

Imagining Emerging Technologies for Promoting Intercultural Meaningful Social Interactions: A Participatory Futures Approach

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ABSTRACT

Intercultural Meaningful Social Interactions (IMSI) are positive and impactful interactions held between intercultural strangers. Previously, studies have explored these interactions characterizing them, identifying factors that influence them, and tactics and strategies to promote them. Still, what kind of technologies could encourage IMSI is underexplored. Hence, we took a participatory futures approach to understand participants' imaginaries and perceptions of potential technologies to promote IMSI. We conducted participatory futures workshops with locals and migrants living in Istanbul, an exemplary multicultural city between the east and west, who envisioned and discussed 15 concepts of emerging technologies that would enable IMSI in Istanbul of 2050. By analyzing this work, our contribution is first to present six visions of alternative futures of IMSI and, second, to introduce the tools and implications of the methodology followed to enable participants' futures thinking of IMSI in an intercultural context.

CCS CONCEPTS

• **Human-centered computing**; • **Interaction design; Interaction design process and methods; Participatory design.**;

KEYWORDS

Participatory futures, Intercultural Contact, Tools, Futures Thinking

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1 INTRODUCTION

Social interactions contribute to developing emotional, psychological, and physical personal advantages and to shaping social bonds with those around us [15, 19]. As a result, they have a significant influence on human well-being. Besides, social contacts help the growth of healthy social fabrics. Interacting with new individuals, for example, can establish a sense of trust and community with others, facilitating the integration of diverse groups as part of the same social system [17, 68]. Furthermore, genuinely engaging with someone from a different race, social background, or age group through Intercultural Meaningful Social Interactions (IMSI) could increase people's confidence in people as a whole, which supports collaboration among different communities [25]. However, IMSI present additional barriers than regular interactions, such as language barriers, potential biases, and lack of motivation [3, 4].

Even though technologies are sometimes judged as detrimental to human-to-human interactions, they have also been explored because of their quality of supporting social interactions [26, 48]. For instance, the HCI field has studied different collocated interactions such as serendipitous interactions, which are not planned but positive in result [16]; playful interactions, which are pleasurable and joyful experiences [38]; opportunistic interactions, which are daily-unplanned social interactions in public places [45]; and emergent interactions, which are imminently initiated interactions [46]. All these social interactions have been investigated from a design perspective to propose different technologies that could promote them in public places, such as public installations, mobile apps, and platforms for collective action [37, 50, 74]. Still, we have not found explorations of technologies to promote IMSI, thus, there is still a lack of knowledge on how emerging technologies could contribute to promoting these interactions.

Addressing this gap, we created a structure for participatory futures workshops [9, 22] in which participants co-speculated future technologies to enable IMSI in Istanbul of 2050, and then discussed the implications of these ideas for intercultural contact. We took this approach as it allowed us to explore perceptions and imaginaries of such technologies and futures from a participant's point of view, who are, in the end, the ones engaged in IMSI. Therefore, we could extract relevant insights according to their previous experiences being part of intercultural interactions and identify more or less desired futures.

In this study, we present the results of eight sessions of participatory futures workshops developed for strangers to envision emerging technologies to promote IMSI by using different tools. The participants co-speculated 15 concepts of emerging technologies in dyads or triads of inter and intracultural participants. In each session, they first created their concepts and then presented and discussed them. By analyzing their proposed ideas and the discussions ignited, we identified relevant visions of the futures of IMSI. Therefore, our contribution is two-fold: first, to present six visions of futures of IMSI in Istanbul of 2050, and second, to introduce the tools and methodology followed to enable participants' futures thinking in an intercultural context.

2 RELATED WORK

2.1 Intercultural Interactions

By 2020, 281 million people had a migrant status, according to the International Migration Organization [33], representing the most significant migration movements in history. These movements are ingrained in our reality and will increasingly be so in the future [70]. Nonetheless, effective migration and integration management requires some degree of anticipation of the magnitude and nature of future flows to promote a positive impact [66].

Moving or having to immigrate to a new country is the first of many difficulties when it comes to migration. Upon arriving in the new context, an integration process is yet to start, which might include positive and negative experiences. Indeed, while migrants can experience discrimination, isolation, and even violence, they can, on the other hand, come across welcoming individuals and opportunities to build their own support system. This process can similarly involve challenges for locals, who could perceive threats to their culture and occupations inspired by fear and prejudices. Hence, migration brings about a collection of mixed experiences which are personal and subjective, which can only be captured by getting in touch with the relevant individuals who have experienced those events.

With the increase in migration rates, there has also been a rise in radicalization expressed by discrimination and social exclusion of migrants triggered by prejudices and stereotyped perceptions of others and their cultures [1, 21, 52, 54]. For instance, in Turkey, one of the countries that hold the highest number of refugees globally, most of whom come from Syria [43], there has been a rise in negative sentiments specifically towards individuals with Arab origins [32], although Turkey has been historically known for its multiculturality and relation to multiple empires. All of this influences the exclusion, not only of refugees but also of other migrants and individuals that are perceived as different. In fact, intercultural interactions (i.e., interactions held between people from different cultures and nationalities) are easier to avoid and even more challenging to promote as they present additional challenges to tackle as lack of motivation, physical exclusion, and biases[4]. However, positive and meaningful intercultural interactions can help promote social cohesion diversity in society [73].

2.2 Social Interactions in HCI

The social is a design material [21] because social interactions are influenced by the affordances of the environment and the tools around us. Thus, promoting social contact between people is an issue that can be addressed in the design and HCI fields. In fact, during the past ten years, different ways of promoting collocated interactions have been explored.

Collocated interactions are the encounters developed between people who are physically together or nearby and who are not necessarily acquainted with each other. For example, they can be held with nearby strangers [49, 50] (i.e., close-located unknown others) or familiar strangers [44, 53] (i.e., people regularly encountered that can be identified but still ignored and remain unknown to each other).

Collocated interactions address the matter of how physically close people are, thus, enabling different kinds of encounters. One example of the latter is serendipitous interactions; these are unexpected but fortunate discoveries driven by uncontrolled actions [47, 64]. The feeling of serendipity is elicited by actions previously determined by an artifact's mediation in the interaction context. Social serendipity can be enhanced through social facilitation, mutual interests, goals, shared benefits [37], and the environmental layout or differences between individuals [16]. Thus, eliciting serendipity can also be understood as a technique to promote collocated interactions. Another kind of encounter is playful interactions which are more pleasurable and joyful experiences [38] with acquainted or unacquainted others. In this area, there have been explorations for motivating people to act together by making eye contact [7]; and using playfulness to promote interactions through urban [51] and cultural [34] games. Besides, frameworks have been developed to define the design values for playful social interactions [10] and the design space around these interactions [49]. Opportunistic experiences, which are daily-unplanned social interactions in public places, have also been explored and promoted through multimedia technologies that find the opportunities for these unplanned interactions by using ubiquitous technologies [45], which can allow participants to connect with low effort with people around [74]. Finally, emergent interactions are related to the imminent characteristic of initiating an interaction. In this area, studies have also used playfulness to create interactions, for example, studying the emergence of interactions between geo-catchers [40] and spatial arrangements of the participants within the moments before starting an imminent encounter[46].

