Investigating the Intersection of Cultural Design Preferences and Web Accessibility Guidelines with Designers from the Global South

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Abstract

Cultural background influences aesthetic web design preferences, and aesthetic design impacts accessible design. However, limited research has focused on this intersection of cultural background and accessible web design. With the majority of HCI and design resources originating from the Global North, we investigated the conflicts experienced due to the cultural background of digital designers from the Global South and current web accessibility guidelines. We conducted a design activity and interview study with 10 designers from five countries in the Global South to identify how current web accessibility guidelines conflict with our participants' cultural design preferences. We found there are specific cultural challenges encountered in accessible web design, both at the design level (e.g., typography and color scheme) and within broader societal contexts (e.g., designer-client interactions). Our paper also offers suggestions from our participants to make the accessible design process more culturally inclusive by improving the web accessibility resources to become culturally customized and engaging more cultural perspectives in accessibility research and education.

CCS Concepts

• **Human-centered computing** → **Accessibility**; *Human computer interaction (HCI)*; • **Social and professional topics** → Cultural characteristics.

Keywords

Accessible Design, Cultural Background, Design, Non-Western Designers

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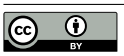

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1 Introduction

Cross-cultural differences play an important role in HCI research and design [63, 68]. Cultural backgrounds shape people's identity and can be displayed in the design of digital products such as web interfaces [21, 46, 74]. Cross-cultural HCI research on digital design has demonstrated that cultural background influences design in different ways, such as visual design choices and aesthetics (e.g., color, layout, typography) [20, 33, 46], and design methods [14]. Such findings indicate the importance of respecting cultural backgrounds to create user-friendly designs across diverse cultures [14]. However, the majority of research findings and design resources in the field of HCI originate from the West and Global North, which may not generalize to other cultures and, in effect, may exclude whole groups of users [5, 33, 47, 66].

In our paper, we will use the terms Global North to refer to groups from Western regions and Global South[1] for those from non-Western regions. This choice is informed by ongoing critiques of the Western/non-Western dichotomy, which some consider to be rooted in colonialist frameworks [18, 45, 76]. While there are debates surrounding the use of Western/non-Western terminology, we adopt Global North/Global South due to its increasing familiarity and acceptance within academic discourse, particularly in HCI [76].

The North-centric design resources can cause digital design marginalization, a digital divide, where certain users are disproportionately disadvantaged in broader social contexts beyond their immediate use of digital products [72]. Neglecting people from the Global South can lead to insufficient cultural inclusion in design resources, potentially marginalizing users in the region within the

[1]After the Soviet Union's collapse, "Global South" replaced "Third World" as a geopolitical term, referring to underdeveloped and developing nations [45]. According to Levander and Mignolo, *Global South is the location where new visions of the future are emerging and where the global political and decolonial society is at work* [45], and *from the perspective of those who inhabit the Global South, it is the struggle between institutions and actors who aligned with the global north* [45]. Global South is perceived to include Africa, Latin America, developing parts of Asia, and the Middle East [17]

global design landscape [47]. Research has suggested that some countries can have a homogeneous culture [51], while others have diverse regional subcultures within them, reflecting variations in cultural preferences. These variations are due to differences in ethnic identity (e.g., due to immigration), historical background, and geographical characteristics [36].

In our study, we recognize the cross- and within-country cultural differences and focus on web design in the context of accessibility within the Global South to explore the relationship between cultural backgrounds and accessible web design. We aim to support designers from the Global South in navigating their challenges in accessible web design. Achieving an accessible design is heavily dependent on design choices (e.g., aesthetic design choices) [32, 79], which can either enhance or hinder accessibility (e.g., text color not providing sufficient contrast). One way to guide designers in making accessible web design choices is through established accessibility guidelines, with the W3C's Web Content Accessibility Guidelines (WCAG) as one of the most widely used [11]. Considering that culture influences design choices [63], we argue that this influence extends to accessible design and how accessibility resources (e.g., guidelines and tools) account for cultural influences in design. This means that a designer's cultural preferences may conflict with established accessibility guidelines, creating unique challenges for the designers referred to as *cultural challenges* in our paper. Such conflicts can result in marginalizing certain regions and cultures by disregarding their values or excluding disabled people by overlooking accessibility needs [5].

Despite many studies exploring various cross-cultural research in the design area, the relationship between cultural background and *accessible web design* remains unclear. There have been discussions on the existing conflict between web design choices and the restrictions in accessibility guidelines [49, 79, 82], such as restrictions on color contrast in WCAG sometimes being seen as limiting visual creativity [49, 62]. However, these discussions often neglect the role that cultural background plays in shaping these conflicts.

We investigated the role of cultural backgrounds in accessible web design. To do this, we recruited 10 digital designers from five countries in the Global South and conducted a design activity and follow-up interviews. We sought to understand how established accessibility guidelines account for any cultural preferences in web design within the Global South, how cultural design choices and guidelines conflict, and how to better support designers in the Global South in overcoming their cultural challenges.

We found cultural challenges in the accessible web design process, categorized into two levels. The first level involves design-specific challenges, which arise directly from typography design, color schemes, and the use of white space. The second level encompasses broader challenges that affect accessible design beyond the design stage, including interactions with clients and web developers, as well as larger societal and institutional factors. We also found a need for more culturally customized accessibility resources, starting by acknowledging and addressing cultural aspects of typography design and color scheme, as well as wider research and improved education.

Our primary contribution is presenting the first study on the intersection of cultural background and accessible web design with designers in certain countries within the Global South. Our second contribution is identifying two levels of cultural challenges in accessible design, highlighting an overlook of cultural influences in the accessible design guidelines. Our third contribution is a set of recommendations for addressing the cultural challenges of the designers in accessible web design and how to expand this new line of research within the HCI community.

2 Background and Related Work

This section reviews the concept of culture and its influence on design. We then reflect on how current web accessibility guidelines overlook cultural design preferences, potentially creating challenges for designers from diverse backgrounds.

2.1 What Do We Mean By Culture?

The concept of culture is complex and used in various contexts. As defined by Hofstede, we describe culture as a common "programming of the mind" [35] influencing how we live, behave, feel, and think within a group which may not be entirely shared or understood by people outside of that group [85]. Interactional prompts within a culture often reflect common elements such as values and assumptions rather than uniform codes of behavior [68]. Several factors influence the formation and development of a person's culture, including the general behavioral norms and modes of interaction within a country [37], (e.g., a country's political orientation and social structure [35]), as well as within-country regional subcultures [36].

Most cross-cultural research in HCI focuses on a person's or a group's affiliation with a country [20, 44, 46, 68]. To facilitate comparisons between national cultures, anthropologists have tried to define culture with a definite set of constructs, such as the classifications suggested by Hofstede [35] and Hall and Hall [30]. Each of these classifications presents factors to help compare and measure national cultural differences between countries. There have been critiques on the limitations of *country* as a proxy for culture [78]. In response, our study adopts a broader understanding of culture, defining it as the shared values, beliefs, thoughts, preferences, and behaviors that exist among people at a country level, particularly the countries in the Global South. However, we acknowledge that culture can vary between regions within a country, known as regional subcultures, that are nested within the broader national culture [36].

2.2 Intersection of Cultural Background and Design

Cultural background plays an important role in the design process, as the design choices can be shaped by the cultural preferences of designers and users [46, 64]. Prior studies have emphasized how culture influences design such as aesthetic design choices (e.g., icon, color) [20, 38, 46], design for different languages [26], design and evaluation approaches [14, 16], information seeking and organization [12], and users' interactions [6, 7] and behavioral differences in using technology [65]. Research has also offered recommendations for culturally inclusive design, such as interfaces that automatically adapt to the user's cultural preferences [63] or usability practices

suitable for bidirectional design (i.e., designing interfaces in a language that consists of both directions: Right-to-left and Left-to-right such as Hebrew) [26].

