In- and Exclusion in Online Meetings

S. Reidl[1], J. Greithanner[1], S. Beranek[1], H. Schiffbänker[1], A. Schneider[2], D. Sellitsch[2], G. Regal[2], Monika Meirer[3], Jenny Schlager[3], Flavia Anzengruber-Tanase[4], Robert Hartmann[4]

[1]Institute POLICIES, Joanneum Research, Austria

[2]Center for Technology Experience, Austrian Institute for Technology, Austria

[3]Integrated Consulting Group, Austria

[4]Netural GmbH, Austria

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Abstract: The climate crisis and COVID-19 restrictions have boosted online meetings. To promote sustainability, it is crucial to continue using this form of communication post-pandemic, reducing traffic and pollution. However, online meeting technologies must ensure inclusion and belonging. Virtual communication offers advantages, facilitating participation for people with limited mobility and encouraging shy individuals to engage. Yet, it can also worsen inequalities: women may be overlooked, collectivized cultures may communicate less openly, and language barriers may increase for non-native speakers. Age and education level also affect technology receptiveness. In the FEMtech project FairCom[35], we examined inclusion and exclusion in online meetings and sought to enhance their inclusivity through a user-centered approach. We selected diverse teams from work, education, and leisure contexts and observed their meetings. Through questionnaires and interviews with facilitators and team members, we explored usage patterns, exclusion mechanisms, challenges, and improvement wishes. Our findings on user needs and exclusion mechanisms confirm inequalities in online meetings. Women, TIN and younger participants find it difficult to engage in online meetings. Accordingly, speaking times are very unevenly distributed, with men and older people taking up significantly more space. This is reinforced by the moderation. Using a Laptop or PC instead of a mobile phone and activate the camera can support participation, but hardware equipment depends on economic resources. The results of the needs assessment were brought into co-creation workshops by means of personas and user-scenarios, which developed ideas for solutions on fair speaking time, non-verbal feedback to the moderator and visibility of diversity.

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1 Introduction

Online meetings have become integral to professional and social interactions, providing convenience for collaboration, knowledge exchange, and networking. However, as these virtual spaces gain prominence, it is crucial to examine their inclusivity and potential for perpetuating exclusionary dynamics. Gender research highlights that online communication is not gender-neutral but influenced by social dynamics (Armentor-Cota, 2011; Herring and Stoerger, 2013). Gender and other inequality dimensions can act as exclusion factors in online formats, both through factors observed in analogue communication[36] and through online-specific mechanisms. Exclusion and disadvantage mechanisms refer to general (non-)participation in online communication, as well as to exclusions, e.g. during online meetings - to "access" and "accessibility" (Parreira do Amaral, Stauber and Barberis, 2015) to and of technology use.

While online meetings may appear to have fewer barriers, they do not necessarily reach a higher share of diverse groups, as privileged groups remain overrepresented (Einstein Levine *et al.*, 2021; Wang, Li and Di Wu, 2023). Gender and age strongly correlate with perceived technology competence and openness, potentially leading to avoidance strategies among certain user groups (Arellano, 2020; Hauk, Hüffmeier and Krumm, 2018; Laitinen and Valo, 2018; ÖIAT, 2014; Reidl *et al.*, 2020). Participation in online meetings can be unevenly distributed and vary based on demographic characteristics such as gender (Lewis, Sekaquaptewa and Meadows, 2019; Ruthotto *et al.*, 2020), but also age and hierarchy e.g. (Arellano 2020, Heath und Wensil 2019). Social anxiety and introversion also influence online participation, with introverts apparently being less shy in virtual environments (Hammick and Lee, 2014; Sanudin *et al.*, 2022). However, computer-mediated anxiety can hinder participation (Brown, Fuller and Vician, 2004; Fuller, Vician and Brown, 2016).

Increasing participant numbers and longer meeting durations negatively impact engagement in online meetings (Jakobsson and Brock, 2021). Exclusionary communication practices and microaggressions, such as interruptions, occur in both analogue and online communication, disproportionately affecting non-binary individuals and women, queer women, women with disabilities, and Black women (da Silva Figueiredo Medeiros Ribeiro, Karen, 2020; Mendelberg, Karpowitz and Oliphant, 2014; Thomas *et al.*, 2019). Women's contributions tend to be overlooked and undervalued in both offline and online communication, which seems to be amplified in an unstructured

[36] For example, in offline communications, women's speaking percentages are often overestimated, while men take up more speaking time (Cutler and Scott (1990); Brescoll (2011)). This might be reproduced or even amplified in online settings.

communication culture, which favors dominant speakers (Connley, 2020; Huynh, Lee and Schuldt, 2005; Wang, Li and Di Wu, 2023). Other exclusionary practices include the use of jargon, monologuing, debating and passive-aggressive behaviours (Arellano, 2020). Unfortunately, non-binary perspectives are often overlooked in technology development and online communication research (Scheuerman *et al.*, 2021; Spiel, Keyes and Barlas, 2019).

