidance.*** In our study, the parents were able to understand and interact with technology by relying on visual cues such as images and videos. Further, their children, who were

helping them use the technology, relied on visual cues and referred to the UI elements. Prior research has explored visual elements as a scaffold in navigating technology and facilitating engagement [10]. We believe that visual icons can be augmented with multiple languages of the user's choosing to guide their navigation. For example, users can be supported to select multiple languages when they are navigating a page (e.g., Mandarin and English) and mark that they are learning the language. The subsequent changes on the website then could entail displaying translated text in multiple languages when the user hovers over an icon or other elements. Likewise, the webpage could allow users to see translations of the texts in multiple languages after they press a certain low-in-use key, such as the alt key. Such mechanisms recognize the different needs *and* strengths of bilingual users.

5.1.2 ***Facilitating collaboration by supporting multilingual queries.*** The growing use of voice-based interfaces and chatbots can exacerbate the problems emerging from monoglossic ideologies. Indeed, the inaccuracies in cross-language queries observed in our study suggest that interaction functionalities of technology should be expanded beyond its current monolingual capabilities. To this end, prior research has explored the use of cross-language information retrieval to improve multilingual users' information-finding experiences (e.g., [15]). However, to support translanguaging, we need to go further and examine ways to facilitate collaboration between people and also between the human-machine assemblage. User queries should not be restricted to a single language but rather our systems should interpret queries composed of words from different languages. Moreover, the system should promote transparency, showing how multilingual queries are interpreted and allowing users to restructure the queries. This, we believe would facilitate a collaborative exploration while overcoming the challenge of accommodating the possibility of words having multiple meanings in the same language and hold different meanings across languages.

5.1.3 ***Reducing delegation using community-created overlaid tutorials.*** Overtly delegating tasks can impede the learning process. Structures are required to balance the tension of asking users to complete the task on their own while also supporting them as they do so. Prior research has explored community-based tutorials as a support mechanism to enhance technical literacy among individuals with lower digital fluency (e.g., [13]). We believe that web and mobile applications could support helpers to create tutorials with demonstrations that are then overlaid on the system. The tutorials could entail recording either the entire screen while the helper navigates the system or a localized portion. In both cases, the system would record their helper's voice, allowing them to create tailored tutorials building on their familiarity with the help-seekers' technical and linguistic abilities.

In this paper, we focused on two parent-children pairs that allowed us to share nuances of their help-seeking and help-providing practices. English was one of the languages that our bilingual parent-children spoke which is the dominant language in technology use. It is unclear whether similar findings would arise when bilingual parent-children pair do not speak in English. Moreover, our study was further constrained by the use of specific activities via the website and mobile prototypes we created, and did not include an evaluation in the wild. Much work is required. Despite the shortcomings, we believe that this work constitutes an initial conversation in a long line of future research on supporting translanguaging in technology.

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REFERENCES

[1] Brigid Barron, Caitlin Kennedy Martin, Lori Takeuchi, and Rachel Fithian. 2009. Parents as learning partners in the development of technological fluency. *International Journal of Learning and Media* 1, 2 (2009), 55–77.
[2] Teresa Correa. 2014. Bottom-up technology transmission within families: Exploring how youths influence their parents' digital media use with dyadic data. *Journal of communication* 64, 1 (2014), 103–124.
[3] Andrew V Danilov, Rinata R Zaripova, Leila L Salekhova, and Nnamdi Anyameluhor. 2020. Developing Computer Literacy of Bilingual Students via CLIL Methodology. *International Journal of Higher Education* 9, 8 (2020), 19–23.
[4] Dennis F Galletta and Brian K Dunn. 2014. Assessing smartphone ease of use and learning from the perspective of novice and expert users: Development and illustration of mobile benchmark tasks. *AIS Transactions on Human-Computer Interaction* 6, 4 (2014), 74–91.
[5] Ofelia García. 2009. Education, multilingualism and translanguaging in the 21st century. In *Social justice through multilingual education*. Multilingual Matters, 140–158.
[6] Ofelia García and Rosario Torres. 2009. Monoglossic ideologies and language policies in the education of US Latinas/os. In *Handbook of latinos and education*. Routledge, 208–219.
[7] Ofelia García and Li Wei. 2014. Language, bilingualism and education. In *Translanguaging: Language, bilingualism and education*. Springer, 46–62.
[8] Carmen Gonzalez, Beth Bollinger, Jason Yip, Laura Pina, Wendy Roldan, and Carolina Nieto Ruiz. 2022. Intergenerational online health information searching and brokering: framing health literacy as a family asset. *Health Communication* 37, 4 (2022), 438–449.
[9] David Harmon and Jonathan Loh. 2010. The index of linguistic diversity: A new quantitative measure of trends in the status of the world's languages. *Language Documentation & Conservation* 4 (2010), 97–151.
[10] Indrani Medhi, Archana Prasad, and Kentaro Toyama. 2007. Optimal audio-visual representations for illiterate users of computers. In *Proceedings of the 16th international conference on World Wide Web*. 873–882.
[11] Manuel Pérez-Quiñones and Consuelo Carr Salas. 2021. How the ideology of monolingualism drives us to monolingual interaction. *Interactions* 28, 3 (2021), 66–69.
[12] Aung Pyae and Paul Scifleet. 2019. Investigating the role of user's English language proficiency in using a voice user interface: A case of Google Home smart speaker. In *extended abstracts of the 2019 CHI conference on human factors in computing systems*. 1–6.
[13] Laton Vermette, Shruti Dembla, April Y Wang, Joanna McGrenere, and Parmit K Chilana. 2017. Social CheatSheet: An interactive community-curated information overlay for web applications. *Proceedings of the ACM on Human-Computer Interaction* 1, CSCW (2017), 1–19.
[14] Sara Vogel, Christopher Hoadley, Ana Rebeca Castillo, and Laura Ascenzi-Moreno. 2020. Languages, literacies and literate programming: can we use the latest theories on how bilingual people learn to help us teach computational literacies? *Computer Science Education* 30, 4 (2020), 420–443.
[15] Ivan Vulić and Marie-Francine Moens. 2015. Monolingual and cross-lingual information retrieval models based on (bilingual) word embeddings. In *Proceedings of the 38th international ACM SIGIR conference on research and development in information retrieval*. 363–372.
[16] Jayne Wallace, John McCarthy, Peter C Wright, and Patrick Olivier. 2013. Making design probes work. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. 3441–3450.
[17] Marisol Wong-Villacrés, Aakash Gautam, Deborah Tatar, and Betsy DiSalvo. 2021. Reflections on assets-based design: A journey towards a collective of assets-based thinkers. *Proceedings of the ACM on Human-Computer Interaction* 5, CSCW2 (2021), 1–32.