Despite the extensive research in HCI and computing on cultural design preferences worldwide, most of the research originates from the West/Global North [5, 22, 47, 66]. These Northern-centric outcomes may not generalize to other cultures and, in effect, may exclude whole groups of users [33, 47, 66]. Linxen et al. [47] emphasized a Western domination, evident in the CHI proceedings between 2016-2020 [47], where the majority of research findings originate from Western, Educated, Industrial, Rich, and Democratic (WEIRD) countries. The authors recommended increasing the involvement of non-Western researchers, facilitating the recruitment of non-Western samples, and monitoring the geographic representation of study participants in future research [47].

There has been an increase in research focusing on the underrepresentation of certain populations within various HCI and Computing research areas [31, 42, 48, 53, 87].

centralization of HCI and design resources on the Global North standards, intended for global use, has led to the homogenization of design trends and websites, often overlooking cultural differences in web design [27]. This overlook causes a digital divide, where certain users in the world are disproportionately disadvantaged in broader social contexts [72], resulting in disregarding the rich variety of web design practices across different regions and cultures [27]. Studies in design and culture have emphasized the importance of localizing websites and have made recommendations for culturally inclusive design, such as design practices suitable for bidirectional design (i.e., designing interfaces in a language that consists of both directions: right-to-left and left-to-right such as Persian and Hebrew) [26] or interfaces that automatically adapt to users' cultural preferences [63].

For example, typography, as a key web design element, is greatly interrelated to culture. The design and creation of type in a written language go beyond mere aesthetics—they carry cultural values, traditions, and identity of a society [4]. Moreover, various cultures have distinct preferences when it comes to color schemes, necessitating specific choices in terms of contrast and saturation. Take Japanese websites, for instance, which tend to favor bright colors in their designs according to Čermák's research [13]. On the other hand, countries like Saudi Arabia and China often include traditional colors more prominently in their interface designs, as highlighted in the same study [13]. This cultural variation in color preferences not only adds depth to the aesthetics but also plays a crucial role in conveying meaning and resonating with the local audience. Another illustrative example is found in the work of Tang et al. [77], where they explored cultural differences in designs created by British and Chinese students who took the same design course. Their findings showed that designs by UK students indicated round shapes, fixed structures, and less creativity, contrasting with the designs by Chinese participants, which featured more complex structures, additional functions, and greater creativity [77].

The lack of attention to cultural nuances in design standards can result in the erosion of cultural identity, making it crucial to consider how cultural preferences align with or contrast the established design norms.

2.3 Intersection of Cultural Backgrounds and Accessible Web Design

We argue that cultural influences on web design extend to accessible web design as well. Accessible web design refers to web content designed to be inclusive to and usable by disabled people, using accessibility guidelines [71]. However, the alignment between cultural design preferences and established accessibility guidelines remains unclear. Potential misalignment between cultural design preferences and the web accessibility guidelines may result in marginalizing certain cultures by disregarding their values or excluding disabled people by overlooking their accessibility needs [5].

One of the most widely used accessibility resources is the W3C's Web Content Accessibility Guidelines (WCAG) [11]. Although available free for everyone to use, WCAG may not adequately address different cultural design preferences. For example, at the most fundamental level, there is no official translation for Hindi and Turkish, requiring international designers to use the guidelines in a non-native language. In addition, while WCAG was developed by experts around the world, it only briefly mentions cultural aspects, focusing on idiom translation, human language differences, and names [39], lacking in-depth discussions on how cultural background can influence design choices.

There are general discussions on the conflict between design choices and the restrictions in web accessibility guidelines [49, 79, 82]. For example, restrictions on color contrast in WCAG are sometimes seen as limiting visual creativity [49, 62], and studies have shown that 'visually clear' interface designs including abundant white space can be more accessible [49]. However, these discussions often neglect the role that cultural background plays in shaping these conflicts, potentially resulting in cultural challenges when trying to adhere to the established accessibility guidelines. Since web design choices vary between cultures [20, 46] (e.g., Japanese websites have been found to use more vibrant colors in their web design [13], and countries such as Saudi Arabia and China have been indicated to use more traditional colors in their web designs more commonly [13]), our research addresses the relationship between cultural background and accessible web design.

Research has shown insufficient accessibility support in the Global South [5, 58, 59]. For example, Barbareschi et al. [5] highlighted that most of the findings at the intersection of disability and technology in HCI venues are from the Global North, thereby resulting in accessibility and HCI research neglecting the needs of people from the Global South. Even though the authors did not discuss cultural aspects explicitly, they highlight a lack of literature on accessibility in the Global South [5]. Their argument connects to our study by emphasizing how the absence of region-specific accessibility research can exclude key factors such as educational [5, 54], economic [3, 24], and socio-cultural considerations [53] that impact designing accessible digital products.

2.4 Summary and Research Questions

In summary, despite the extensive research on the influence of cultural background in web design, limited studies have investigated how it can impact accessible web design. The predominance of Western-originated HCI and design resources leads to a homogenization of design practices, often overlooking cultural influences

in design. Our study explores how established accessible web design guidelines account for cultural backgrounds in design, with a focus on countries in the Global South, through conducting design activities and interviews with designers in those regions to answer our research questions:

- RQ1: What cultural challenges do the designers from the Global South face during the process of accessible design?
- RQ2: What do these designers need to make the accessible design process more culturally inclusive?

3 Method

Our study was approved by our Institutional Review Board before recruitment. We conducted design activities with digital designers[2] from Global South. After each participant completed their design activity, we conducted interviews to further discuss their cultural challenges in accessible design.

3.1 Study Material and Procedures

3.1.1 Recruitment. We recruited designers from the Global South who were at least 18 years old or above. It was important that participants grew up in their country for their formative and teen years since cultural identity forms early in life [23]. This ensured minimizing the possibility of exposure to the Global North cultures in the early stages of life.

We screened participants using an online survey. We advertised our survey through public social network feeds such as LinkedIn and Twitter, and also advertised through mailing lists run by other researchers in HCI and cross-cultural design areas. We also engaged with local design communities that were hosted on Slack workspaces, LinkedIn groups, and Telegram groups. We also encouraged people to share our study advertisement to reach a wider audience. We note that some of our advertisements were shared with groups whose members we did not know personally but who met the general criteria for our participants (i.e., digital designers). Due to recruitment challenges across multiple countries, as well as the increase in fraudulent participation in qualitative research [60], we recruited most of our participants through our public social networks and the local design communities that we trusted.

To identify the design expertise of participants, we asked them to clarify the type of digital designs they create (e.g., web app, mobile app) in the survey. In addition, we inquired about participants' professional titles (e.g., UX designer, Graphic designer, etc.). We also asked whether they incorporate web accessibility practices in their designs, the proportion of digital content they typically make accessible, and the accessibility resources (e.g., guidelines, tools) they usually use. These questions helped us gain an understanding of our participants' background in design and accessibility, shown in Table 1. Our participants were compensated with $50 for their time and effort.

Our study included three phases: first, the orientation meeting, then the design activity, and finally, the interviews.

3.1.2 Phase 1: Orientation Meeting Procedure. We conducted individual orientation meetings with our participants lasting 30-45 minutes to explain the study goals, procedures, and materials. Using Google Slides, we previewed the agenda of our study to give an overview of our study phases. We dedicated some of the slides to providing our definitions of important concepts in our study, including cultural background, digital aesthetic design, and accessibility, to make sure that all of our participants had a uniform understanding of the concepts.

We presented an example comparison between the Japanese and U.S. Yahoo websites to illustrate the connections between our concepts, highlighting key aesthetic design differences. The Japanese web design featured more text, icons, and colors, while the U.S. version appeared more minimal. We then expressed curiosity about how such cultural influences in design might intersect with accessibility, encouraging our participants to reflect on it during their design activity. To avoid influencing our participants' design choices and researchers' cultural bias, we chose a Japanese web design example, a culture different from our participants' and researchers', as none of us were from there.

Next, we outlined the design activity, including tasks, materials, timeline, and deliverables (more details are provided in section 3.1.3), allowing our participants to ask questions or share any insights. If the participants were interested in proceeding with the study, they were given 2-3 days to confirm their design start time. We checked in with the participants twice a week to monitor their progress.

3.1.3 Phase 2: Design Activity Procedure and Material. We conducted a design activity lasting two weeks to learn how our participants navigate accessible web design and to explore the possible conflicts between their cultural design preferences and the accessibility guidelines.

