

Participatory Design for Human-Robot Interaction with Syrian Refugees and Asylum Seekers

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Abstract. The Syrian refugee crisis is among the largest globally. We are developing a social robot tailored to the needs of displaced Syrians hosted in Scotland. As part of a mixed-methods study to understand the needs of this population and the possible use cases of the robot, we conducted two focus groups with Syrian refugees and asylum seekers residing in Glasgow. Using thematic analysis, we identified these participants' unmet needs and existing gaps in access to services. Participants observed an Arabic-speaking social robot, and together we explored its potential as a solution to help navigate bureaucratic processes and access services. The participants expressed curiosity and enthusiasm about the robot. As they shared experiences of homelessness and displacement, they also highlighted bureaucracy and the English language as key barriers to accessing services. This study identifies key design requirements for developing a multilingual support robot for refugees and asylum seekers.

Keywords: Human-robot interaction · Field studies · Focus groups · Refugees · Asylum seekers · Migrants · Arabic

1 Introduction

Millions of people worldwide flee their countries for reasons including wars, climate change and hostile environments. One of the largest refugee crises is in the Syrian Arab Republic, where over 6 million Syrians have been displaced from their homeland [37]. According to the UK Home Office, Scotland has received around 16% of the 20,319 Syrian refugees placed in the UK under the Vulnerable Persons Resettlement Scheme [26]. In addition, the Scottish Refugee Council (SRC) reports that approximately 650 Syrians in Scotland currently have pending asylum applications [29]. Refugees and asylum seekers such as these require a gradual integration in their new host country, including support with access to resources and services [13].

We are developing a social robot designed to meet the needs of displaced Syrians hosted in Scotland. As part of the design process, we have collaborated with a Scottish charity supporting refugees. Through the charity, we recruited 9 Syrian refugees and asylum seekers currently residing in Glasgow. We carried out two focus groups where the participants were invited to share their perspectives in Levantine Arabic, their native language, with the goal of co-designing a social robot that addresses their specific needs and enhances their well-being.

2 Related work

Refugees and asylum seekers have diverse experiences in their host countries, including homelessness [25]. Those who find themselves displaced and applying for asylum often encounter what has been described as “*being kept in a perpetual limbo*” [12] and they may face prolonged detention and expulsion [5]. The newly arrived are often not fluent in the spoken host language, and rely on cultural mediators such as integration advisors [33]. A further shared experience is navigating bureaucratic processes, requiring significant time and energy for appointments and paperwork. [19].

At the national level, non-government organizations such as Refugee Action and Migrant Help play a central role in supporting and caring for refugees and asylum seekers across the UK [7]. In Scotland, these efforts are complemented by the *New Scots Refugee Integration Strategy*, a collaborative effort by the Scottish Government, COSLA (the Convention of Scottish Local Authorities), and the Scottish Refugee Council (SRC), aimed at supporting refugees and asylum seekers in Scotland. The term “New Scots” was chosen as it “*conveys a helpful message of inclusion to all who need safety in Scotland for as long as they need it*” [28]. The SRC provides refugees with a welcome package translated into five languages, including Arabic, containing essential information about emergency services, benefits, healthcare, finance, and more [27]. However, due to significant mental strain and distress caused by displacement, many refugees were unable to focus on the package contents, despite its informative nature [15].

To better understand the experiences of refugees and asylum seekers, researchers have conducted focus groups and interviews, often with the assistance of translators. For instance, focus groups with refugees from conflict-affected regions, such as Somalia and Ethiopia, identified key barriers to discussing mental health, including factors such as a history of political repression, fear, lack of knowledge, and shame [30]. Other studies, conducted in Germany and Turkey have further examined the challenges Syrian refugees face in accessing services. Participants reported being unable to book appointments over the phone due to limited host language proficiency [11], or being unaware of available services in their own language [21]. In Scotland, interviews with Syrian refugee families highlighted socio-cultural differences as major barriers to accessing services [15]. A year-long design research project conducted in informal Syrian refugee settlements in Lebanon emphasized the crucial role of NGOs in building trust between researchers and participants [34].