Studying the characteristics that these kinds of interactions highlight, we observe they focus on exploring how interactions are started rather than providing knowledge on how interactions could be meaningful. Additionally, these explorations do not include an analysis of how people from different cultures could get in contact.

2.2.1 Intercultural Meaningful Social Interactions. Meaningful Intercultural interactions refer to encounters held between individuals from different cultures, ages, faiths, genders, or socioeconomic statuses, which are memorable and positive, and generate some kind of impact on the individuals engaged in the interaction [28]. Previous work concerning IMSI has explored how the elements of a participatory art project enabled and disabled meaningful interaction between young people with African and British heritage [4]. In this study, the authors used Prat's concept of *contact zones* [55], referring to social spaces where diverse cultural groups meet and interact, sometimes in conflict. Still, the authors posit that contact

zones have been missing from the projects aiming to promote social inclusion. Also, [72] explored place attachment in Kuala Lumpur, finding that the development of meaningful spaces could influence it, but the study does not explicitly characterize these spaces. Moreover, [67] investigated the meaning people attach to intercultural contact and how different places influence this contact. They identified three learning processes during intercultural communication: qualification, socialization, and subjectification.

Additionally, previous work has aimed to propose design guidelines to create design concepts that promote IMSI. For instance, [60] proposed four stages of IMSI: start, the meaningful moment, closure, and an after-interaction self-reflection stage. Besides, this study suggested elements that characterize different configurations of IMSI: group size, duration, mobility level, kind of communication, and proximity. Additionally, [59] proposed eight design strategies to promote IMSI. The strategies are: Facilitating Empathy, Syncing feelings, Supporting understanding, Boosting confidence, Nudging positive perspectives, Experiencing together, Encouraging Cross-learning, and Identifying similarities. Finally, [57] identified five impacts that IMSI provokes on individuals: developing self-knowledge, creating ties between intercultural strangers, building trust, spreading joy, and encouraging kindness. The authors also explain that different factors influence IMSI, for instance, previous experiences, individual traits and preferences, the need to keep balance and personal space, language barriers, known and unknown biases, and unspoken social rules.

Most of these works expressed that people cannot be forced to interact, and there should be a broad spectrum of opportunities to promote meaningful encounters as broadly understood [4, 28, 60]. As a result, they urge that local governments, as well as the general public, recognize their importance and seek to facilitate, encourage, and promote meaningful relationships in all their forms. Hence, seeking ways to make meaningful interaction in cities easier is necessary as they emphasize that fostering contact is about facilitating interactions and connecting them to other everyday activities.

2.3 Participatory futures

Participatory futures aim to directly engage individuals involved in a potential future scenario in imagining, envisioning, and dreaming of alternative futures [20, 22, 65, 71]. In a way, it does not aim to predict one single future nor state how it should be but to provoke and debate around participants' dreams and imaginaries of futures. This approach has shown to be helpful in including relevant participants in co-speculating futures of human rights [5], engaging individuals in future experiences around data and privacy [65], and collaboratively exploring urban technologies [9].

Methodologically, participatory futures use scenarios and fictions portraying alternative worlds [18, 19, 35, 62] to enable participants' creativity. Further, these worlds open up reflections about participants' experiences, influencing a discussion for building and transforming meanings of reality and potential futures [6, 41, 63]. Speculations also allow discussing what kind of emerging technologies could be part of potential futures and how it would be to live in such a world [8]. Moreover, by reflecting on these aspects, it would also be possible to compare realities and potential futures [36] hence approaching individuals' values, beliefs, perceptions, and dreams through these inquiries to collaboratively build visions of what futures participants want [65].

Therefore, by exploring participatory futures, we expected to gather imaginaries of future emerging technologies while creating a space for participants to discuss and reflect on those potential technologies, thus generating a collaborative process of imagining and discussing futures [27]. Additionally, to guide this process, design tools help promote a shared understanding of relevant concepts and link cognition and action to achieve a design outcome. For instance, cards are portrayed as a source of inspiration while ideating, and personas and journey maps are often characterized as tools that contain relevant synthesized information that is key to the design process [2, 11, 39]. However, we have not found previous examples of how to apply this approach in intercultural settings.

2.3.1 Aim. With all the above, we have found a lack of exploration on how emerging technologies could facilitate IMSI. Consequently, the potential of tech to enable IMSI is currently underexplored. Thus, we set ourselves to explore potential emerging technologies to enable IMSI with a participatory futures approach where participants, who are the people involved in such interactions, co-speculated ideas and explained how their concepts could promote IMSI in Istanbul in 2050. As we did not find previous examples of participatory futures workshops with intercultural participants, we created and iterated a set of tools and structure to ignite participants' futures thinking and discussion. In the next section, we introduce the process of structuring and conducting the workshops with local and international participants living in Istanbul.

3 METHODOLOGY

3.1 Workshops procedure

We conducted participatory futures workshops for participants to co-speculate ideas about possible technological interventions that could be useful to promote IMSI in public places in Istanbul of 2050. For this purpose, we created a workshop structure that could guide participants to ideate and present their ideas and a set of tools to enable their creative thinking and promote a shared understanding of IMSI. We conducted the workshops online using Zoom and Miro as, at the moment of this research, Istanbul was still facing social contact restrictions due to COVID-19.

3.1.1 Structure and materials. Once participants joined the Zoom meeting, each participant and facilitator introduced themselves to the group. Then, we explained the workshop's aims and structure, followed by a definition of IMSI characteristics [4, 25, 60, 61]. We randomly created the teams, which were dyads or triads of intracultural (i.e., just Turkish participants) and intercultural (i.e., migrants and Turkish participants) attendees. Each group was then directed to breakout rooms to proceed with the workshop and create their ideas.

The activity had two stages: The first stage was future-oriented [31]. In this section, participants worked in teams to ideate emerging technologies that could promote IMSI in the future of Istanbul in the year 2050. For the latter, we presented participants with different tools.

We presented them with a scenario of an alternative future [18] in which they were part of a team of designers creating technologies

for people to meaningfully meet in public places of Istanbul in 2050, after people revolted against a dictatorial rule of the world that had led to increased division and prejudice over the years. We introduced them to the global situation of that era and their mission: designing solutions to facilitate meaningful interactions in public places and new ways of interacting while considering people's differences and reluctance to interact (Figure1).

Participants created their design challenge by selecting a place in Istanbul where they would situate their story of intercultural meaningful contact; second, participants used cards (Figure1). to define the characteristics of IMSI they would want to promote. The cards introduced the concepts of meaningful social interactions and their relevant aspects to make participants understand and internalize these concepts. We created the cards according to previous work, which defined the impact of IMSI [28, 58, 67], the strategies to promote them [3, 59], and the elements of interactions [24, 60].

The participants created *diversity personas* that represented characters they would be ideating for. The tool aimed to facilitate participants' target focus on a person with specific characteristics and experiences who will become their user. Besides, it helped with the empathy and creative process of ideating for different people (Figure2). We asked that at least one of these personas represented a migrant in the context of Istanbul in 2050. We created the templates for these personas by taking a regular persona template and then adding and highlighting diversity aspects such as languages spoken, migration status, values, beliefs, and personality characteristics [56]. Additionally, we added a section describing a meaningful interaction story that that persona experienced. Each participant created one diversity persona.