Details on the design brief: We asked our participants to design a prototype of a local tourism website. Travel websites worldwide serve as a tool for promoting, attracting, and enhancing users' visit intention [28]. Users trust travel websites that address their cultural values [2, 86] and the tourism industry relies on online platforms such as websites for online marketing to engage with tourists [56] by integrating their cultural values [15, 41].

We instructed our participants to imagine they were hired to design a website for a local tourism company in their hometown, state, or country, depending on their preferences, targeting users from their own cultural background rather than an international audience [55]. We emphasized that the company's goal was to advertise its local business through the website, primarily targeting the local audience. This encouraged participants to incorporate cultural design elements that would appeal to users from their region.

Furthermore, we asked our participants to imagine that their manager requested an accessible website to ensure that the website is usable by people with disabilities as well. Considering the widespread use of WCAG,[3] we instructed our participants to use that as their primary accessibility resource. However, they were free to choose an alternative and explain their reasoning. We also highlighted that a prototype of one or two web pages would be sufficient to keep the task manageable due to the limited two-week timeline.

[2]We refer to the creators of digital content, especially experienced in web interface design, as digital designers, and for simplicity, we will use the term "designer".

[3]Web Content Accessibility Guidelines: https://www.w3.org/TR/WCAG22/

Example:

Design element	First choice	Reason?	Second choice	Reason?	Third choice	Reason?
Color scheme	 Turtle color scheme	It is a famous color combination in my country and people are most likely interested in this color in web and app design.	I decided to change the color scheme to coral 	After checking the accessibility of the color theme, I had to change it to make it accessible.	*Fill out if needed*	*Fill out if needed*

The table:

Design element	First choice	Reason?	Second choice	Reason?	Third choice	Reason?
Color scheme						
Letter spacing						
Word spacing						
Line spacing/ height						
Font style						
Other design aesthetics (add more rows if needed)						

Figure 1: The table in the design diary that participants were asked to fill out. The top table is the example we provided to our participants to clarify how they should fill out the table

Details on the design elements: Given the complexity of designing, we only focused on prototyping to streamline the design process for our participants. One's language is counted as an important aspect of their cultural background [4, 84], where each language defines its own visual conventions that affect the reading process [4]. Therefore, our participants were asked to design in their native language and, if not, explain the reasons for this choice. We encouraged our participants to carefully incorporate any elements that they felt would look appealing to and best resonate with their intended local audience. To ensure consistency, all participants used Figma as their design tool.

Documentation of the design process: We asked the designers to document their design process in a digital notebook we called the "design diary", including a table guiding designers to document their design elements. The table offered examples at the beginning of each row (Figure 1).

We explained that each row in the table represented a web design element, and the columns indicated the designers' choice of each design element. For clarification on how to fill out the table, we filled out the first row (top image in Figure 1) as a sample. The sample represented a Turtle color scheme as a design choice, and the reasoning for this selection is in the following column. Multiple columns were included to document changes in design choices and to identify if changes were linked to accessibility. Our participants could also add extra rows and columns as needed.

In the next phase, we interviewed our participants to further discuss their challenges in accessible web design.

3.1.4 Phase 3: Interview Procedure and Material. We conducted semi-structured online interviews via Zoom, lasting 35-50 minutes, and were recorded. The interviews were divided into three parts:

Part 1: We asked the designers to briefly describe their experience in the design process, including their satisfaction with their design: "*How do you like your design?*", the process of accessible design, and the main challenges they faced while making their design content accessible: For example, "*What was your biggest challenge in the accessible design process?*", "*Did you have to change any part of your design due to web accessibility guidelines?*", or "*Did you feel frustrated during the process of accessible design?*".

Part 2: We focused on our participants' design choices and the accessible design process, asking detailed questions about the reasoning behind each of their design choices and any modifications made, particularly due to accessibility. For example, if a participant

had to modify a couple of colors in their color scheme, we then asked "*Why did you change your color scheme?*" and "*Can you show us where in your design you used your colors?*"

Part 3: We inquired how our participants felt about the changes they applied to their designs, gathering their perspectives and feelings about the possible misalignment between their cultural background and the accessibility guidelines. We also asked questions about ways to improve the process of accessible web design for our participants, such as "*How do you suggest addressing cultural design preferences in web accessibility guidelines?*" or "*How do you think the misalignments between your cultural preferences in design and accessibility guidelines can be reduced?*"

3.2 Study Participants

We recruited a total of 10 designers from five countries in Global South, India (3), Indonesia (1), Nepal (1), Iran (4), and Turkey[4] (1). Our recruitment strategy (see section 3.1.1) led to more participants being from Iran and India, as two authors are from each of those countries. We recruited three participants through our public social networks, three through snowball sampling, and four from local online design communities.

Three of our participants identified as men and seven as women[5] with the age range of 23-38 (average=26.9), and 2-13 years of digital design experience (average=5.06). For detailed info about our participant demography, please see Table 1. We selected designers ranging from those experienced in accessible web design (9) to designers who never implemented web accessibility guidelines in their designs (1). However, even the designers with no prior accessible design experience indicated that they were familiar with accessibility concepts. Our participants, on average, make 55% of their design work accessible (Table 1 presents a demographic overview).

3.3 Data Analysis

We analyzed our interview data using Braun and Clarke's reflexive thematic analysis approach [9, 10], supported by screenshots of relevant design sections discussed by our participants. We used our Zoom recordings to transcribe interviews in Google Docs, helping us familiarize ourselves with the data. We used Miro (https://miro.com) for collaborative, remote analysis of interview data alongside design screenshots. Data analysis began with identifying initial codes in Google Docs and then organizing patterns in Miro. These patterns were categorized into final themes that addressed our research questions and the research team discussed the codes and themes through multiple rounds.

We do not report inter-rater reliability because it is not part of Braun and Clarke's thematic analysis. The results of our analysis are presented in Section 4, with participants identified by IDs (e.g., P1, P2).

[4]There is ongoing debate regarding whether Turkey should be classified as a Western/Global North or non-Western/Global South country. Therefore, we relied on our Turkish participant's own viewpoint that they considered themselves to be from the Global South, and counted as a developing country.

[5]We used gender options provided by the HCI Guidelines for Gender Equity and Inclusivity [69]

3.4 Positionality

The lead researcher of this study is from the Global South, residing in the U.S., and is experienced in conducting research with underrepresented communities in different countries. Given the qualitative nature of our study, our goal was not to generalize findings but to explore and describe human experiences in-depth [50, 73]. Recognizing the limited literature on the intersection of culture and accessible web design, we sought to study this topic further.

To ensure the neutrality of our study material and minimize potential biases stemming from the authors' positionality [50] and cultural backgrounds, we standardized the materials used in the orientation meeting across all participants. These included slides, information, and descriptions that were carefully designed to maintain neutrality throughout the study. For example, as highlighted in subsubsection 3.1.2, we used examples from a country that was not associated with either the participants or the researchers.

Moreover, to minimize bias in our data analysis, we focused on the content of the data itself rather than allowing the lead researcher's personal and cultural bias to influence interpretations. We involved all researchers in reviewing our analysis, ensuring a broader perspective and helping to identify any potential prejudices. This tactic ensured our interpretations of the data were well-grounded.

4 Findings

Our findings provide insights into our participants' cultural challenges during the accessible web design process. Through our thematic analysis, we identified cultural challenges on two levels (RQ1), (1) challenges that were exclusively related to the design process and the elements used in design and (2) challenges that our participants faced during the accessible design process that stems from institutional and societal factors.

4.1 Theme 1: Cultural Challenges at the Design Level

Our first theme highlights our participants' design-specific challenges during the accessible design process. These challenges were exclusively related to the design process and the elements used in the design, including typography, color schemes, visual illustrations, and the use of white space.

4.1.1 Different Typography Design Across Cultures and a Lack of Accessibility Resources Addressing Those Differences. The major challenge that our participants mentioned was related to the typography design. Typography is the art of making written language scripts legible and appealing, which plays a key role in reflecting cultural expression and communication. Accessibility guidelines such as WCAG and accessible typography guidelines from Google,[6] mainly focus on typography rules for Latin alphabets, especially English. While they acknowledge differences between Chinese, Korean, and Japanese languages with English, our participants highlighted that there are no specifics about their own native language in the accessibility guidelines.