Fig. 1. Syrian women observing the robot system in action

Participatory design of a social robot has become a common practice, working with different user groups, such as senior adults [23], children [2], blind people [6], and many more. Only a few studies have been conducted with migrants, and even fewer with refugees. For example, in one study, researchers interviewed teachers at an international primary school in Switzerland, and proposed the use of social robots in classrooms to support the inclusion of migrant-background children [36]. Another study engaged three Middle Eastern refugees and four professionals in a co-design process. The project focused on developing an egg-shaped robot prototype aimed at supporting refugee integration in Portugal [31].

Research in the field of migrants and HCI is extensive, as demonstrated by a survey of 282 research publications published between 2010 and 2019 [24]. The authors noted that HCI research on migration remains exploratory, given its limited technological focus and number of intervention studies. Recent studies have focused on designing chatbot assistants (e.g., [16, 38]). However, such online solutions may distance migrants from the aid agencies and there is a potential risk of misinformation, in case the data is out-of-date [14]. To bridge this gap, we present the design process of what we believe to be the first social robot co-designed with refugees and asylum seekers to address their bureaucratic needs. The robot is envisioned to work alongside human support staff, with up-to-date, organization-specific data to ensure relevant and effective assistance. This work lays the groundwork for its future development.

3 Materials and Methods

Our overall goal is to develop a social robot that is able to support Syrian refugees and asylum seekers with access to services and support. As part of the

design process, we carried out focus group studies in the refugees' own language to assess the needs of this group, as well as their overall attitudes toward robots.

Prior research on second-language interaction and access to services has found that clients prefer communicating in their native language, as it allows them to express emotions, articulate problems, and reflect on situations more thoroughly (e.g., [17, 35]). Based on these findings, we had the following research questions for this study:

- RQ1** What services do Syrian refugees and asylum seekers need access to, and how do they currently access these services?
- RQ2** Do Syrian refugees and asylum seekers prefer accessing services in their native language, even if provided by a robot? Additionally, does the robot's appearance, including gender and religious attire, influence their preference?
- RQ3** Will Syrian refugees and asylum seekers have a more positive view of using a robot after observing it in action?

3.1 Participants

The focus groups involved a total of nine Syrian refugees and asylum seekers currently living in Glasgow, UK. Ages ranged from 31 to 48 years (3 women, 6 men; mean age = 38.22 years, $SD = 4.87$). Four men were single, while 2 men and 3 women were married with children. We collaborated with *Central and Western Integration Network* (CWIN), a Scottish charity supporting refugees, asylum seekers and migrant workers throughout Glasgow (www.cwin.org.uk), where the first author has been volunteering with the drop-in service since April 2023. In the last year, 152 individuals from Syria have come to CWIN to participate in their activities and to seek support (30% women). Participants were recruited through the charity's different WhatsApp groups and through posts on Facebook.

3.2 Focus Groups

Two focus groups were conducted in Levantine Arabic by the second author, a native speaker: this is notable, as previous studies have shown that using interpreters can interrupt the flow of conversation and cause distractions [32], while a shared language between researcher and participants fosters trust [24]. The first group took place in December 2024 with six men, and the second in March 2024 with three women (Figure 1). Both sessions were held at a multicultural center in Glasgow where the CWIN charity is based.

3.3 Robot System

As part of each focus group, participants were shown the multilingual student support robot system described in [4]. At a hardware level, the robot incorporates the Furhat robot [1] and a Kindle Fire tablet, along with a microphone (Figure 2). An interaction with the system will start by clicking on the tablet, and choosing between English or Modern Standard Arabic. The interaction will start in that language, using a language-specific synthetic voice from Amazon Polly [3]. Each session ends with a QR code that the user can scan, which will lead to further information in the language chosen at the beginning of the interaction.