Inclusive practices in online meetings involve creating smaller groups, utilizing multiple communication channels, and providing more time for response and reduced social interpretation (Jakobsson and Brock, 2021; Lowenthal *et al.*, 2020; Luk, 2021; Nisa, Prameswari and Alawiyah, 2021; Zolyomi *et al.*, 2019). 'Zoom' fatigue, characterized by feeling drained after videoconferencing, seems to affect women more than men (Bailenson, 2021; Johns *et al.*, 2021; Nesher Shoshan and Wehrt, 2021; Shockley *et al.*, 2021). Women's seemingly stronger dissatisfaction with their appearance during video conferences may also play a role in gender differences (Castelli and Sarvary, 2021; Fauville *et al.*, 2021; McIntyre, Negra and O'Leary, 2021; Meyer, 2020; Oducado *et al.*, 2021; Ratan, Miller and Bailenson, 2021; Shockley *et al.*, 2021).

For individuals whose first language differs from the meeting language, communication is already challenging, and online communication can pose an additional barrier due to limited non-verbal cues, poor video and audio quality (Arellano, 2020; Hui, Milin and Divjak, 2021; Mori, 2020; Rini, Noorman and Nafisah, 2021; Sohn, 2018).

By investigating these complex interrelationships between different inequality dimensions (such as gender, age, language skills, education) and in-/exclusion in the context of online meetings, the FEMtech project FairCom[37] aims to contribute to a deeper understanding of the challenges and opportunities that arise in these digital environments. Through an examination of existing research and empirical evidence, we seek to identify key factors influencing inclusion and exclusion dynamics and offer technological and communicative solutions for cultivating more inclusive online meeting practices. Ultimately, this research endeavours to inform both scholars and practitioners in their quest to create virtual spaces that offer inclusive communication opportunities. To this end, this article first presents the methodology of our empirical study in the first half of the project, describes its results, and gives an outlook on how the results were used to develop ideas for solutions in a participatory process. Finally we show possible solutions that will be developed within the project and draw conclusions for researchers and practitioners in the field of online communication.

[37] FairCom (FFG Project Nr. FO999890502) received funding from the Austrian Research Promotion Agency FFG

2 Methodology and Sample

In the FairCom project, inclusion and exclusion in online meetings was investigated using a multi-method approach. Observations, interviews and a quantitative online survey were conducted. For the investigation, seven teams from work and leisure contexts were recruited. During the acquisition process, care was taken to select teams/groups of 5-15 members in order to enable observation. Moreover, team members should cover as many diversity characteristics as possible. Thus, teams were sought that differed in terms of age, ethnicity/cultural background, educational background and gender in all its diversity.

>*Observations:* Based on a comprehensive literature review, an observation protocol was inductively developed that takes into account different indicators of inequality or exclusion mechanisms in online meetings identified in the literature (e.g. speaking time, interruptions, de-/activation of the video function, moderation techniques, etc.). In total, we observed 53 people in 9 meetings, of which 22 were perceived as men (42%) and 31 as women (58%). No one expressed themselves as trans, inter- or non-binary (TIN). 40% of the observed persons were estimated to be under 35 years old, also 40% between 36-50 years old and 17% older than 50 years. The meetings ranged in length from 50 minutes to 130 minutes. For each team, at least one meeting was observed by two people from the project team and recorded, if consent was given. After the observation, the facilitation of the meeting was reflected upon by the observers and the reflection was recorded in writing. For each recorded meeting, speaking time statistics were compiled based on the recordings. The collected data was analysed quantitatively, the reflection notes were analysed qualitatively.

>*Interviews:* Guided interviews were conducted with 16 selected team members and seven team facilitators, one person from an inter-organisational LGBTQIA group and three experts for moderation of online meeting on usage behaviour, meeting culture, personal experience, needs for change and requirements for online tools. Of the 24 interview partners (excl. the three experts), 17 people described themselves as female (including one trans woman), 7 people as male, and no one as gender diverse. The age distribution among the interview partners is very balanced. The interviews were conducted between April and June 2022. The guidelines were created on the basis of the project's literature research and adapted to the role of the person (team member/facilitator). The interviews were recorded, transcribed and analysed for content using MAXQDA.