[6]https://fonts.google.com/knowledge/readability_and_accessibility/introducing_accessibility_in_typography

Table 1: The table represents our participants' demographic information on their gender, age, country of origin, professional title, the area of design they have expertise in, how long they have been working as a designer, and the portion of their digital content they usually make accessible when creating a design.

ID	Gender	Age	Country of origin	Profession Title	Design Expertise	Years of design experience	Portion of design usually made accessible
P1	Woman	24	India	UX Designer & Researcher	Web-based applications	2 years, 5 months	50%
P2	Woman	27	Iran	UI/UX Designer	Mobile and web app	3 years	80%
P3	Woman	25	India	Behavioural Design Researcher, UX Designer	Mobile and web app	3 years	70%
P4	Woman	28	Turkey	Product Designer	Mobile, dashboard, web app	4 years	66%
P5	Woman	25	Nepal	UI/UX Designer	Mobile, web, desktop app	4 years, 8 months	83%
P6	Woman	24	Iran	UX Designer	Web-based applications	2 years, 6 months	50%
P7	Man	27	Iran	Product Designer	Mobile, web app, magazines	6 years	30%
P8	Man	38	Indonesia	Product Designer	Mobile and web app	13 years	80%
P9	Woman	23	India	UI/UX Designer	Mobile and web app	2 years	40%
P10	Man	28	Iran	Senior Product/UX Designer	Mobile and web app	10 years	0%

Our participants discussed typography design in Marathi (P1), Persian (P2, P6, P7, P10), Telugu (P3), Turkish (P4), Nepali (P5), Indonesian (P8), and Hindi (P9) languages, highlighting distinct differences between the visual and structural aspects of their native language compared to English: "*The writing of scripture [for the Telugu language] is way different, very different from Latin script (Figure 2a).*" (P3, India, Telugu language). The differences between scripts make the current accessibility guidelines on typography design (e.g., accessible typography guidelines from Google) unusable for all written languages:"*The default accessibility rules that exist for English or in general in the [Google] accessibility guidelines are almost unusable for Persian.*" (P2, Iran, Persian language). For example, character complexity in Persian is indicated by P2 to be more than in English characters, whereas, in Persian, many strokes and dots are involved. Such differences in structure require specific alignment and kerning[7] for the characters in the Persian typography design:

> "*As you can see [(Figure 3b)], we have one alignment line here [in the bottom text, the first and second horizontal lines from the top] and another alignment line there [in the bottom text, the second and third horizontal lines from the top]. These are the principles of Persian typography. We have specific heights for characters and ultimately for dots and strokes, which makes it much more complex [than English].*" (P10, Iran, Persian language)

Scripts can also vary significantly in length when representing the same phrase. For example, Indian language scripts such as Hindi and Telugu are longer compared to the same phrase in English. Therefore, the challenge is to fit the text into the design while maintaining adequate spacing (Figure 2b):

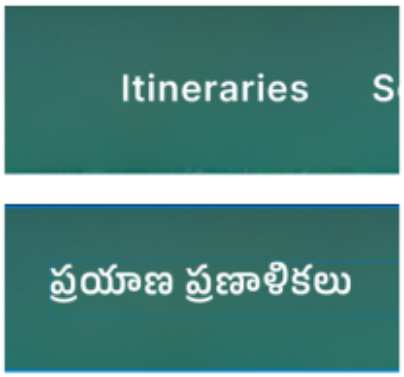
> "*For example, there is like, in English when we say "Itineraries"! "Itineraries" is only like one word right? But when coming to Telugu it becomes a 2-word thing. That again changes a lot.*" (P3, India, Telugu language)

However, the principles of typography design in different languages are overlooked in accessibility guidelines while they require unique attention: "*Regional languages need their own accessibility typography rules.*" (P3, India, Telugu). For example, Google accessibility guidelines for typography suggest that to avoid confusion, letters should not be visually similar. Applying this principle is challenging in Persian due to the different structures of the script: "*This was actually one of the English language accessibility rules, for example, that two letters should not be very similar, but how they become similar in Persian, whether they are similar or not, was the challenge here.*" (P2, Iran, Persian language)

Furthermore, P4 from Turkey highlighted the unique readability challenges posed by their language's morphological structure. They explained that in Turkish, adding different suffixes to a word can significantly alter its meaning, making it less straightforward to skim and understand compared to English: "*So "Elimizdekiler" is one word, but it all starts from El. So "Elimizdekiler", and "Elinizdekileris" are two separate words, and M, and N is so similar visually, too.*" (P4, Turkey, Turkish language). We found that our participants dedicated considerable effort during their design activity to researching suitable accessibility resources for their native language typography design, highlighting a key difficulty in accessible design: "*So with the accessible design process, how I interpreted it is my entire exercise of finding the accessibility resources and trying to apply it to designing in the Hindi language*" (P9, India, Hindi language). During their quest for researching accessibility resources, participants sometimes came across unexpected yet valuable materials. For instance, P7 discovered a book called "*Persian Design*" by Ardeshir Hakimi, that "*Explains Iranian design in comparison to Japanese and*

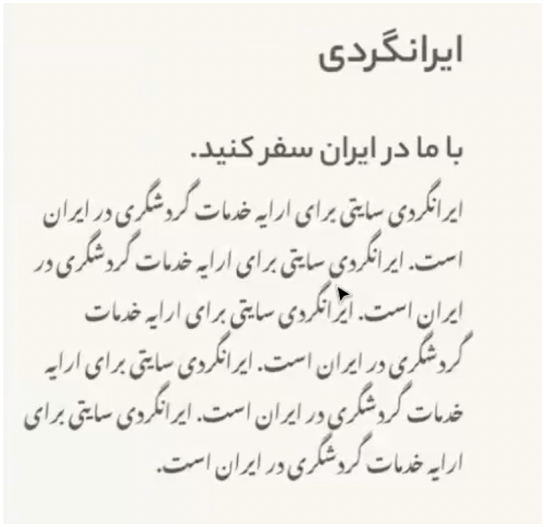
[7]Kerning is the contextual spacing adjustment between pairs or triplets of characters as defined in the font in certain situations while spacing refers to the overall distance between letters, words, and lines: https://learn.microsoft.com/en-us/windows/win32/directwrite/justification--kerning--and-spacing.

(a) An example of visual differences between English and Telugu written languages

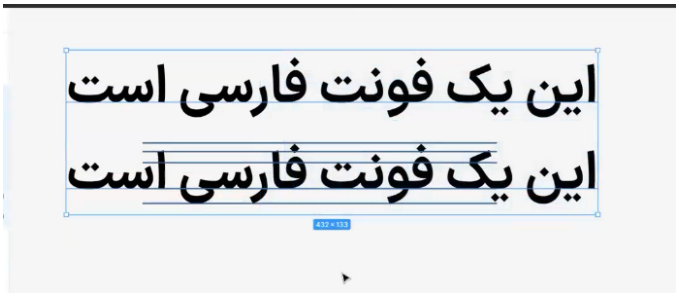


(b) Longer phrases in Telugu compared to English for the English phrase "Itineraries"

Figure 2: Differences in Telugu written language that our participants emphasized, showing how it differs from the English language.



(a) Some letters get too close when changing the line and word spacing in the Persian font above, as shown in the location of the cursor.



(b) Unique text alignments according to letters' strokes and dots in Persian.

Figure 3: Examples of spacing, text alignments, and kerning in Persian typography that from P2 and P10 emphasized.

American designs" (P7, Iran, Persian language). However, the book does not cover web accessibility.

Additionally, our participants highlighted issues with automated spacing settings in their design tool, Figma, as the auto-spacing settings in Figma might not be suitable for all languages. For example, Persian typefaces need specific spacing based on their unique typographic principles:

> "*When you want to work with this [Persian] typeface, the default spacing shouldn't be the generic auto-space. For example, hypothetically, the spacing should be 3 to 6 for this specific typeface.*" (P10, Iran, Persian language)

This results in typographic issues that make the text appear messy and difficult to fix.