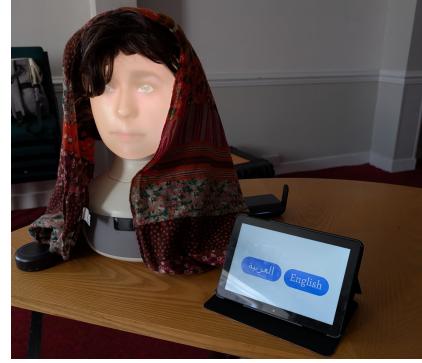


Fig. 2. The robot system

3.4 Data Analysis

Thematic Analysis

The Arabic recordings of the two focus groups were transcribed using Whisper [20], then divided into speakers in the Speaker Diarization process using Pyannote.Audio [9]. The diarized transcripts were then translated into English using DeepL Pro, a secured online translator [10]. The transcripts and the English translations were verified by the second author. Following the six steps outlined by Braun and Clark [8], we then generated codes and themes.

NARS Questionnaire Analysis

The Negative Attitude toward Robot Scale (NARS) [18] is commonly used to explore populations' acceptability of robots. It is classified into 3 subscales:

S1: *Negative Attitude toward Situations of Interaction with Robots.*

S2: *Negative Attitude toward the Social Influence of Robots.*

S3: *Negative Attitude toward Emotions in Interaction with Robots.*

We translated the NARS questionnaire into Arabic for use in the study (see Appendix). Participants completed it before and after observing the robot system in action, and their responses were compared to explore trends in their attitudes. Each statement was evaluated on a 7-likert scale (1=Strongly Disagree, 7=Strongly Agree). Scores for positively worded statements were reversed (e.g., 1=7, 2=6). For each participant, we calculated three average scores, one for each subscale, for both the *before* and *after* phases. This resulted in 27 data points per phase.

3.5 Procedure

Participants in each focus group were welcomed to a designated room, where they were told that they will be asked about access to services and their views about robots and AI. They then filled in the NARS questionnaire, containing 14 statements concerning the negative attitude toward robots. They were asked about the difficulties they had when they arrived in the UK, and a discussion started. Afterwards, they were shown the robot system, with two interactions concerning local tax exemption, first in Arabic, and then in English, to showcase the system's multilingual capabilities. The robot's appearance was modified by first dressing it with a wig and a hijab (see Figure 2), and then switched to a bearded face with a hat. They were asked about using the robot to assist them and about its appearance. After the system introduction, they filled the NARS questionnaire again. All participants were compensated for their participation with a £20 shopping voucher.

4 Qualitative Results

We report four themes: 1) *Experiences of Refugees and Asylum Seekers* with subthemes: a) Housing Insecurity b) Being Displaced; 2) *Barriers to Services* with subthemes: a) Language b) Bureaucracy and Knowledge Gaps; 3) *Existing Support Systems*; 4) *Exploring Potential Support Solutions* with subthemes: a) Interaction b) Robot Appearance. The first three themes were identified in the transcript of the discussions prior to the robot demonstration, while the fourth theme primarily occurred in the discussion afterward.

4.1 Experiences of Refugees and Asylum Seekers

Housing insecurity is a common challenge faced by refugees and asylum seekers. Participants described times without housing or work—and even when they were housed, it was often temporary, as one stated “*God willing, you will be in the hotel. We stayed for about a month. Then we got a temporary house*” (Woman, 41). The feeling of helplessness and lack of agency was emphasized in the words of another participant, “*this is one of the first difficulties, the most difficult one, which means you spend a week or two without a home and without a job*” (Man, 31).