Participants conducted a collaborative ideation session which was finalized by using an IMSI journey map (Figure2) to define their emerging technology further. This journey map highlighted critical moments of intercultural meaningful interactions according to [60], which were: start, meaningful moment, closure, and reflection.

Finally, they created a *cover story* briefly summarizing their idea and how the interaction developed. We created this template in the form of a newspaper front page.

We conducted all these stages in a single Miro board that integrated the tools and instructions to guide the development of the workshops. After completing this stage, participants had a break.

The second section of the workshop was back-casting. At this moment, the participants presented their ideas and discussed them, giving their overall impressions of their emerging technologies concepts, explaining what was meaningful about their ideas' potential implications and finalizing by sharing their general perceptions on their experience participating in the workshop dynamic.

3.2 Participants call

We invited participants through an online open call by contacting NGOs working for social inclusion, the social media of such NGOs, and our own research group's social media. With the open call, we shared a survey through which participants could learn the purpose of the activity and enroll for a specific date. Once they registered, we sent each participant a calendar invitation so they could confirm their participation. Each invitation contained a Zoom link through which they could join the activity.

3.3 Participation

We conducted eight workshop sessions during the summer of 2021. Thirty-five participants attended; their ages ranged from 19 to 55. The participants' occupations varied from university students, professionals looking for a job, municipality and NGO workers, and one retired person. All of them have had a previous intercultural experience (i.e., interaction with someone from a different country or culture). All participants joined voluntarily and could leave the activity at any moment. Some participants left the workshop during the first ten minutes due to language barriers or misunderstanding of the topic. In this study, we report only on the engagement of participants who completed all the workshop activities. The demographics of the participants are presented in Table1. In these tables we grouped participants according to the teams they worked in, whether on intercultural or intra-cultural composition.

3.4 Analysis methodology

We collected 40 hours of audio recordings and transcribed them using Panopto[1]. Then we revised the transcriptions to corroborate their accuracy. We only used the discussion section's audio recordings as data (i.e., the section of the workshop in which participants presented their emerging technologies ideas and discussed them). Thus, we were already familiar with the data as we conducted the workshops and revised the transcriptions before coding.

We applied a reflexive thematic analysis [14, 15] which focuses on analyzing qualitative data to understand participants' experiences, perceptions, and representations in relation to a specific topic. In this case, we focused on understanding the potential futures participants envisioned and the technologies possible in that context of Istanbul of 2050, as well as their perceptions of being part of the workshop. Consequently, we first created a list of codes according to the themes we explored in the back-casting section while being open enough to include or edit the themes and codes as we analyzed. Initial themes included *Kind of technology, Technology Feature* and *Feedback*. Then we added subcodes according to smaller data units. Examples of subcodes were *feedback_cards, feedback_avatar, and feedback_workshop*. We continued coding in collaborative sessions, discussing the codes, updating the final list of codes, and categorizing them according to time frames (i.e., about the future, about the present). We conducted three sessions using Taguette[2] to highlight the relevant quotes, in which all the authors participated. With all the above, we ended the process with seven codes grouped under three themes: *Visions of the future, Perceptions of the Present,* and *Workshop Implications*.

4 FINDINGS

4.1 Participants' Co-speculations

Participants created 15 stories of meaningful interactions between intercultural strangers (Table2). These stories narrate how interactions developed and introduce technologies that would be used for promoting these interactions.

Idea1 was an extended reality game promoting intercultural contact between individuals who were curious about another country.

[1]https://www.panopto.com/
[2]https://www.taguette.org/

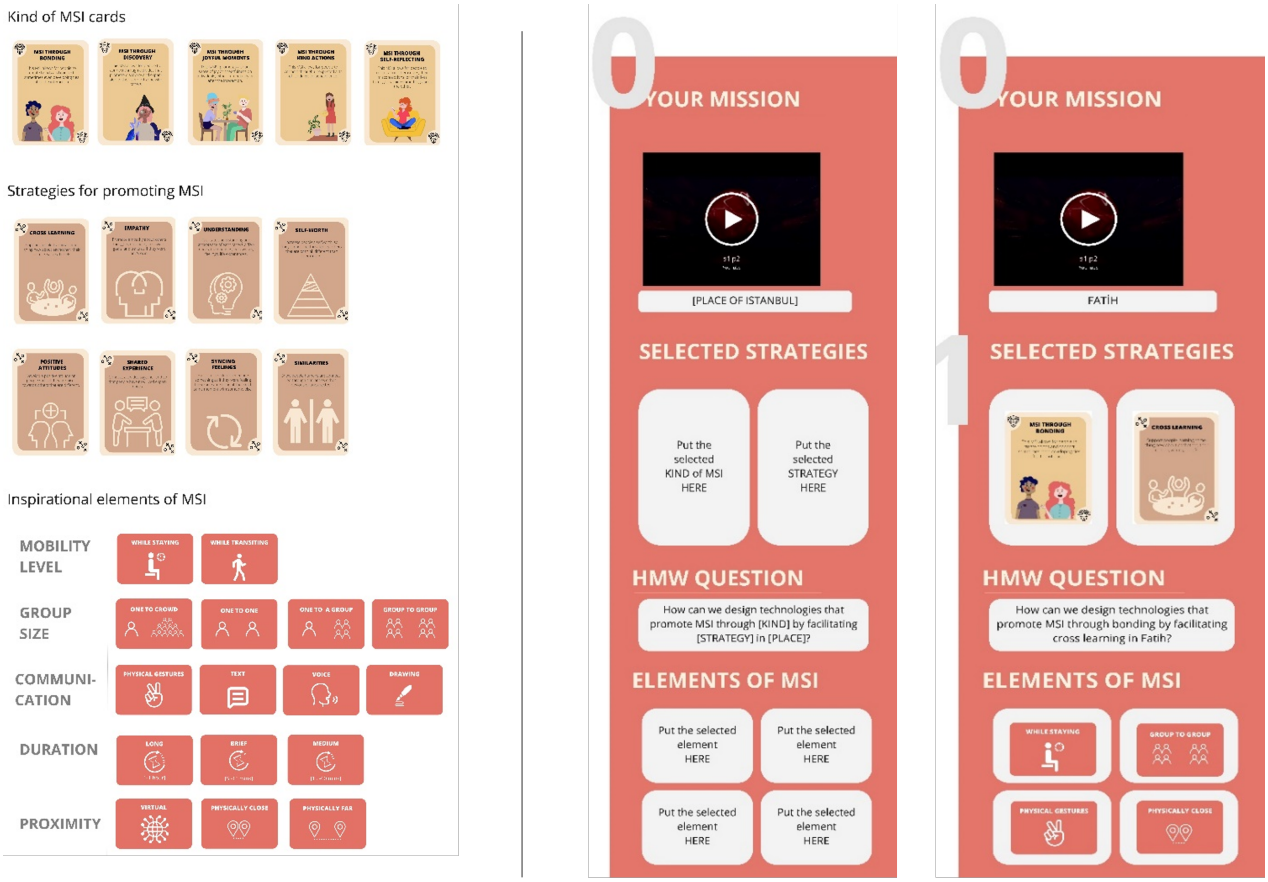


Figure 1: Example of materials. From left to right, first, we present the card decks, then the template to determine the IMSI design challenge (step 1 and 2) and an example of a filled template