The interview data were analysed using qualitative content analysis according to Mayring (2000). Patton (2002) describes this as the process of reducing a volume of qualitative material to core consistencies and meanings. For this process we used inductive categories identified in the literature review, but also deductive approaches and developed categories from the interview material.

>*Online survey:* Based on a comprehensive literature research and the expertise of the project team, a questionnaire was inductively developed and created in SoSci. The questionnaire was online from April to June 2022[38]. The questionnaire contained questions about the use of (individual features of) online communication tools, experiences with communication and moderation in these meetings, as well as demographic information. A link to the online questionnaire was sent to all team members, facilitators and some interest groups and associations of gender diverse, trans, inter or non-binary people. A total of 60 questionnaires were included in the analysis. Significantly more women (56%) took part in the survey, followed by 28% men and 17% people who identify as trans, inter or non-binary. The participants were relatively evenly distributed between 18 and 70 years of age. Most respondents were in the 36-50 age group (42%). The age group up to 35 years accounted for 30% and those over 50 years for 28%. Among the participants, 68% have a higher education degree, while 20% have completed an apprenticeship or high school degree. 12% have a compulsory school leaving certificate or no completed school education. 90% of the respondents speak German as their mother tongue, while 10% have another mother tongue. About 18% indicate that they are often perceived as non-Austrians because of their appearance or language. The questionnaire was analyzed taking into account various diversity dimensions (gender, age, migration background, education, visual and/or hearing impairment).[39]

The results of all three methods were synthesized in one report. The results presented in this report have been used for participatory co-creation workshops with users to collect ideas for technological and communication solutions for facilitators to promote equal online communication. This participatory process and initial ideas for solutions are described below. First, however, we want to show summary results of the needs assessment:

[38] The period was chosen so long because the observation dates had to be scheduled according to the teams' meeting dates.

[39] As the questionnaire does not contain any compulsory questions, the number of answers sent in varies depending on the question. It should also be emphasised that the survey is not representative.

3 Results from the needs assessment

The majority of respondents utilize online meetings primarily within a professional setting, with over half of the participants also employing them for leisure and family activities. Additionally, half of the respondents utilize online meetings for educational purposes. Among the various online communication tools, Zoom and Microsoft Teams dominate in terms of popularity. Cisco Webex, Skype, GoToMeeting, Discord, and Slack are only sporadically used by some individuals. When participating in online meetings, the most commonly utilized devices are laptops or PCs. Less than a third of the participants use a mobile phone, and only a small number rely on tablets. Notably, people of colour tend to predominantly use mobile phones for online meetings. In our sample, this is mainly due to their economic conditions; a PC or laptop is not available for financial reasons. In addition, only women of colour participate in meetings from the public space - here clearly different resources become visible - in many cases they have neither a PC nor their own room at their disposal.

Technical difficulties are a recurring theme and were frequently mentioned in the interviews. Respondents report connectivity and software issues, problems with their hardware, and operational issues such as accidental muting during online sessions.

Camera use plays a central role in visibility and participation in online meetings and is therefore a significant factor of inclusion. In the interviews, the importance of the activated camera is emphasised in order to read the facial expressions of other meeting participants and thus to be able to better interpret verbal messages. Accordingly, the online survey reveals a significantly high proportion of individuals who consistently keep their cameras on during online sessions.

Slightly less than half of the respondents indicate in the survey to have always activated the camera. Only around 5% of respondents (almost) never have their camera on all the time. Men were significantly more likely than women, trans-, inter- and non-binary-people to say that they have their camera on (almost) all the time. An above-average number of women and trans, inter or non-binary people almost always have their camera deactivated. In our observations, also people of colour had turned off their camera more often than other participants.