Participants discussed reasons for leaving Syria and looking for a new host country, “*because of the war and destruction, people were displaced, it wasn't an economic reason, it was a political reason, people were afraid for themselves and their lives*” (Man, 43). A major concern is the long wait for asylum decisions, during which they may face detention and have to rely on lawyers to speak with authorities. They fled Syria for a better future, yet remain at the mercy of others: “*it depends on the official officer who investigates and takes the case, and based on the evidence you give him, he decides whether you deserve asylum or not*” (Man, 36).

4.2 Barriers to Services

Two key barriers to accessing services were identified: language and bureaucratic knowledge gaps. The language barrier was especially pronounced when participants had to use the phone to book appointments, a situation that leads to frustration or being dependent on one's community and friends. "*I'd have to get a friend who speaks English and they only accept reservations from a private number, so I have to call a friend to book me a GP appointment*" (Man, 35) or "*as for the GP, it's difficult to call at exactly 8:30am, and you can't go in person — they don't answer the phone, you can only book for the same day, and there's no interpreter*" (Man, 43). Fluency in English is either required or highly favorable for university study or employment. While ESOL (English for Speakers of Other Languages) courses are available for free, they often have long waiting lists, and individuals may wait up to a year before they can begin. "*there are young people here who say that they had to wait, for example, 6 months or 8 months until they were accepted*" (Man, 39).

The lack of reliable information sources is a major barrier, especially when dealing with bureaucracy. Participants encountered many difficulties when trying to access basic services such as registering in a clinic without a home address. "*When you apply for asylum, they're supposed to understand your situation — that you're new to the country and don't know your way around... The problem is, when you try to register with a GP, you need a proof of address. But when we first arrived, we didn't have one... It took a long time before we could finally register*" (Man, 35). They had to rely on their wit and knowledge in order to find their way around: "*there was no one to help us, no one to inform us. No organization or official body shared this information with us — we had to find out on our own, and only managed because we were educated*" (Woman, 34).

4.3 Existing Support Systems

Participants acknowledged the importance of local NGOs and charities operating in Glasgow. They often text or email them in order to receive support. "*If I have an application form that I don't understand, I can send it (to the SRC) on WhatsApp or if I want, for example, Travel Documentation, if I don't know how to make the application, they will help me*" (Woman, 41). On the other hand, there are many organizations which help, but each is responsible for a different aspect, so it can be difficult to know where to go and for what purpose: "*when you try to call, they either say it's full, say no, or don't answer—because you don't speak English. So you have to go to an organization for help, but then they refer you to another one, or give you appointments weeks in advance, or add more steps. There's no single organization that provides everything, so the information really needs to be centralized*" (Man, 31). The participants expressed interest in having a single platform having all the information in one place. Specifically, regarding ESOL course enrollment, they suggested having a list of nearby colleges offering such courses, "*if all the information is there — the names of the colleges, the levels, the registration times, things like that. So it can*

be useful for refugees" (Man, 43). They also emphasized the need for support with registering at a doctor's clinic.

4.4 Exploring Potential Support Solutions

This theme was identified during the conversations that took place after the participants observed the robot and the support interactions in Arabic and English. While participants understood that the focus was on an Arabic-speaking robot, they emphasized the importance of making it multilingual to support other refugee groups: "*the robot provides services to Syrian refugees who speak Arabic, it should also provide services to the Kurdish brothers who speak Kurdish*" (Man, 45). Participants added that they would like it to be polite and empathetic, and discussed the positive aspects of using a robot: "*it can be embarrassing if you talk to a person, but if you talk to a robot... there's a comfort level*" (Woman, 43).

The participants were amused by the robot's appearance, but they did not display a preference to a gender or an attire. "*it's important that it gives me the result I want in the end... Sometimes, you feel that some people trust a man more when he's the one speaking — like the information feels more accurate and convincing. But others who, on the contrary, feel more comfortable if it's a woman*" (Woman, 37). Participants emphasized the importance of having services such as ESOL course registration and access to official information available in a single location. In addition, they suggested that the robot could assess students' English proficiency: "*The robot can determine the level of the student and start working with him or guide him forward*" (Man, 48). More generally, participants felt that any solution complementing existing services would be valuable, as one noted, "*this is a very positive step that will make it easier for refugees and asylum seekers to access services very quickly.*" (Man, 35).