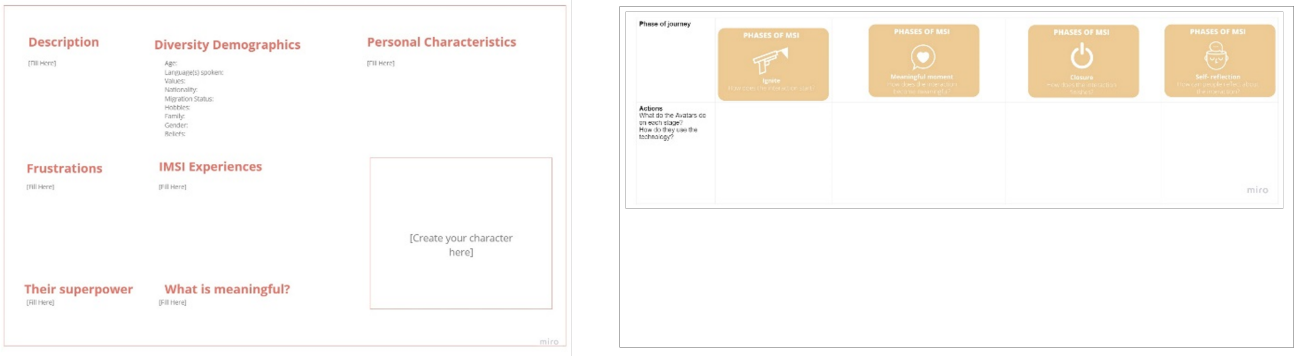


Figure 2: On the left the template of a diversity persona, on the right the template of an IMSI journey map

Idea 2 was a VR experience developed through different devices to find similarities and understand each other's points of view. Idea 3 was an extended reality experience established through a book for people to have a shared experience through their similar interests. Idea 4 was a technological device to help people overcome cultural and language barriers. Idea5 was a VR experience that showed how people from different cultures live their life for cultural exchange. Idea6 was a digital experience for people to develop intercultural contact in a fun way. Idea 7 was a virtual hub to provide intercultural support to each other. Idea8 was a device for intercultural participants to make art together. Idea 9 was an extended reality art exhibition to promote intercultural art exchange. Idea 10 was an extended reality experience to create an online intercultural

Table 1: Participants' demographic information. On the right, participants working on intracultural groups. On the left, participants working on intercultural groups.

ID	NATIONALITY	GENDER	OCCUPATION	AGE
3	Turkish	F	Insurance specialist	28
4	Turkish	F	retired	55
6	Turkish	F	Student	19
7	Turkish	M	Training content creator	28
8	Turkish	M	Assistant specialist	31
9	Turkish	F	Psychologist	25
17	Turkish	M	Expat center director	44
18	Turkish	M	Lecturer	46
21	Turkish	F	Psychology Student	20
22	Turkish	M	Engineer	27
23	Turkish	F	Graduate student	24
24	Turkish	M	UX designer	25
25	Turkish	F	Business owner	39
28	Turkish	F	Product manager	28
30	Turkish	F	Design student	20
31	Turkish	F	Mathematician	27
32	Turkish	F	Visual designer	30
34	Turkish	F	Design Student	19

ID	NATIONALITY	GENDER	OCCUPATION	AGE
1	Vietnamese	M	Student	21
2	Turkish	F	Student	23
5	Lebanese	F	Student	19
10	Turkish	F	Midwife	26
11	Turkish	F	Visual designer	25
12	Chinese	F	Student	20
13	South Sudanese	F	NGO volunteer	28
14	Colombian	M	Teacher	27
15	Indonesian	M	Engineering Student	18
16	Russian	F	Teacher	30
19	Turkish	F	Urban planner	30
20	Pakistani	M	Researcher	32
26	Turkish	F	Design Student	22
27	Turkish	F	Architect	25
29	Turkish	F	Design student	20
33	Turkish	F	Student	21
35	Morocco	F	Psychologist	24

interaction space. Idea 11 proposed redesigning public transportation spaces to help different individuals integrate into society. Idea 12 was a device to facilitate understanding between diverse people. Idea 13 was an app to create distant contact with someone by helping them discover the city and get in touch. Idea14 was a 3D food printer to promote Intercultural food exchange with feelings attached. And Idea 15 was a redesign proposal for a public park to give more opportunities for people to exchange their cultures.

4.1.1 Patterns. Among the ideas participants presented, we could find some patterns. For instance, participants introduced different multisensorial experiences (e.g., Idea2, Idea5, Idea14) in which people could exchange experiences such as bodily sensations and memories. These participants expressed that these kinds of experiences were relevant as just seeing from somebody's eyes (referring to VR) might not be enough to empathize; it might be needed to feel what others feel. Further, participants seemed to think these experiences would be ordinary in the future and could support connecting meaningfully. Still, these proposals had some ethical considerations that participants also discussed. For instance, they thought someone could misuse multisensorial experiences and take advantage of them. Hence, it could make someone too vulnerable to people with bad intentions.

Other ideas had both digital and physical components (e.g., Idea7, 10, and 13). For instance, starting an interaction online and continuing it in person or interacting in a digital city and having those interactions impact an actual physical location of Istanbul. Hence, it seems that the digital and physical worlds might be more intertwined in the future. Moreover, participants discussed that we might not even be able to perceive a big difference between these realities (i.e., digital and physical) and what happens in which place. Furthermore, in the future, it might not even be relevant to differentiate between physical and digital realities as they might complement each other.

Most of the ideas were related to XR technologies (e.g., Idea1, Idea2, Idea4). While discussing them, participants expressed that even if some of these technologies are available today, it is not a common thing for most people in Istanbul. Therefore, even if some of these ideas were evaluated as less out of the box, they expressed that it would be a common aspect of the future to access these experiences and an easy way to promote IMSI.

4.2 Perceptions of future intercultural contact

The presentation and discussion of the ideas allowed us to explore imaginaries of the futures of IMSI in Istanbul of 2050, which we now introduce of visions of the future.

4.2.1 Vision1: interculturality beyond migration. When asked how they thought intercultural contact would be in Istanbul in 2050, most participants thought interculturality would not be about passports or nationality. Instead, interculturality would be based on

Table 2: Description of the ideas created and the cards selected for each concept. In the *idea* column, we described the composition of each group that created each idea as intra (i.e., intracultural) and inter (i.e., intercultural).