Given the lack of accessibility guidelines tailored to different languages, typefaces are most likely created according to the guidelines for English: "*In Dana and Iran Sans fonts, accessibility is probably considered, but I don't think it's Persian language typography guidelines. The digital space is primarily based on English rules, and we adapt to it.*" (P7, Iran, Persian language) which pose challenges and frustration for P7 in the accessible design process.

4.1.2 Self-derived Tactics to Overcome Cultural Challenges in Typography Design. In response to the challenges with typography design in different native languages, the designers had no other

choice but to manually adjust the text spacing, which happens more frequently compared to designing in English: "*Depending on where you want to use it, you often have to change it [text spacing] manually. This happens much less in English.*" (P10, Iran, Persian language)

Our participants also had to rely on their own visual judgment and previous experiences to adjust the spacing causing cultural challenges for the designers:

> "*So when it comes to the particularities, [that] is where I'm facing the biggest challenge while designing in Hindi. For English, it's clearly laid out. For Hindi, it's like there's no proper information out there. So if, as a designer, I'm designing in terms of accessibility in the Hindi language, I'll probably do a lot of guesswork based on my own experience of how, visually, it appears legible.*" (P9, India, Hindi language)

Despite manual adjustments, P2 found out that spacing and kerning in certain Persian fonts (e.g., Nastaliq, a traditional font) still did not meet accessibility guidelines provided by Google and WCAG (Success Criterion 1.4.12 Text Spacing), with letters either too close or too far apart. As a result, P2 decided to give up on certain fonts to avoid the hassle and spacing adjustment challenges, as shown in Figure 3a.

In some cases, our participants had to rely on comparison where they used the current tourism websites in their region as a reference for typography and spacing adjustment as indicated by P6: "*I compare it [their design] with different sites to see if this [typography and spacing] is logical if it [the text] seems crowded to me, or if it seems too empty. For example, the spacing is too little or too much.*" (P6, Iran, Persian language). The lack of proper accessibility guidelines for native languages hindered P9 from learning to design in their own languages: "*So I do not really have the opportunity to go into the particularities of Hindi language.*" (P9, India, Hindi language). Consequently, some participants, such as P1, avoided using their native language (Marathi) and chose to design in English instead, finding it easier with the readily available accessibility resources.

4.1.3 Compromising and Modifying Visual Illustrations for Accessibility Compliance. Despite a shift towards more homogeneous Western-looking modern trends in web design, our participants valued incorporating cultural elements into their modern designs. They noted that design trends in their countries are rooted in historical, natural, social, religious, or ethnic contexts, such as choices like vibrant and popping colors to capture attention and for branding purposes: "*For the marketing purpose as well, they [the Nepali community] search for popping colors where they can like denote the color as a branding.*" (P5, Nepal).

Our participants had to be cautious with text colors to ensure they met the WCAG standard color contrast ratio with the background, which often meant using less appealing colors, compromising their initial design choices. Figure 4b shows two different interface designs from P2 where they changed their text color from khaki to gray:

> "*In that tool I used [WebAIM contrast checker], I saw that it [text color] wasn't very accessible: it didn't pass, so to choose another color, I had to make sure to prevent the color from being too ugly, I didn't want to use black either. I applied a kind of grayish color that is close to black and creates a good difference [with background].*" (P2, Iran)

For P4 "*[the changes of colors] was kind of major*" with some participants having to completely remove certain colors due to accessibility: "*It wasn't accessible [Iranian pink with gray color text] in the places I used it, and a darker shade of it [the pink background] wasn't the kind of pink that would be authentic Iranian pink, so for that reason, I had to completely remove it.*" (P2, Iran). This compromise resulted in losing elements of cultural authenticity in P2's design. Color compromise for P8 was partly related to the ornaments they used in their design, where they had to change the ornaments' color in the footer multiple times. See Figure 4a for the process of the ornament modifications.

In addition to the color scheme in design, P5, P6, and P8 discussed additional web design elements they added to their design diary table, including white space and visual illustrations. For instance, "*in Nepali designs, you'll find lots of cases where they say, avoid white space, avoid white space*" (P5, Nepal), in Indonesian design, there are crowded traditional illustrations (Figure 5a), as well as authentic geometric shapes in Iranian designs: "*I used this card design but such a design doesn't exist. It's all rectangular and square, but here I broke the structure a bit (Figure 5b)*" (P7, Iran).

However, the designers noted that web accessibility guidelines often conflict with their cultural preferences regarding white space, compromising their design elements, such as the density of their visual illustrations. For example, the WCAG guidelines advise on using white space to avoid clutter[8] and P8 highlighted that they had to reduce their use of detailed, busy decorative ornaments to meet accessibility requirements: "*Our ornaments are too crowded, so I tried to reduce them and only use them in some places to maintain more white space*" (P8, Indonesia).

4.1.4 Frustration and Dissatisfaction Leads Designers to Take Actions. These compromises often frustrated our participants, feeling forced to settle for less engaging or authentic web design elements. Therefore, sometimes the designers tried to "*Go beyond that [accessibility guidelines]*" (P5, Nepal), prioritizing design over accessibility compliance. For instance, P8 from Indonesia expressed frustration with TPGi's Colour Contrast Analyzer,[9], which failed the contrast ratio of their background colors against both white and black text (Figure 6a). P8 emphasized the cultural significance of these specific color shades, as outlined on the Jakarta government website (Figure 6b)where they are recommended for web design due to their historical, religious, and nostalgic meanings. Although P8 tried to modify the colors to meet accessibility guidelines, they found the adjusted colors to be *"dull"* and eventually reverted to the original shades.

However, our participants did acknowledge the importance of accessibility, but they still found it frustrating to modify and compromise their design choices. As P1 from India noted: "*I know it's important that design is accessible to everybody. So then it was okay. But from a designer's point of view, it was a little bit frustrating that I wanted to use this color, but I had to use another color.*" (P1, India).

[8]WCAG guidelines on white space: https://www.w3.org/WAI/WCAG2/supplemental/patterns/o3p10-whitespace/

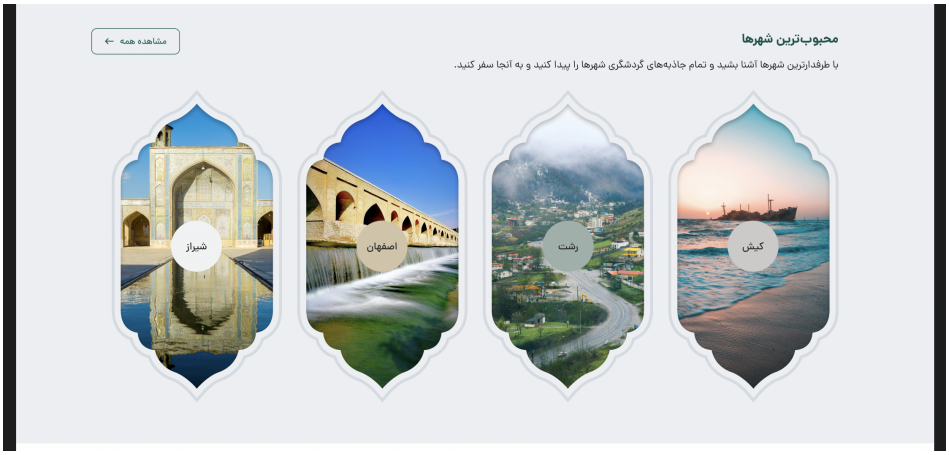
[9]TPGi's Colour Contrast Analyzer (CCA): https://www.tpgi.com/color-contrast-checker/

(a) An example of the process of modifying the Indonesian ornaments' color at the footer of the design. The footer consisted of ornaments in white color (top) as a background of text but the designers had to change the ornaments to a more transparent color (bottom).

(b) P2 from Iran had to modify the color of their text from the authentic khaki color (top) to gray (bottom) due to the color contrast criteria of WCAG.