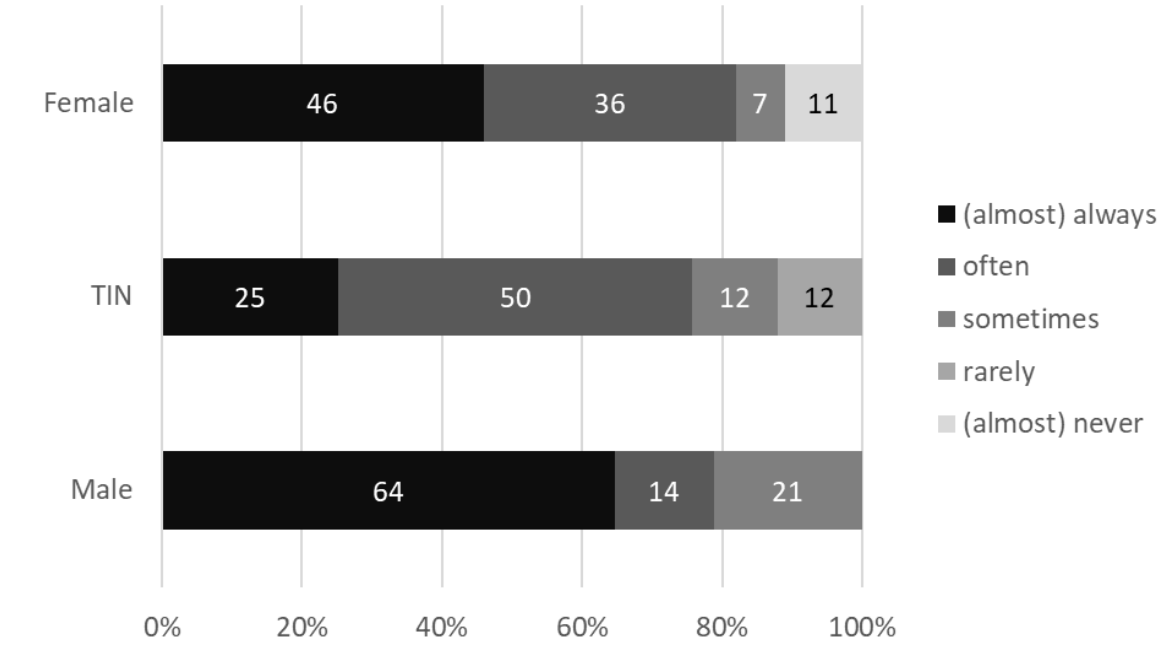

Figure 1: camera use by gender

If we look at camera use by age, we see that among participants under 35 years of age, less than a third have always activated the camera. By contrast, more than half of those aged 36 and over did so. People with a visual and/or hearing impairment (70%) have a much higher proportion of people who had (almost) always activated their camera.