5 Quantitative Results

Figure 3 shows the overall NARS scores of participants before and after they observed the robot system. Participants' attitudes toward interaction with robots were generally positive, with average scores of 2.85 before and 2.8 after the observation. Their attitudes toward the social influence of robots were neutral, with average scores of 4.16 before and 4.36 after the observation. Lastly, their attitudes toward emotions in interaction with robots were neutral before the observation, average score of 4.33, and it was a bit more positive afterward with an average score of 3.44.

To control for multiple comparisons, we applied the Bonferroni correction, adjusting the significance threshold for all tests to $\alpha = 0.0167$. Paired t-tests did not find significant differences in any of the subscales (S1: $t(8) = 0.15, p = .88, d = .06$; S2: $t(8) = -0.35, p = .73, d = -.16$; S3: $t(8) = 2.07, p = .073, d = .91$). Thus, with this very small data sample, we were unable to find quantitative evidence to address RQ3.

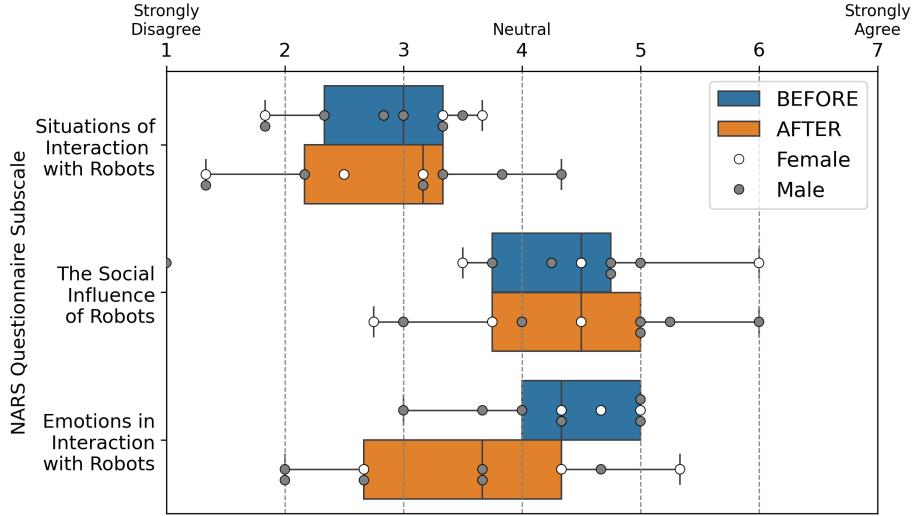


Fig. 3. Negative Attitude Toward Robots (n=9) [1=positive; 7=negative]

6 Discussion

In the discussions prior to showing the robot to the participants, three primary themes were identified: 1) *Experiences of Refugees and Asylum Seekers*; 2) *Barriers to Services*; 3) *Existing Support Systems*. Discussion on all of these themes addressed RQ1 regarding the services that Syrian refugees access and the way that they currently access them. The results also agree with previous research carried out in different host countries on the needs and challenges faced by refugees and asylum seekers (e.g., [30, 21]), which is relevant to this group in Scotland. In the fourth theme identified after the robot demonstration, *Exploring Potential Support Solutions*, participants addressed RQ2 and were positive about using the robot as a complement to existing services delivered in their native language. Finally, participants' overall attitudes toward the robot ranged from neutral to positive, with no significant differences between before and after the demonstration, likely due to the small data sample used, and no evidence was found to address RQ3.