Idea	Description	Focus	Cards Used
Idea1 Intra	Augmented (AR) reality bar game that connected people from different countries to a culture they could be curious about	Helping to find people to interact with and overcome the lack of motivation to interact by giving them a shared goal	Kind of IMSI: Joy Strategy: Shared experience Elements: Group size: 1 to1 Communication: By text Duration: Brief Proximity: Physically close
Idea2 Intra	Extended reality (XR) experience ignited through a watch and headphones	Finding people to interact with while avoiding misunderstandings from different cultures and points of view	Kind of IMSI: Bonding Strategy: Shared experience Elements: Group size: group to group Mobility: Staying Duration: Medium Proximity: Virtual
Idea3 Intra	XR book experience that allowed people to meet in a different time and space by sharing an excerpt from their favorite book	Tackling people's lack of skills to connect in real life	Kind of IMSI: Bonding Strategy: Shared experience Elements: Group size: 1 to a group Mobility: Staying Duration: Medium Proximity: Virtual
Idea4 Inter	A system that helps people connect by translating and guiding their interaction	Overcoming cultural and language barriers	Kind of IMSI: Joy Strategy: Similarities Elements: Group size: 1 to 1 Communication: Oral Duration: Long Proximity: Physically close
Idea5 Intra	VR experience that allows the user to see each other's lives and understand them	Finding people to interact with and facilitating the interaction	Kind of IMSI: Self-reflection Strategy: Shared experience Elements: Group size: 1 to a group Mobility: Transiting Communication: Oral Proximity: Virtual
Idea6 Inter	Hybrid cultural event based on VR and online content, promoting intercultural contact in a fun way	Facilitating intercultural knowledge and contact	Kind of IMSI: Bonding Strategy: Cross learning Elements: Group size: group to group Mobility: Staying Communication: Gestures Proximity: Physically close
Idea7 Intra	A virtual hub where people can tackle current city issues together	Enable people to help each other and have a tangible impact from a virtual space and let people get to know different cultures by discovering the world virtually	Kind of IMSI: Discovering Strategy: Cross learning Elements: Group size: Group to group Mobility: Transiting Communication: Gestures Proximity: Virtual
Idea8 Inter	A Device to create art together in a coffee shop providing alternative ways of communicating	Tackling language barriers and the incommodity of starting interactions with strangers	Kind of IMSI: Bonding Strategy: Understanding Elements: Group size: 1 to 1 Communication: Drawing Duration: Medium Proximity: Physically close
Idea9 Intra	AR intercultural art exhibition that displays intercultural art pieces and provides instances to interact with others	Exploring art as a means to connect with others, this idea tried to provide more access to art created by artists from other countries	Kind of IMSI: Joy Strategy: Syncing feelings Elements: Group size: Group to group Mobility: Staying Communication: Oral Proximity: Virtual

Idea10 Intra	An online platform that promoted intercultural interactions in the form of an AR and VR system to discover the cultural layers of Taksim	Tackling problems of access to the physical space, the issue of not knowing when and with whom to interact, and language and cultural barriers	Kind of IMSI: Joy Strategy: Cross learning Elements: Group size: group to group Mobility: Transiting Communication: Oral Duration: Medium Proximity: Virtual
Idea11 Inter	A new transportation system promoting multiculturality, the system includes kiosks, cultural stores, and transportation	Tackling difficulties Martians could experience while integrating into regular life in Istanbul (e.g., moving around, using public transportation).	Kind of IMSI: Kindness Strategy: S-worth Elements: Group size: group to group Mobility: Transiting Communication: Gestures Proximity: Physically close
Idea12 Intra	Contact lenses that allow users only to see similarities, thus facilitating understanding between Martians and earthlings	Tackling the lack of contact due to physical and language differences	Kind of IMSI: Self-reflection Strategy: Similarities Elements: Group size: Group to group Communication: Oral Proximity: Virtual and physically close
Idea13 Inter	An app for people to interact while on the ferry, users receive a recommendation to visit certain city places based on a drawing they have to elucidate	Tackling the problem of not knowing a town or people in that city	Kind of IMSI: Discovery Strategy: Understanding Elements: Group size: Group to group Mobility: Transiting Communication: Drawing Duration: Medium
Idea14 Inter	A 3D food printer for food exchange with memories, feelings, and experiences attached to the food	Creating another level of understanding between the involved participants	Kind of IMSI: Kindness Strategy: Empathy Elements: Group size: Group to group communication: Gestures Duration: Brief Proximity: Physically close
Idea15 Inter	Redesign the experience of going to Macka Park, proposing new playground and activities to give more opportunities for people to exchange their cultures and interact around them	Tackling the lack of intercultural public places	Kind of IMSI: Discovery Strategy: Empathy Elements: Group size: 1 to 1 Mobility: Transiting Communication: Gestures

ways of thinking or personal values. On the other hand, participants thought that intercultural contact would most probably be performed through apps and platforms to help people connect at various levels through different multisensorial experiences. For some people, this was positive as it could make it easier to interact with others. However, some participants perceived it as unfavorable as people might lose the human ability of interpersonal connection by developing it through technology or entirely relegating it to the latter. . Also, participants felt that people in the future would be more inclusive and open to new experiences and meeting other people than in the past (i.e., our present). For instance, P5 said, *"I feel like Istanbul in 2050 will be very multicultural, considering the number of immigrants that Turkey welcomes. And I think the initiative for more inclusive conversations regarding multiculturality and multicultural dimensions is necessary".*

4.2.2 Vision2: the impact of multisensorial experiences. The stories from the futures pose alternatives or even complement ideas of the futures. There was a trend in proposing different multi-sensorial experiences in which people could exchange felt experiences such as body sensations and memories, for instance, seeing as someone else sees or feels (e.g., ideas 1, 2, 3, 5, 14). Participants discussed different sensory levels feeling what others feel would be more impactful than just seeing from somebody's eyes (i.e., compared to VR). Further, participants thought these experiences would be ordinary in the future and could support connecting meaningfully. Still, these proposals had ethical consequences that participants also discussed. For instance, they thought that someone could make inappropriate use of these experiences and the personal information involved. Hence, it could make someone vulnerable to potentially harmful people or people who would want to take advantage.

Similarly, vision2 is related to finding other ways of communicating beyond an individual's language. For the latter, some ideas proposed diverse ways of communicating (e.g., ideas 8, 9, 14, 15) or facilitated intercultural communication (e.g., idea 4). The participants discussed relevant aspects concerning these ideas, such as their quality of finding another layer of contact, for instance, art, food, and memories. Supporting this vision, P16 explained that

"(by) tasting their food you can understand the tastes of the different cultures, maybe there is a story which connected to this food, kind of the background behind the dish. And the person through this experience can reflect on themselves", additionally concerning art, P26 explained that "*it is good because you don't judge your partner, you don't know each other, and you go out there, draw something, draw what comes from your heart, what comes from your mind, and then you unify those things. And it will give you the feeling that we are different, but we can be one together*".

4.2.3 Vision 3: navigating from digital to physical interactions. Six ideas had both a digital component and a physical component, meaning that the interaction could start through a digital platform and continue in person (e.g., ideas 5, 6, 12, and 15) or involve interacting in a digital city and having those interactions impact an actual physical location (e.g., ideas 7 and 10). Hence, participants perceived that more interactions would begin digitally, and the in-person interaction would only happen once participants built trust in one another.

However, who they would be able to meet in those digital spaces might also present a level of exclusion. Concerning digital places, participants perceived social media as a public place because they are open to everyone. They also mentioned that people are spending more time on these platforms because they might want to be in places where they feel more equal than in current reality, a need they thought would increase in the future. However, an opposing perspective expressed that different digital worlds would provide different experiences for different people, thus creating different access levels linked to their social and economic status. For instance, P8 said that *"maybe there will be special platforms for some people since we have these special luxury restaurants for them to feel much more superior, maybe they can have like that kind of closed groups, platforms that will not (be) accessed by others".*

Moreover, some participants thought that as real-life experiences become increasingly expensive, the digital world would provide experiences for people with low resources while real-life experiences (i.e., really traveling) would only be for wealthier people. As an implication, a participant expressed there would be a digital overload that would only be experienced by people with less economic resources (i.e., they might need to watch many ads, being infoxicated). Consequently, there would be a socioeconomic hierarchy in the digital world.