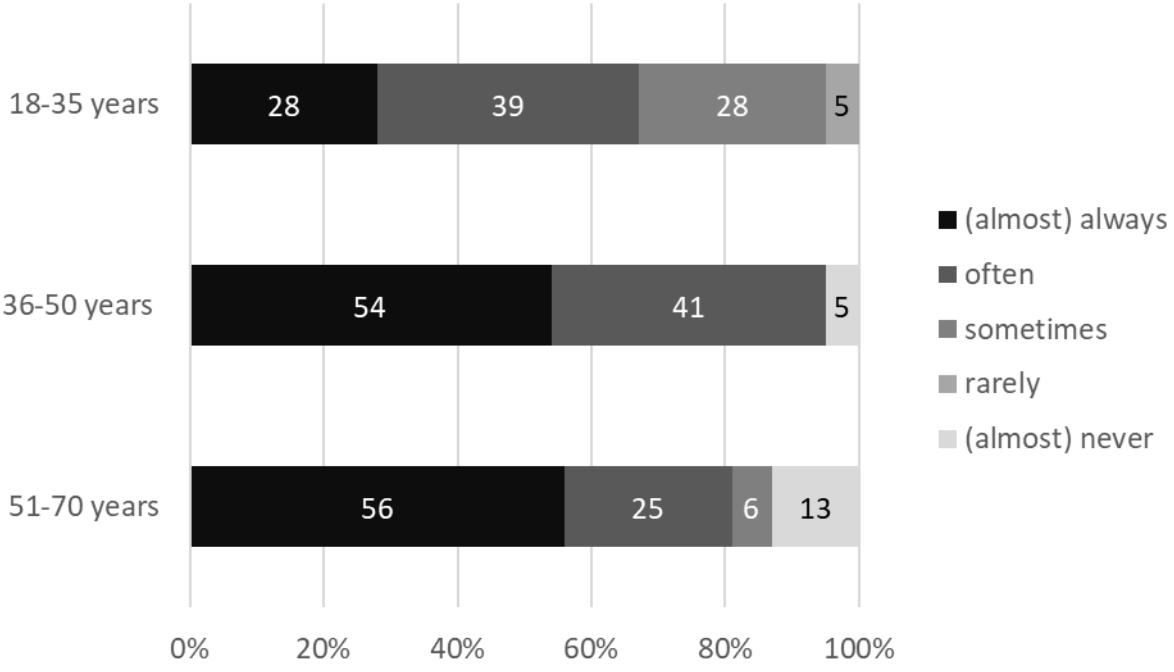

Figure 2: camera use by age

The most important reason for deactivating their camera is a poor internet connection. Not wanting to be seen, which is mainly frequently selected by trans-, inter- and non-binary-people, or to be able to do other things without being observed is also a reason for many to switch off the camera. If other participants in an online meeting have turned off their camera, this is a reason for around 46% to do the same. In the interviews, only women mention to turn off the camera because kids are around. Not wanting to see themselves is only a reason for 9% of respondents to turn off the camera. In the interviews, individuals mention that the self-view is exhausting or strange, only women are critical about their appearance in this respect.

If we take a closer look at the communication problems that participants face, we can see that the following situations are the most common ones that were mentioned in the survey and make online meetings difficult:

- Speaking at the same time (and then letting the others go first)
- Not getting a word in edgewise
- Being interrupted
- Voice is transmitted with a delay
- Long monologues by other people
- Being ignored and overlooked

With regard to the communicative challenges, we identify differences among the participants according to different diversity dimensions. Men report being interrupted more often in online meetings than trans-, inter- and non-binary-people and women – this contradicts the findings in the literature where women and non-binary people were found to be more interrupted than men. However, analysis of speaking time in the online meetings observed in this project shows that men have a significantly higher proportion of speaking time. More than half of the women had less than 5% speaking time, while this applied to only 20% of the men. It is therefore possible that men in our sample were more likely to be interrupted, because they were also more likely to speak. Moreover, the quantitative data of the observations shows, that men speak out more often than women and trans, inter- and non-binary people and the moderators reinforce this gender bias by inviting men to speak significantly more often than women and trans, inter- and non-binary people.

The following result could also be seen in this context. In the survey, women are more likely to say that other people in online meetings talk for an uncomfortably long time. Maybe, this is why women are also more likely than men to experience online meetings as tiring. Similarly, trans-, inter- and non-binary-people and women find it more difficult to speak up than men. In addition, women and trans-, inter- and non-binary-people more

often feel that less attention is paid to their words. None of the men expressed this experience, as figure 3 shows.

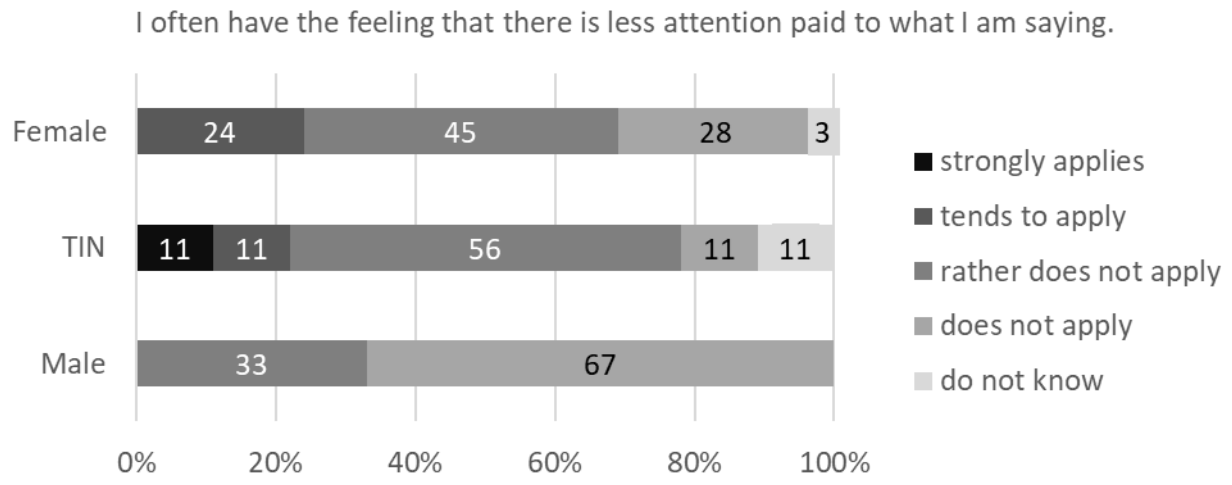

Figure 3: attention paid to their words by gender

For trans-, inter- and non-binary-people, further differences become clear: they are more likely to say they cannot get a word in edgewise and are more likely to be ignored/overlooked than male or female participants. Nevertheless, women and trans-, inter- and non-binary-people are slightly more likely than men to find it easier to speak online than in person.