The experiences participants shared concerning housing insecurity and being displaced were also observed in previous work (e.g., [25, 12, 5]). The major barriers to accessing services identified were language and bureaucratic knowledge gaps. Participants expressed a strong preference for communicating in their native language, Arabic, due to the difficulties posed by having to rely on others. This observation aligns with existing literature and has been reported among refugees in Turkey, Germany and Scotland (e.g., [11, 21, 33]). Concerning bureaucracy, our data is also similar to previous findings (e.g., [19]). In the third theme, participants recognized the value and limitations of support from local

charities, in relation to their own personal challenges. Similar claims were made in previous studies (e.g., [7, 34, 15]). These discussions revealed the services most important to them, particularly ESOL registration and access to healthcare, thereby addressing RQ1. They also emphasized the need for a reliable source of official information, ideally a unified platform.

Discussions continued after the participants observed the robot and examples for support interactions in Arabic and English. Participants explored potential support solutions, and indicated they would willingly use a robot, regardless of its gender or religious appearance (RQ2).

While a previous study using the NARS questionnaire reported fairly positive attitudes toward humanoid robots among Arabs who were not displaced [22], this study found similarly neutral to positive attitudes among Syrian refugees. This suggests that positive perceptions of humanoid robots may persist even in the context of displacement (Fig 3). Having observed the robot in an interaction with the second author, both in Arabic and English, did not change their attitude significantly (RQ3).

7 Conclusions and Future Work

This study engaged refugees and asylum seekers in the first co-design process of a social robot aimed at addressing their bureaucratic needs. In a qualitative thematic analysis, we found that participants in our focus groups reported similar challenges that have been found in previous studies. When introduced to the idea of a social robot as a complement to existing support systems, participants were willing and enthusiastic about the robot addressing their needs, which was especially encouraging.

Based on our findings, we are currently developing a social robot speaking Modern Standard Arabic, Kurdish Sorani and Persian, in addition to English, with the goal of accommodating refugees and asylum seekers from Syria as well as the other regions that are registered at the CWIN charity. This robot will mainly provide information about healthcare services and other organizations operating in the city for its pilot version, and based on the feedback from the participants we will also explore support for other common and challenging tasks such as ESOL course registration.

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Disclosure of Interests. Author GS was employed by Furhat Robotics AB. The authors have no competing interests to declare that are relevant to the content of this article.

Appendix

أوافق بشدة	أوافق	أوافق إلى حد ما	لا أوافق ولا أعارض	أعارض إلى حد ما	أعارض	أعارض بشدة	
							1. سأشعر بعدم الارتباط إذا امتلكت الروبوتات مشاعر بالفعل.
							2. قد يحدث شيء سبي إذا تطورت الروبوتات إلى كالثات حية.
							3. سأشعر بالراحة عند التحدث مع الروبوتات.
							4. سأشعر بعدم الارتباط إذا أعطيت وظيفة تتطلب مني استخدام الروبوتات.
							5. إذا امتلكت الروبوتات مشاعر، سأشكّن من تكون صداقات معاها.
							6. أشعر بالراحة عندما أكون مع روبوتات لديها مشاعر.
							7. كلمة "روبوت" لا تعني لي شيئاً.
							8. سأشعر بالتوتر لأنّه تشغيل روبوت أمام أشخاص آخرين.
							9. سأكره فكرة أن الروبوتات أو الذكاء الاصطناعي يفهومون بإصدار أحكام حول الأشياء.
							10. سأشعر بالتوتر الشديد بمجرد الوقوف أمام روبوت.
							11. أشعر أنه إذا اعتدت كثيراً على الروبوتات، قد يحدث شيء سبي.
							12. سأشعر بالارتباط (الخوف الشديد) عند التحدث مع روبوت.
							13. أشعر بالقلق من أن تكون الروبوتات تأثيراً سلباً على الأطفال.
							14. أشعر أن المجتمع في المستقبل سيكون تحت سيطرة الروبوتات.

Fig. 4. NARS Questionnaire in Arabic

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