4.2.4 Vision4: complementing hybrid realities. Overall, the discussions reflected that the digital and the physical worlds might be more intertwined in the future, so much that we might lose the ability to identify which is real and what happens in which place. Participants actually discussed that it might not be a relevant difference to make in the first place as both (i.e., digital and physical) would form one entity.

With these second-life ideas about a virtual life that connects to the physical one, some ideas extended power issues from the current social exclusion to a possible digital future (i.e., privileged vs. unprivileged groups). Further, this discussion initiated a debate around post-truth, mentioning that people in the future might not care about what is real anymore. In a way, some participants thought there would be a redefinition of what is real as more people start complementing their in-person lives with digital lives (i.e., second life) or even transitioning towards mainly digital lives, which presented opposing perspectives. On the one hand, participants thought that people could feel freer to be whoever/do whatever they want in the digital space without the social pressure they might feel in the physical space.

On the other hand, some participants questioned whether that life was real or not, expressing that it is unclear what would be true. Moreover, they criticized the relevance of digital lives in the future, arguing that people would forget human-like activities because there would be no in-person activities; for instance, people exploring cities or finding topics to talk about. They further expressed that as everything would be automatized, there would not be a need to put effort into doing these activities or engage in interactions. Additionally, some participants thought people would lose the ability to empathize with others. Nonetheless, the participants also speculated this would not be a fixed state; once people realize they are losing something inherently human due to the strong influence of technology, they would try to regain it and propose new social changes.

4.2.5 Vision5: contact ahead of borders and governments. Another vision revolved around individuals helping each other (e.g., ideas 7, 10, and 11) and creating together (e.g., ideas 8 and 13). For instance, idea seven was about a digital world in which people from different countries would help each other overcome their local social problems. Hence, it seems like participants envision more collaboration among people and citizens from different countries than government involvement in various issues. With these ideas, in a way, participants perceived fewer barriers to experiencing and learning about cultures and between geographical countries and international people, hence the relevance of digital experiences to facilitate IMSI. Nonetheless, participants identified negative consequences of the technologies they ideated. For instance, the ideas that promote the exchange of felt experiences can open the door to abusing the knowledge of a person's previous experiences, interests, or memories. Therefore, participants also discussed that as life becomes more digital, there would be a need to create digital police to fight digital vandalism. In a way, participants think such online control could avoid bad experiences, violence, and discrimination, among other things that might need to be regulated in the future.

4.2.6 Vision6: delaying biases. A more controversial vision was related to the stories that used hiding an aspect of the self as a strategy to decrease differences (i.e., idea11 and idea 12). This idea was discussed from different perspectives concerning its implications for diversity and meaningful intercultural interactions. For instance, while hiding aspects of the self could be beneficial and not create conflict, it is unclear whether it is ethical to promote it or whether erasing differences could encourage tolerance and diversity in society. However, P25, who proposed such an idea to ignite the interactions, explained that "*they can eliminate the differences and come to terms with their similarities. We hope and believe that these two communities can build better relationships and learn from each other without feeling inferior or superior to each other when we physically and knowledge-wise make these groups in an equilibrium".* Therefore, suggesting that humans can only understand each other by being the same, which is against interculturality and diversity.

Nevertheless, participants argued that these experiences could be helpful in specific moments. For example, some international participants mentioned that if they could momentarily change their appearance to physically blend or know more about the culture in particular locations of Istanbul, they would adapt easily to the city. Accordingly, it could be helpful in specific moments of the interaction, but not on its own. However, due to its possible negative implications, this approach must be supported by other methods that promote accepting people with their differences.

4.3 Perceptions of the present intercultural contact

Overall, participants perceived Istanbul as a multicultural city. Many participants referred to Istanbul as the world's capital, expressing how it is a cosmopolitan and multicultural city where diverse aspects of various cultures could be found. So much that participants thought it could be confusing, even more for tourists and migrants, because there is so much to see and do. However, this was also discussed as what makes Istanbul an attractive and exciting city. Further, compared to other cities in Turkey, it was identified as already more technological regarding its public places. For instance, P13 explained, "*I've already seen incorporation (of technological interventions). In the Gayrettepe metro station, there is dialogue in the dark (i.e., a museum promoting visitors experiencing the world as visually impaired people). So, interventions like that, good technology, could make the interactions (between people) better".*

However, P14 mentioned that *"if you are not a cisgender white looking middle-class man"*, it was harder to inhabit the city, referring to discrimination experienced by some groups. Likewise, participants referred to geographical exclusion, in the sense that people who do not belong to an area are excluded from that place or judged; as P14 added, *"in Istanbul right now, I've seen some controversies because certain people are using and are coming to the coast that doesn't belong to their neighborhood, so, there is this idea that even in the public spaces and in cities as crowded and diverse as Istanbul, there are certain public spaces that are only for certain groups of people".*

Turkish participants were more critical of the city than international participants. Turkish participants expressed that people were currently pessimistic about the future, and that the social and economic crises make people hopeless. For instance, P22 said, *"Turkey is not the best place to be positive, so most people will say depressive things about it; however, if you are going to talk about the good future, Turkey has potential*". We observed throughout the workshops that there could be a higher sense of mistrust in Turkish participants than in international participants. For instance, P6 expressed that sense of mistrust by saying, "*we don't know the foreigners' intentions, so maybe they want to harm us or not just us but the country*". International participants had a more positive stance about the city, although they all expressed experiencing discrimination while living in this country. Therefore, their fears were mostly related to experiencing discrimination again, which was a more significant concern when participants presented physical characteristics linked to nationality or ethnicity.

Notwithstanding the different perceptions and pessimistic perspectives, by the end of the workshop, participants expressed having a more hopeful sense of the city for the future, ignited by the intercultural discussion of the different perceptions of the city. Also, we noted that the discussions about the present were related to what futures participants dreamed of for Istanbul. At the end of the workshops, participants expressed hopes of a less crowded, greener, and more just Istanbul, where diversity is accepted and people with their differences can live peacefully.

4.4 Participatory Futures Workshops

We created these workshops' structure to promote participants' future thinking and creativity in ideating, imaging, and dreaming of alternative futures and potential technologies for IMSI. For the latter, we ideated and iterated different materials. After the eight sessions, we extracted some findings concerning these materials.

4.4.1 About the workshop experience. Concerning the online format, participants had mixed perspectives. For instance, some participants found it challenging and frustrating that we conducted the activity online. Some felt overwhelmed by using different digital tools at once. P9 said, *"using Miro was enjoyable, but switching between the tabs was hard, and it distracted me*". Additionally, some participants mentioned they would like to see other people's faces while using Miro. So, looking at someone's face was relevant for them to engage in the activity. However, some participants expressed that opening their cameras felt like opening a space of their home to strangers. Further, some felt uncomfortable at the start of the activity while working with someone they did not know. Nonetheless, they mentioned feeling comfortable and having fun with their peers by the end of the workshop. Consequently, the online format positively and negatively affected participants' engagement.