Sexist comments are rarely observed by participants in online meetings, but most often by female participants. More than half of trans-, inter- and non-binary participants report that they are sometimes addressed by the wrong gender. In contrast, this has not happened to any of the male respondents and only very rarely to female respondents.

When analysing the experiences by age group, clear differences between the younger and the older participants become apparent in many areas. For example, it is more often the younger participants (under 36) who experience difficulty in speaking up and more often have the feeling of not getting a chance to speak. These experiences decrease with age. Only 25% of those over 50 sometimes feel they cannot get a word in edgewise (see figure 4).

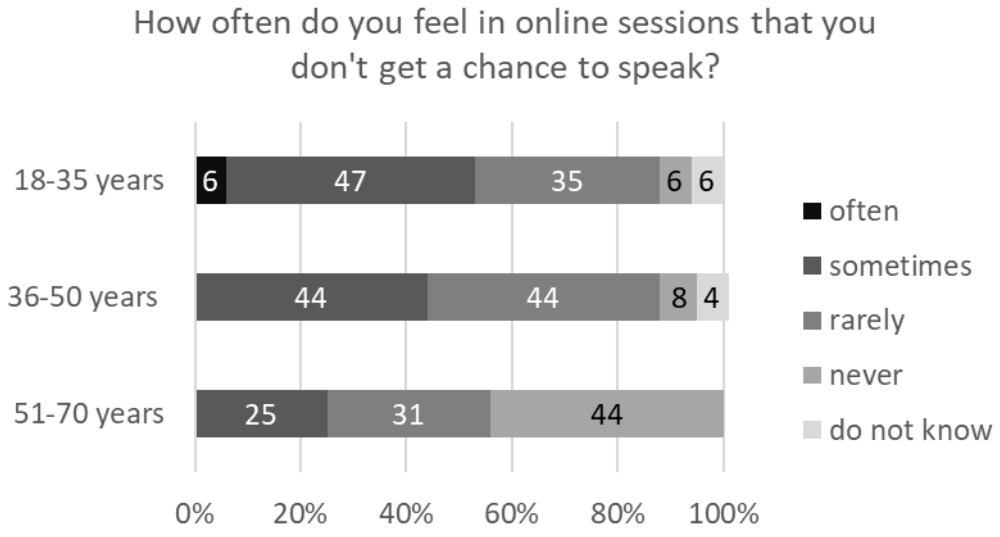

Figure 4: frequency of not getting a word in edgewise by age

Also younger people (44%) tend to have less of a say than others. Among the older respondents only 36% agree with this statement. The feeling of receiving less attention is also strongest among 18-35 year olds and decreases with age. The same goes for nervousness when speaking: Younger people are more likely to say they feel nervous before speaking. Even 22% of them strongly agree with this statement. With increasing age and therefore experience, nervousness decreases. This may also explain why chatting and emoticons are preferred to speaking, especially by some younger participants, as figure 5 shows. Only 13% of those over 50 prefer chatting and emoticons.