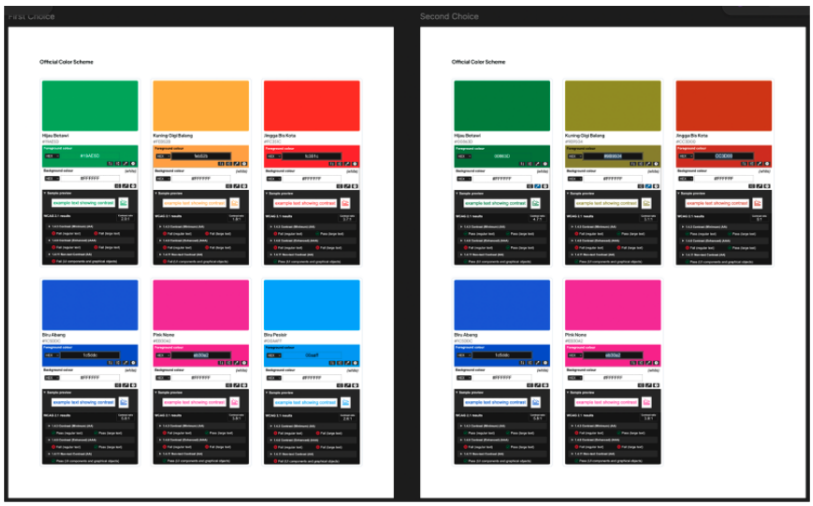
Figure 4: Examples of modifications applied to illustrations and visual representations of designs due to accessibility rules on color contrast according to WCAG.

(a) The pattern of the famous Indonesian ornament. This ornament was used in multiple places of the design.

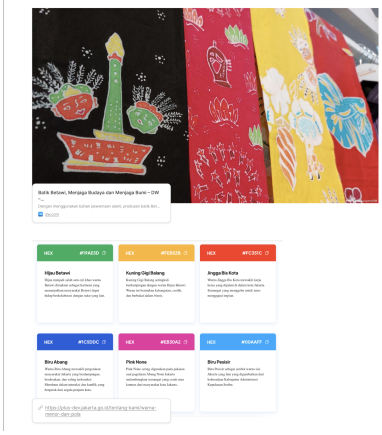


(b) The authentic Iranian visual representations and geometric shapes.

Figure 5: Examples of unique illustrations and visual representations that are common in interface design in Indonesia and Iran. The left figure is for Indonesia, and the right one is for Iran.



(a) Famous colors in Indonesia (left) and the modified version of them, which were darkened (right).



(b) Recommended colors and shades in Jakarta government website for interface design.

Figure 6: Indonesian color preferences in design that our participant retrieved from the Jakarta government website.

Even though our participants occasionally pushed beyond accessibility guidelines, they sought to find ways to balance cultural authenticity while meeting accessibility guidelines: "If we are going 100% accessibility design, then it will become difficult for anyone to achieve that aesthetic look. You have to compromise on some part" (P3, India).

4.2 Theme 2: Higher-Level Cultural Challenges Beyond Design Elements

Our second theme illustrates broader factors that contribute to the lack of culturally inclusive accessibility resources. Our participants shared experiences that went beyond design elements, revealing higher-level cultural challenges encountered during the design process. These issues extend to interactions with clients, developers, and societal factors, indicating that designers face multifaceted challenges, which complicate the accessible web design process.

4.2.1 Lack of Equal Education and Investments for Supporting Cultural Aspects in Accessible Web Design. Cultural challenges in accessible web design can be rooted in the current educational and socio-economical gaps. P9 discussed potential reasons why culturally inclusive accessible design resources are absent for different native languages; in India, education in English is typically accessible to those with greater financial resources and better opportunities to access technology, unlike people educated in their native languages. Eventually, English-educated people are more digitally sound in the tech and design industry, contributing to the lack of culturally inclusive technology support, including accessible design resources for Hindi typography design:

> "*Usually, what you would find here in India is that people who are educated in English usually would be more digitally sound than people who are educated in Hindi because people who have access to getting educated in English are usually people who have the money and the means to get educated in English.*" (P9, India)

On the contrary, Hindi education is typically associated with lower-income groups who lack similar technological exposure and presence within the industry, which implies less awareness of and opportunity to develop accessibility guidelines in Hindi. As a result, there are little efforts to create such guidelines:

> "*Whereas people getting educated in Hindi don't have that money, and so, of course, they don't even have that exposure to technology as much as the English-speaking crowd here [...] I think this is all interconnected, which is why nobody till now has invested in this particular [issue], you know, developing guidelines for Hindi language. Or even if there are, there's not much awareness about it*" (P9, India)

Similarly, there is a cultural gap in the development and awareness of accessibility guidelines for the Turkish language, pointing out the importance of dedicated research for the development of language-specific accessibility guidelines: "*There should be a lot of research behind it. So I don't think anyone would take their time to do that haha!*" (P4, Turkey) However, P4 expressed their concern about the possibility of such research being undertaken as they believed that such research requires abundant time and effort, which is challenging.

4.2.2 From Clients to Developers and Society Challenges. Our participants discussed their previous experiences with web design projects, where they struggled with balancing between the web accessibility guidelines and the cultural preferences of their clients: "*We need to take care of our client requirements.*" (P5, Nepal). P5 further clarified that their clients only accept modifications to their initial design demand to an extent which makes it impossible to meet the accessibility guidelines because: "*The client won't give us that authority. I think they want what they want*". Even though

clients' preferences can be rooted in different aspects besides culture, we made sure our participants stayed focused on the clients' demands that were related to common unique cultural design in their country. P6 provided further clarification by presenting two web pages they designed, one with the considerations of WCAG and Google accessibility guidelines (Figure 7b) and another one without (Figure 7a). The modified accessible version on the right side featured more white space and line spacing in contrast to the design without accessibility considerations on the left. However, the accessibility modification does not align with the cultural preferences and aesthetics of Iranian clients:

> "*You can't use accessibility guidelines everywhere in Iranian design because it doesn't fit. For instance, if you want to design this website (Figure 7b), it might not have many supporters. If I take it to, say, the national TV or tourism and cultural sector, they might not understand it well. If I had to say which one is more wanted, it's this one [left side (Figure 7a)] with cramped text and few white space.*" (P6, Iran)

We identified the dilemma of balancing client demands with accessible web design; for instance, when a client insists on using specific colors and refrains from changing their mind, "*it could be an issue.*" (P1, India). P9 expressed their concern about situations when clients provide a fixed amount of text in Hindi. Given the typically longer script of the Hindi language, the challenge is to fit the text into the design while maintaining adequate spacing: '*If I do not have that flexibility, if there is a copy that has to go in [as demanded by the client] then what do I do [with spacing]? How do I make it accessible while still, you know, putting the entire copy there?*" (P9, India)

Our findings showed that making typography adjustments in the native language for accessibility complicates the website development stage. Accordingly, our participants often prefer to create their designs in English as not only does it simplify the accessible design process for the designer: "*The easier way is to design in English and follow the accessibility guidelines for English*" (P5, Nepal), but it also results in more convenient development process for the developers as well: "*We have to think about the front-end developers as well. So we don't quite change in the line heights and anything [...] We keep it static still, cause it helps the front-end developer to generate the code very fast.*" (P5, Nepal) An additional challenge from the developer side was the disconnect between the design and development stages, especially regarding the implementation of web accessibility and visual design features. P1 noted that despite providing specific guidelines for text colors and alt text for images, developers often do not adhere to these recommendations, and "*They use something completely different from what's given to them.*" (P1, India).

Cultural challenges in accessible web design expand beyond the design and development stages, influenced by societal factors. P3 from India explained that the universality of accessibility guidelines, which often lack cultural considerations, can lead to broader societal consequences, aggravating the current regional and historical conflicts:

> "*[In India] Hindus believe in orange, red, and everything, whereas Muslims, they take green color as the main color [...] There are already regional conflicts going on in between this diversity. [...] So if we are putting these contrast checkers and all like universal tools, maybe that will again increase that kind of rage is what I feel.*" (P3, India)

In contrast, P9 offered a different perspective on the issue and expressed skepticism about the potential risks of implementing culture-specific color guidelines. This includes the risk of reinforcing "*Some stereotypical color meanings.*" (P9, India). In India, colors such as orange and green can carry specific religious and cultural significance, and there are different interpretations associated with them:

> "*I mentioned orange and green and how people perceive the colors here. It's not in a positive way, still not a negative way. I think it's a little like treading on thin ice, and there would be a lot of filtering that needs to be done.*" (P9, India)

P9's caution about "treading on thin ice" highlights the balance required when designing culturally inclusive guidelines, underscoring the complexity of creating web accessibility guidelines that respect cultural differences without falling into the trap of stereotyping.