Likewise, participants mentioned having fun with the dynamics and feeling comfortable while ideating. It seems that the creative action enabled them to overcome some initial barriers even though thinking outside the box could make them shy in the first instance. Concerning the obstacles they experienced during the activity, we found different patterns concerning the group composition. For example, participants in the intracultural teams described the challenges they had to *"let their imagination fly"* (P16), or to express what "*was in their mind when [they] do not have a clear idea themselves*" (P25). In intercultural groups, participants expressed barriers such as conducting the activity in a different language and the lack of common references (culturally) that could help them create a shared understanding and share jokes. For example, P11 expressed her intercultural experience by saying, "*to be honest, it was not that easy. Especially if you have so many differences in backgrounds, it's much harder. But my partner had so much imagination, and it inspired me*".

Nonetheless, the participants mentioned they valued the workshop as a space to collaboratively build ideas and potentially feel they have a chance to influence the future and think differently about it. Moreover, some participants also mentioned they were amazed by how they could dialogue with another person from a different culture, understand their perceptions, and honestly share their own. In a way, we observed that by getting in contact and building something with someone from different culture, which at the same time has the goal of enabling interculturally meaningful interactions, they also get engaged in a meaningful interaction with

the other people on their team by sharing their previous experiences and perceptions while building the co-speculations.

4.4.2 Cards. We presented participants with three sets of cards, the first relating to the kinds of impact IMSI produced [28, 58, 67], the second presenting design strategies to promote IMSI [3, 59], and the final set showing the various elements of IMSI [24, 60][60]. The cards helped create a shared understanding of core IMSI concepts. Further, while selecting the cards, the participants could differentiate between them and share their preferences. The cards subsequently served as a base that oriented and inspired the participants in their ideation processes.

Overall, when evaluating the ideas concerning the kind of IMSI selected, we observed that 14 of them matched the brief created through the IMSI card selection, while idea14 was more closely associated with a different kind than the participants' selected one. Further, concerning the design strategies for IMSI, 14 ideas integrated their selected design strategy while also integrating another strategy at some point in the interaction process. Still, Idea14 was evaluated as applying a design strategy different from the one the participants selected.

The elements were slightly more challenging to interpret when using the cards as a criterion to evaluate them. For instance, we found more alternatives than the participants defined when considering the contexts of use, specifically the group size. In this case, even when the technologies were designed to promote group interaction, the participants' stories could be narrating a one-to-one interaction or vice versa. Therefore, group size could fit with different use contexts. Additionally, mobility level was also slightly complex to analyze because even if sometimes the technologies were created to be used while staying in a place, apps and digital technologies allow interaction to happen while moving around a city by holding an interaction in an app. In fact, with virtual realities, mobility levels were even more intertwined because VR headsets could be used in a private space, for instance, a living room, where a participant is staying. Still, the interaction could be held in an alternative world where participants could be moving around the city.

4.4.3 Diversity personas. Participants created diversity personas during the workshop. We designed this tool to make potential cultural and personal differences visible among the characters that should interact meaningfully through the emerging technologies ideated. Overall, participants found the diversity avatar idea valuable as it helped them ideate and connect with the activity and the character they were ideating for.

When integrating diversity personas into their dialogues, participants were generally referring to them in the third person (e.g., my avatar would not like this, would not accept that), but in some cases, participants referred to them in the first person (e.g., I am not too fond of this, I do not support this) when talking from the perspective of the avatar, hence taking a more personal identification with the character. Therefore, participants experienced different levels of empathy and identification with their created characters. Moreover, some groups discussed how they felt similar to their diversity personas in that they were also intercultural strangers and interacted meaningfully through the workshop. Moreover, it was a tool that allowed participants to also share parts of themselves and previous experiences with each other, through the avatar.

Diversity personas also seemed to integrate some stereotypes participants had about nationalities with some character traits and access to technology. For instance, if they portrayed a character that was a migrant from middle east countries, participants associated it with being a refugee and not having access to technologies. Thus, this tool was helpful for participants to identify and discuss stereotypes, how other cultures perceive Turkish people, and how different cultures are perceived in Turkey. For instance, most of the migrant diversity personas were not Europeans; however, there were two German characters who, in their characteristics, were presented as more liberal. Concerning gender, some participants created female characters who could understand each other just because they were women. Hence, there was a supposition that people labeled with similar stereotypes were expected to relate to and understand each other, making them homogeneous. Therefore, it seems some participants understood each other in a single-layered fashion (i.e., being one thing) instead of multilayered (i.e., being many things simultaneously). However, participants argued that the diversity personas allowed them to think about their character more thoroughly.

Finally, participants mentioned how these ideas impacted the avatars' lives and their characteristics when presenting emerging technologies. For instance, they explained that after the IMSI, their diversity persona realized something or learned something. In this sense, the diversity persona allowed them to identify traits that could be improved to create personal growth, thus determining the positive impact of IMSI on their characters.

4.4.4 Journey map. The journey map allowed the participants to organize the idea they selected during the ideation process into a structured sequence of events constituted of four phases: the ignition phase, the meaningful moment phase, the closure phase, and the self-reflection phase[60]. Overall, participants mentioned that the journey map guided them to detail their idea and showed how their avatars, the card selected, and the technology created were linked, creating a coherent story. Therefore, this tool helped connect different aspects of their emerging technologies with actions and reactions of personas according to each stage of IMSI. Additionally, it allowed them to think about the emerging technologies' potential impacts on the characters, a function we did not initially expect.

4.4.5 Board. The board we created to conduct all sections of the workshop provided a co-working space that guided the activities and connected the different steps of the workshop. According to the participants' comments, the board also promoted a feeling of progress for the participants since they could see all the outputs of all the activities they completed in one place. Since all groups worked on the same Miro workspace on different boards, it also allowed them to feel enthusiastic by giving visibility to the activities of the other groups who attended the workshop. However, the participants still commented that they might need more links between the different stages of the workshop to understand the connection between the activities. They perceived they could only understand how everything came together at the end of the future-oriented section when they created their stories.

5 DISCUSSION

5.1 Lessons from enabling participatory futures

5.1.1 About the tools. The purpose of this workshop was for intercultural strangers to get together and ideate concepts of emerging technologies that could promote IMSI. We created scenarios that ignite their creativity skills as a usual practice to encourage participants' future thinking and different tools that could guide participants' thinking process and promote a shared understanding of concepts [2, 5, 11, 27]. Through the workshop, we could observe that the structure and tools helped enable participants' future thinking and creativity skills. The cards helped promote a shared understanding of IMSI that could provoke participants' thoughts and discussions about alternative possibilities concerning emerging technologies and IMSI.

Second, the diversity persona was helpful in enabling empathy with the fictional character and was successful in creating an understanding of characters as multilayer personas (i.e., migrant or local and a family member, a student, a worker, a caregiver, with specific values and gendered) instead of being classified in single labels (i.e., "just" a migrant, refugee or local). With this, it also helped to discuss more or less desired futures concerning a diversity of potential users. Moreover, this tool helped to find similarities and specific characteristics between characters that could ignite IMSI.

With the understanding of IMSI and potential users, the participants created images of possible futures detailed through the journey map. This tool allowed them to look at their idea and the interaction made more comprehensively than just as a way of starting interactions through serendipity or chance [69, 74]. With all the above, our structure and materials created were supportive of ideating emerging technologies for IMSI. Nonetheless, there are aspects we need to improve, such as some descriptions of the cards, their visuals, and how the materials could guide individuals who want to explore emerging technologies and futures on their own.