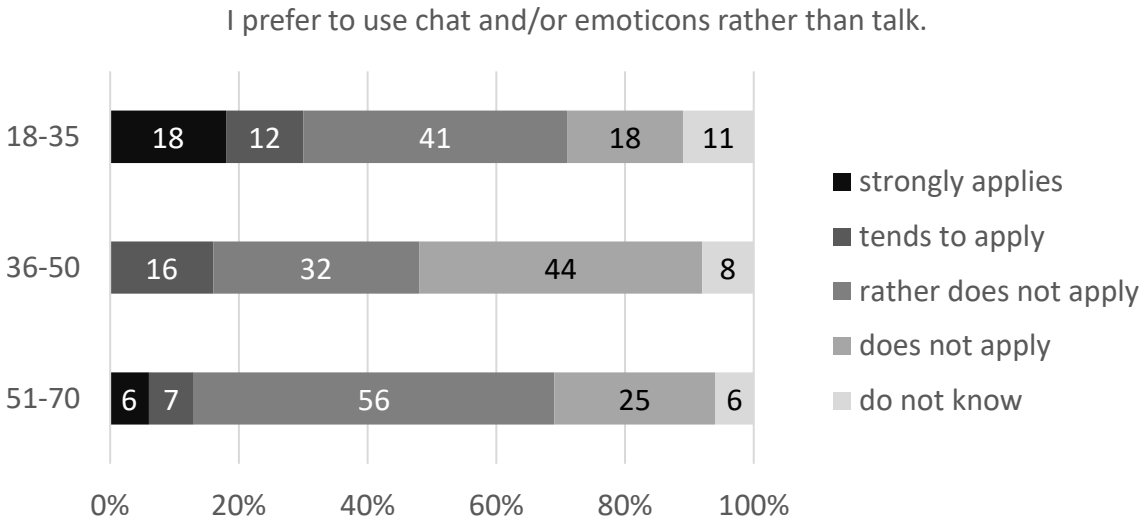

Figure 5: preference chat/emoticons over speak by age

Participants under 50 are more likely to be distracted and less able to concentrate than people over 50. This may be because they are less actively involved and find it difficult to get a word in edgewise. On the other hand, the disadvantages faced by older participants are associated with technological overload. This is especially a problem for those over 50, they are more often overwhelmed with dealing with technology. The interviews show that this is especially the case when other software, such as a whiteboard, has to be used in addition to video conferencing software.

4 Feeding results into co-creation – outlook on possible solutions

Based on the results of the previous needs assessment, personas and user stories were created, which served as input and starting point in the following co-creation activities and ensured a common understanding about the target groups and their needs in the project team. Special attention was paid to the diversity and gender dimensions and it was tried to avoid stereotypes. A total of six personas were created, which differ in the degree of their affinity for technology and extraversion, as Figure 6 shows:

Name of the Persona	Short description	Extraversion	Tech. Affinity
Maria Muth	Teaches online, often speaks into a black hole and monologues as a result, wants to address special needs of participants and knows the benefits of equal communi-cation, but misses strategies to do so	high	low
Hermann Kiraly	Must attend telcos at work, is very stressed as a result, has difficulties in using, often turns off his camera	Low	low
Valentin Miller	Successful start-up CTO, likes to share, technology must be able to do everything and solves any problems	High	high
Tiam Ansarh	Language barrier, therefore prefers to use chat, afraid of making mistakes, is very structured and also wants structure in an online meeting	Low	high
Alex Mayer	Has to communicate a lot at work, but doesn't like telcos, feels misgendered and being discriminated against, wishes for more sensitivity, acceptance and tolerance in this context	Middle	middle
Darja Melnik	Uses telcos privately to communicate, participates with her cell phone, in a noisy environment, is often disturbed, always has her micro on	Middle	middle

Figure 6: description of personas

The project follows a strongly user-centered design process. In various co-creation activities, new technological ideas and interaction concepts for the interactive design of online meeting technologies and their implementation were developed together with users of different age, gender, ethnicity and professional background.

The co-creation activities included four ideation workshops, which differed in their composition and design. We started with experts who shed light on the different perspectives of inclusive online communication. Following three wokshops with a heterogenous group of users. Methods of gamestorming[40] and critical making (Ratto, 2011) were used.

In these workshops many ideas and interaction concepts were developed that address the described hurdles of the personas. The initial ideas of the users were clustered by a researcher in a preliminary stage and analysed and prioritized in a second stage by several researchers of the project team regarding their usefulness, technical requirements and innovation potential.

Thus, three main needs which potentially could be tackled using technology, could be identified:

1) A f**air distribution of speaking time** for all meeting participants is of particular importance for users. Regardless of their individual attributes and characteristics, speaking time should be allocated depending purely on their role during the meeting and on their concerns related to their tasks and context factors. The technology used should support this fair distribution of speaking time by, for example, visualizing this information about speaking time. However, how to distribute speaking time fairly is a difficult question that we will have to deal with in the further course of our research project, as it depends very much on the objective of the meeting and the tasks of the team members. In a participatory workshop, for example, it might make sense to distribute speaking time equally to give everyone the opportunity to contribute. In a project meeting, the project leader or individual task leaders may need more speaking time than others who are supposed to give feedback or ask questions.

2) All meeting participants should have opportunities to **provide non-verbal feedback** about how the meeting went, both during and after the meeting. In this way, the mood or certain misconduct, such as inappropriate jokes, discriminatory language, too long speaking time, etc. can be addressed.