5 Recommendations To Address Cultural Challenges in Accessible Web Design

We present recommendations on how to make accessible web design processes and resources more culturally inclusive based on the insights from our participants.

5.1 Guidelines for Web Accessibility (G)

- ***G1: Develop Culturally Customized Accessibility Guidelines for Typography*** – Create web accessibility guidelines tailored to native languages and typographic rules.

According to P7, "*There should be a general accessibility guideline suitable for the web. Some things should be customized for different cultures.*", which includes addressing nuances of different written scripts such as specific spacing and kerning rules for words and letters: "*In a very similar way [to current accessibility guidelines], I think we can do it for other languages also. Like we should have a minimum distance of this much in between words or alphabets*" (P3, India, Telugu language). These guidelines would also support font developers in creating accessible typefaces, simplifying the design process for non-Latin languages: "*And then, perhaps use those guidelines in developing a Persian font*" (P2, Iran)

- ***G2: Develop Culturally Customized Accessibility Guidelines for Color Contrast*** – Adapt color contrast guidelines to align with regional color preferences.

Such customized guidelines would help designers balance cultural design preferences while addressing accessibility needs. P8 stressed the need for "*accessibility guidelines for color contrast specifically for Indonesian colors*" due to the preference for vibrant colors in Indonesian design, which often conflicts with accessibility guidelines on contrast ratio. As proposed by P8: "*The easy answer is to reduce the contrast ratio criteria [for Indonesian design]*", customizing color contrast ratios for different regional designs.

5.2 Tools for Web Accessibility (T)

- ***T1: Culturally Customized Accessibility Plugins in Design Tools*** – Integrate plugins in tools like Figma to guide

(a) The design from P6 without adhering to any accessibility guidelines consisting of a huge amount of text, less line spacing, and little white space between elements

(b) This design from P6 is made with the consideration of WCAG accessibility guidelines:https://www.w3.org/WAI/WCAG2/supplemental/patterns/o3p10-whitespace/ which includes more white space between elements and lines of texts.

Figure 7: The two prototypes from P6 comparing the inaccessible (left) and accessible (right) designs.

designers with culturally specific typography and spacing recommendations.

These plugins would streamline the design process by providing feedback on typography adjustments according to the language of design: "*So it can be a plugin available in Figma while designing. If I have that feature enabled, it would tell me that [for example,] for this font, this spacing won't work*" (P1, India). Similarly, P4 suggested that integrated plugins could "automatically" align typography with accessibility guidelines specific to the language

- ***T2: Interactive Real-Time Prompts in Design Tools*** – Add interactive real-time prompts in design tools to notify designers of accessibility issues.

Real-time prompts would enhance the design workflow and ensure accessibility adherence in diverse cultural contexts. These prompts can notify the designers of the accessibility issues and also provide real-time resources and links, directing the designers to the accessibility guidelines specific to the language of their design: "*It would automatically tell you, "Oh no, this won't be enough to do whatever you're trying to do for this language typography" Other than that, it could provide some links for designers who want to read more about specific issues*" (P4, Turkey).

5.3 Cultural Inclusion in Accessibility Research and Education (E)

- ***E1: Engage Local Experts in Guideline Development*** – Collaborate with local experts, such as UX designers, linguists, and font developers, to develop culturally customized accessibility guidelines.

This collaboration ensures that web accessibility guidelines reflect the cultural nuances: "*People who are Hindi language experts should collaborate with UX designers who know about the language, of course, and who have significant experience.*" (P9, India) P8 also suggested that research on the WCAG guidelines could engage more Indonesian experts to better represent local color preferences, noting that cultural differences are often overlooked: "*Because cultural preferences differ. When I think about WCAG, [...] I can assume that there was less representation of our people*" (P8, Indonesia)

- ***E2: Incorporate Culturally Inclusive Training in Design Education*** – Promote language-specific accessible design training in design schools globally.

Equipping designers with culturally inclusive skills would prepare them to address accessibility challenges in diverse contexts: "*I think education institutions can take this up [teaching language-specific design], especially education, like the design institutes all over the world*" (P9, India). P9 expressed enthusiasm for design education that includes language-specific lessons and advocated for "*More education on how to design in different languages, especially like for me in the Hindi language.*" (P9, India).

6 Discussion

The contributions of our work are findings from design and interview studies on the intersection of cultural background and accessible design. We found instances where certain cultural design preferences and accessibility criteria were misaligned, which caused cultural challenges among our participants. These challenges occur on two levels: First, at the design level, where challenges immediately arise in creating website elements. Second, at a broader level, where the challenges emerge in interactions with clients, web developers, and societal factors that shape the design environment.

We note that we do not assume everyone from a particular country shares the same design preferences [36] or that all designers in the Global South have homogenized cultural preferences. Our paper aimed to provide evidence of potential cultural challenges in accessible design, using qualitative analysis to examine designer experiences in-depth [50, 73].

6.1 Reflecting on Cultural Challenges in Typography Design and Color Scheme

The primary cultural challenges for our participants were related to making typography and color schemes accessible because of misalignment between accessibility guidelines and cultural design preferences for color and typography. This misalignment highlights the need for more attention to color and typography elements within accessibility guidelines.

Typography design is historically connected to culture, reflecting how societies communicate through written language [4]. It is not just a visual element of design but a representation of cultural identity and authenticity [4]. Such a connection suggests a need for accessibility guidelines to further reflect on cultural aspects within their typography design criteria. Doing so may help designers navigate their cultural challenges in typography design without being forced to make extreme compromises to their design choices, like abandoning designing in their native languages or avoiding specific fonts.

Regarding our participants' cultural challenges with accessible color schemes, we found that color choices in design are more than just a design element that could easily be disregarded. Color is an important aspect of design that is heavily influenced by culture [20]. People of different countries have unique standards to find a website trustworthy and appealing tied to their cultural characteristics [1]. As much as accessibility should matter in design [81] to avoid the marginalization of disabled people, especially in certain regions [5, 53, 59], it should not lead into cultural marginalization, by enforcing a single set of guidelines for all designers.

Our findings indicated a need for culturally customized accessibility guidelines and tools that better address cultural influences in typography and color scheme design. We argue that doing so can reduce designers' frustration and prevent them from abandoning accessibility considerations. Our participants' frustrations were partially due to a lack of guidance on navigating conflicts between their cultural design preferences and accessibility criteria and insufficient instruction on minimizing these conflicts.

Therefore, acknowledging and addressing cultural aspects in accessible design does not mean it should lead to disregarding accessibility. Instead, it can promote accessibility by helping designers navigate cultural challenges and ensuring a balance where both accessibility and cultural values are prioritized.

Our study opens opportunities for the HCI and accessibility experts to explore further and provide improved guidance on balancing cultural design preferences with accessible design. Without such advancements, design marginalization may persist in Global South regions, negatively impacting both disability inclusion and cultural representation.

6.2 Reflecting on Broader Cultural Challenges Beyond Accessible Web Design Process

In line with previous studies, our participants often face multifaceted challenges when meeting accessible design guidelines, having to manage multiple factors [3, 43], which makes the accessible web design process even more complex. Lazar et al. [43] indicated three challenges in accessible design, including balancing accessibility and graphical design, convincing clients and management of the importance of accessibility, and technical challenges in accessible design. Our study also introduces a novel perspective, highlighting the cultural context in which our participants approach accessible design and the societal aspects that can be intertwined with the creation of accessibility resources.

There has been a growing interest in HCI and accessibility research across countries such as non-Western regions, the Global South, and Indigenous societies (e.g., [5, 47, 59, 80]). Different factors, such as designers' geolocation, educational background, job support structure, socio-economical factors [3], etc., can influence the accessible design process for designers. Our findings revealed

cultural background as a new factor influencing accessible design, not only the design itself but also the interactions between client-designer and designer-developer.