5.1.2 Intercultural co-speculation as a meaningful experience. Previous work expressed that intercultural interactions must fulfill three characteristics to be meaningful: taking place with someone perceived as belonging to a different culture, being memorable interactions with a special event that makes them stand out from other daily interactions, and igniting positive impacts on individuals such as developing self-knowledge, creating ties, building trust, spreading joy, and promoting kindness [58]. Our participants highlighted different aspects pointing to the workshops as not only a means to think of ways to promote IMSI, but also as meaningful interaction in themselves.

At the end of each workshop, participants gave us feedback about their experience. Some of them referred to the workshop as a space in which they met with strangers with whom, through the various activities they had to work on to create and develop their shared idea, they got to share some of their previous experiences, likes and dislikes, make jokes, or even just have a fun and enjoyable moment by being creative together and working towards a shared goal.

Indeed, several aspects of the structure of the workshop seem to facilitate an IMSI. First, having participants working on intercultural dyads, besides ideating with the purpose of having two intercultural strangers interacting meaningfully through the co-speculated technology in the future. Second, the tools participants relied on during the activity seemed to support this meaningful engagement. The cards facilitated a shared understanding of the goals and characteristics of the aimed interaction, and the latter was developed through shared decision-making. The diversity persona was helpful for participants to empathize with the character while also being a space to share part of themselves and their previous experiences, therefore being a space for meaningful contact between these strangers.

With all the above, it seems relevant to continue exploring the characteristics that make these workshops a space for meaningful interactions, especially the relevance of this activity's collaborative, speculative, and intercultural quality. Moreover, it is relevant to study how it would develop in an in-person setting.

5.1.3 Images of futures as provotypes. We observed with this workshop that, while ideating technologies, participants could also create alternative realities and societies, even discussing how cities could be and how interculturality would be perceived in 2050. The latter links society's development with technologies and how they influence each other. Participants were offered a social structure through a scenario we created, which they needed to change by developing new technologies. This process allowed them to discuss the changes they would expect from society concerning how migrants and locals interact. Participants also discussed how the emerging technologies ideated for promoting meaningful interactions influenced culture.

Therefore, the concepts created represented a discussion material or provotype [13](i.e., provocative prototypes). It would be interesting to continue exploring how these emerging technologies concepts would open discussions about potential futures in other contexts and the desirability of certain futures. For instance, we could present the ideas to different groups of migrants and locals and ask them how they could promote IMSI, in which contexts, and the overall effect they could have in a future society.

5.1.4 Dealing with tensions. Participatory futures as a method represented a way of exploring alternative futures [22] rather than utopias or dystopias of intercultural contact [18, 42]. We have learned that bridging pluralistic perspectives of IMSI is related to linking the aggregate of ideas and discussions of more or less desired possibilities rather than creating realistic visions of those futures. Nonetheless, pluralism and diversity are often accompanied by tensions between different perceptions of what is more or less desired [12, 13, 30].

By engaging in this kind of research, we learned that participants having opposing views could enrich the discussions if tensions are expected and well managed. Thus, facilitators must be careful in promoting an open environment that does not transgress individuals. For instance, we experienced tense moments in which, for example, local participants could negatively comment on the migratory situation of the country, a perspective conflicting with the workshop's purpose, or situations in which migrant participants could comment on difficult experiences while living here. Therefore, as facilitators, we needed to intervene and use those experiences and perceptions in favor of the activity by highlighting what was behind the comment (i.e., fear of changing traditions, experiences that could motivate better intercultural communication) to inspire

design concepts rather than just staying with their negative aspect. Futures are not a single and straightforward entity, nor are the presents. Both futures and presents exist in the potential conflict in contexts where diversity is natural. As facilitators, we expect to create the most diverse ideas; sometimes, those ideas conflict with each other. Still, with the discussion sessions, those conflicts could become dialogues about potentially desired futures.

5.2 Enabling presents through futures

The discussion on emerging technologies and potential futures also allowed us to investigate the present and participants' experiences being a local and a migrant in Istanbul today. Presents and their everyday experiences are diverse [23], as are the futures. After analyzing the discussions of our workshops, we understood that, even when we try to inspire creativity, futures thinking is also inspired by participants' present and lived experiences [29]. Participants seemed to identify problematic situations today and ideated to solve them in the future or to present futures without those situations.

In the same way, we observed that futures and related imaginaries can inspire individuals to discuss their present experiences because they take potential ideas of futures and discuss them concerning their life today, identifying potential differences between their dreams and the present. For instance, they discussed how it was needed to develop emerging technologies that are accessible and inclusive because they realized that today that is not the case, and different individuals are left out of such experiences. We were expecting that their recent experiences could inspire the discussion concerning futures. However, we did not expect the ideas of futures to enable such a deep discussion of their experiences today.

Further, this discussion allowed participants to find unexpected similarities between them and their intercultural partners concerning thoughts or experiences. Therefore, this study opened a door for us to continue exploring both futures and presents grounded in participants' experiences and ways of promoting meaningful interactions. The workshop allowed us to understand participants' hopes for Istanbul and their perception of their current life in this city in the same venue. With these findings, we expect to explore potential emerging technologies that can solve other needs, such as the lack of nature, overpopulation, traffic, and physical exclusion, so that our cities can turn into a more human-centered ones.

5.3 Limitations

This work's limitations are related to the format and organization. The workshops were conducted online due to COVID-19 social distancing restrictions, thus limiting the number of participants and potentially their engagement level. Concerning the organization, participants gave recommendations and comments to improve the activity's materials and the number of participants. For instance, some felt shy opening their cameras, while others felt less engaged if their teams had their cameras closed.

Additionally, some participants felt overwhelmed by the number of tabs or the inability to see the person in zoom while on the Miro board. Therefore, their recommendation concerned the venue and how the software used could allow them to see each other's faces while working on their board. These are aspects that were out of our hands to solve. Still, we hope in the future, the digital tools used could improve each time to bridge the gap between in-person and online interactions.

6 CONCLUSION

In this study, we have presented the results of workshops that explored participatory futures of intercultural meaningful social interactions. We described the method applied along with the 15 emerging technologies ideas created by locals and international participants living in Istanbul. Also, we presented themes associated with the discussion of these ideas, and we showed participants' perceptions of the workshop, its structure, and their insights about the presents and the futures in Istanbul.

With all the above, we have contributed to IMSI literature by presenting nine emerging technologies futures (i.e., functionalities) to promote IMSI and participatory futures literature by discussing the tools and structure followed to enable futures thinking. Additionally, we commented on our lessons while enabling participatory futures and how this method could be used to explore participants' current diverse realities and perceptions.

This study opens doors for future work in different directions. On one side, we could continue to explore participatory futures of intercultural contact and create shared ideas on this topic with the general public, exploring a broader perception of these emerging technologies and the potential futures they could create, and thus using the images of the future as provotypes. On the other hand, we continue exploring the methodology of our workshops as an instance for future IMSI and other implications to exploring current realities and individuals' experiences. Finally, the tools that we used during the workshop are an aspect that could continue to be explored so that they could be refined according to participants' comments, therefore, contributing to creating knowledge around participatory futures tools.

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