3) Another important point in online meetings is **to make diversity visible**. The current technological solutions only include the possibility of displaying pronouns together with the name of the person participating. This issue should be addressed in a much more

[40] https://gamestorming.com/

comprehensive and far-reaching way. For example, profile frames or avatars would be a way to make diversity visible. We expect these aspects to be addressed with technology, but organisational measures and moderation techniques are also needed to support them.

The existing ideas and interaction concepts in these three categories of needs will be refined in the further process of the project and developed into prototypical solutions. An evaluation with users regarding the usefulness and acceptance of the ideas and concepts enables early feedback before the technical implementation starts.

Furthermore, the co-creation workshops and an additional workshop with facilitation experts identified some needs for improvement in online meeting facilitation. These needs can be addressed by developing online facilitation methods and guidelines that focus on the following:

1) By setting an agenda, meeting purpose, participant roles, etc., the facilitator can give each meeting a **design and structure** that makes it easier for participants to engage.
2) Facilitation should create inclusiveness, allowing active and **fair participation** of all participants. A variety of methods allows for the appropriate choice of processing form depending on the topic.
3) The results should be documented during the meeting and thus made visible. **Visualization** makes it easier to follow up in the meeting and promotes interaction through joint documentation.
4) The facilitator can actively **shape the rhythm** of the meeting. Different methods can hold attention, activate or promote a constructive discussion climate.

5 Discussion and Conclusion

Most results from the needs assessment conducted in FairCom confirm results from the literature review and therefore confirm the need of improvement on technological but also meeting facilitation level to make online communication more inclusive. In our needs assessment, as well as in Brescoll (2011), it can be seen that men and older participants have significantly longer speaking times than women, trans, inter or non-binary people and younger participants. Also, that women and non-binary individuals are much more affected by exclusionary communication practices like being overlooked (Thomas et al. 2019; Mendelberg et al. 2014; da Silva Figueiredo Medeiros Ribeiro 2020) confirm our findings. Moreover, we see in our results that women are undervalued in meetings more often, as also Connley (2020) and Heath and Flynn (2014) have shown in their research.

Our findings are also consistent with studies showing that women and trans, inter or non-binary people are more likely to deactivate cameras. However, the reasons we were able to identify for deactivating cameras are less likely to confirm that women do so primarily because they are uncomfortable with their appearance in videoconferences, as Fauville (2021), Oducado et al. (2021) and others show in their studies. Feeling uncomfortable seeing oneself only applies to a small group of women and trans-, inter- and non-binary persons. Bad internet-connection and side-activities are much more important reasons for turning off the camera. For people of colour, the hardware is also likely to play a role to turn off the camera - they are more likely to attend meetings via mobile phone. In any case, it becomes more difficult to engage in the meeting without a camera, as the non-verbal communication level is missing. The quality of participation therefore depends not only on gender and age (connected to hierarchy level[41]), but also on economic conditions.

A main finding of our analysis is the very uneven distribution of speaking time, favouring men against women, trans-, inter- and non-binary people and younger participants. This inequality is even increased by facilitators! This result shows how important training and awareness raising of moderators is to enable them to contribute to a more equal participation of team members in meetings. This result also encourages us to concentrate on the development of inclusive facilitation methods and guidelines for action in the further course of the FairCom project, in addition to further technical developments.

If we look at the solutions raised so far in the participatory co-creation process to combat inequalities in online meetings, it quickly becomes clear that organisational culture plays an essential role in the question of how technological and facilitative solutions are used to have an effect. Only those who, for example, attach importance to offering all team members equal opportunities to contribute to a meeting will use moderation methods and technical solutions in this regard. The development of non-verbal feedback possibilities for meeting facilitators will only make sense if this feedback is desired and leads to facilitators reflecting on and wanting to improve their actions.

With our research in FairCom, we were able to contribute findings from Austria to the research on online communication, which mainly comes from the USA. However, results could be different in other cultures, so more research from different regions of Europe and other continents would be desirable. Moreover, our results are based on a very small sample that is not representative. We only managed to include trans- inter and non-binary people in the online survey and not in the interviews and observations. The perspective

[41] The literature shows, that hierarchy level can be a significant factor for distribution of speaking time (see xy). We could not prove this with our teams as there were teams without hierarchy (teams in leisure context) and teams that were moderated by their superior, which already influenced the distribution of speaking time significantly.

of people of colour and people with disabilities could only be touched upon. The context of use of the teams involved often focuses on work. Online communication in associations, NGOs and interest groups could only be mapped to a very limited extent. In this respect, a more comprehensive quantitative and qualitative study would be interesting to validate, expand and deepen our results.

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