Cultural backgrounds significantly affect how clients and developers accept changes to their designs for accessibility purposes [3]. Our findings revealed that clients often have strict demands for their design, with minimal regard for accessibility. This creates a dilemma for designers who must balance client preferences with accessibility. A key reason for clients' rigidity is a lack of accessibility awareness in Global South regions [52, 53], which could be addressed through improved education [3, 54, 70]. Our research extends this discussion to the Global South, underscoring the broader impact of educational disparities on accessible web design. We argue that education should not be limited to formal institutions, which may be unaffordable to many, as indicated by our participants. Instead, easily accessible tutorials, social media [25], or guidelines could help bridge the existing lack of knowledge.

6.3 Reflecting on Recommendations for Addressing Cultural Challenges in Accessible Web Design

6.3.1 Improving web accessibility guidelines and tools to be culturally customized (G, T). Our participants highlighted the value of current accessibility resources but emphasized the need for enhanced cultural support on their native language typography design (G1, T1, T2) and more adaptable color contrast ratios to suit regions that favor vibrant color schemes (G2).

As revealed by our findings, the challenges with typography were not only due to the lack of guidelines for designers to direct to but also the typefaces and their default spacing settings implemented in the fonts. Designers of new fonts, therefore, play a key role in the development of typefaces according to a culture's written language typography rules [4]. Yet, having and relying on proper accessible typography guidelines (G1) would be the first thing font designers need. Font designers have studied non-Latin alphabets to address global needs [4]; however, according to our participants, there still remains a challenge of designing accessible typography for their native languages, such as Hindi and Persian.

In line with previous studies, our findings revealed that designers advocate for integrated accessibility plugins into design tools (T1) [40] to streamline the accessible design process [29]. However, our participants made novel recommendations for built-in accessibility plugins that adhere to culturally customized typography guidelines. These plugins could automatically detect the languages used in a design, correct accessibility issues, and guide designers (T2).

We note that our paper does not aim to generalize or suggest that everyone from a particular country shares the same design preferences. Instead, we seek to identify and provide evidence of the challenges designers face, particularly regarding cultural conflicts in accessible design. We draw on Hofstede's definition of culture on the country level [35] and multiple prior cross-cultural HCI research deploying Hofstede's definition, focusing on a person's or groups' affiliation to a country [19, 21, 44, 63]. However, it is essential to be cautious about stereotypical perspectives [83]. Defining one regional or national characteristic can lead to stereotypes that may be ineffective, not only from a typographical perspective [83] but also color and other design elements.

On a more reflective note, our participants, even those from the same country, expressed diverse views on cultural influences, showing the complexity of these factors in accessible web design. This emphasizes the importance of recognizing cultural diversity and avoiding the assumption that culture is homogeneous within a region [68].

We do not suggest changing accessibility criteria, but given our participants' struggle to find a balance between cultural preferences and the accessibility guidelines, we recommend expanding the guidelines to provide further support in achieving this balance. For instance, beyond WCAG's current criterion on text spacing, there needs to be additional guidance on how kerning and spacing vary across languages, along with the reasoning behind these differences. This expansion could help designers navigate cultural challenges more effectively and improve their approach to accessible web design, reducing the risk of inaccessible designs while including cultural values.

6.3.2 Providing high-level support in broader contexts to achieve culturally customized web accessibility resources (E). In turn, our findings highlighted a need for extensive research and careful considerations (e.g., research methods, participants involved, etc.) when addressing cultural influences in accessibility guidelines (E1).

While the HCI and accessibility communities emphasize human-centered and participatory approaches for greater inclusivity, there are ongoing debates about the unequal distribution of power in these collaborations, with research teams often limiting the engagement of disabled participants in their studies [8]. Building on this, we discuss that accessibility research would benefit not only from the involvement of disabled people but also from engaging individuals from diverse cultural backgrounds, both with and without disabilities. We argue that, in addition to prioritizing accessibility and inclusion for disabled people, the research community must also value cultural diversity for truly inclusive web design, avoiding Digital Design Marginalization.

This process requires involving experts from different cultures, such as UX experts and font designers, to ensure the guidelines address diverse needs. Engaging local experts and participants is crucial [14], as researchers must thoroughly understand the target group to create effective solutions [34]. Linxen et al. [47] especially emphasize the importance of involving researchers from under-represented countries when studying those regions. Moreover, research methods for studying the social and cultural topics in under-represented regions require the deployment of methods proper to their cultural background [67, 88].

There are further regions of the Global South under-represented within the accessibility research, such as Latin American countries in the Global South [5, 57]. The lack of cross-cultural accessibility research can exclude key factors that impact achieving accessible digital products, such as educational [5, 54], economic [3], and socio-cultural considerations [53]. Insufficient research and support in certain parts of the world has resulted in little awareness of accessible web design [5, 52, 75], making clients more rigid in their cultural design choices with little understanding of accessibility. This resistance complicates the design process for our participants

in their workflow, as they must balance their clients' cultural demands with accessibility guidelines, making it difficult to satisfy both.

Cross-cultural accessibility research needs to be accompanied by proper education and training on both accessible design knowledge and cultural studies [54]. Design education does not adequately address the influence of cultural background on design [61, 77]. Nourian et al. [54] indicated a narrower focus where accessibility education also neglects to cover the impact of cultural influences on web design practices and consequently on accessible web design. Building upon these findings, our study highlighted specific cultural challenges our participants faced when making typography and color schemes accessible. Our findings could serve as a starting point for incorporating cultural influences into accessibility education. For example, our participants pointed out in more detail that such education requires preparing designers for accessible design in various native languages (E2).

6.4 Limitation and Future Work

We conducted asynchronous design activities due to time zone differences and geographical constraints. The designers documented their web design choices in the design diary and discussed their designs once finished over an online interview session. While we gained valuable insights from both sources, two limitations emerged. First, some interviews were affected by unreliable internet connections, causing voice disruptions. To mitigate this, we turned off video feeds and used live transcripts for better communication. Second, some of our participants might have forgotten to document some aspects of their design process. Thus, Future research can benefit from synchronous in-person design activities, such as real-time observations. This approach would allow for a more in-depth understanding of the accessible design, discovering further cultural challenges that designers from the Global South may encounter.

Moreover, the existing literature offers limited insight into the intersection of culture and accessible design, and our findings confirmed the presence of cultural challenges in accessible design. While our work highlights the need for accessibility resources to be more culturally sensitive, we cannot provide specific recommendations for individual cultures. However, our study serves as a foundation for future research to explore these challenges in greater depth. Similar to WCAG gradually expanding language translations, further research is needed to address specific cultural needs in accessible design, particularly by involving local designers and users in Global South countries.

Future studies should also expand this line of research to other parts of the Global South with larger samples of participants, focusing on more countries, as well as regional subcultures within countries. Specifically, future research could focus on countries that use non-Latin scripts, regardless of whether they are part of the Global South. For example, Japan's character-based writing system has distinct typographic features compared to English, presenting unique opportunities for examining accessible design. Therefore, future research on the intersection of cultural background and accessible typography design should expand beyond geographic or regional classifications (e.g., Global South or non-Western cultures) to include a deeper focus on language-specific considerations.

Finally, while we benefited from designers' perspectives, we did not account for constraints imposed by clients. Future research could address this limitation by examining how client's cultural preferences and expectations influence the accessible web design process, offering a more holistic view of the design process in more practical contexts.

7 Conclusion

Our research focused on the relationship between cultural background and accessible web design, specifically among digital designers from the Global South. We explored how accessibility guidelines accommodate cultural design preferences and where they may conflict with their design preferences. Through design activities and interviews with 10 designers from five countries in the Global South, we identified cultural challenges at both the design level (i.e., mainly typography design and color scheme) and broader societal levels (i.e., client interactions, developer collaboration, societal factors). Our study highlights the need for more culturally sensitive accessibility resources and calls for greater inclusion of diverse cultural perspectives in accessibility research and education.

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