Housing activists' science communication: online practices as contextual and reflexive

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Abstract

Based on an understanding of science communication as 'social conversation about science', in this paper we explore how technoscientific knowledge is communicated through housing activists' use of online media. We analyse collaborative housing groups in Vienna and find that their online communication practices are contextual and reflexive: technoscientific knowledges are always contextualised through the activists' political issues, while the activists constantly reflect on and negotiate their means and style of communication. The case both offers insights into the diverse ways and sites in which public sense-making about science takes place, and inspiration for other forms of science communication.

Keywords

Community action; Public engagement with science and technology; Representations of science and technology

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Introduction

Recent years have seen science communication framed not as a linear and instrumentalised transfer of knowledge, but as a 'social conversation about science', an approach that is deliberately inclusive and that seeks to capture the diverse ways in which science and technology are discussed within societies [Bucchi & Trench, 2021]. Viewing science communication in these terms acknowledges that laypeople and diverse publics engage with scientific and technical knowledge from diverse sources and through different forms of engagement, and emphasises their role in public sense-making [Davies, Halpern, Horst, Kirby & Lewenstein, 2019]. Importantly, it also allows us to understand science communication as being carried out by a diverse range of actors within society, not just by researchers or professional communicators. In this view, scientists, communicators, and publics are all involved in translating, transforming and producing knowledge [Davies et al., 2019].

From this perspective one important but under-studied actor group is that of activists, understood as actors who aim to influence political, economic, or public

actions and decision-making through actions such as protest, legal actions and public communication, with the goal of creating or preventing societal change [cf. Fähnrich, 2018]. Activists and social movements frequently use, engage with, appropriate, contest, or disseminate knowledge from technoscience (both that produced by elite institutions and citizen science or research 'in the wild'; [Callon & Rabeharisoa, 2003]). While there is a long history of research on social movements, including their engagements with science and technology (primarily in contexts of controversy and contestation, e.g. Epstein [1997], Ottinger [2010] and Rabeharisoa, Moreira and Akrich [2014]), science communication scholarship has only recently started to view activist activities as instances of public communication of science.

In this paper we build on these discussions to explore the (primarily online) science communication practices of housing activists engaged with the politics and practice of housing and urban development in Vienna, Austria. Concretely, we address collaborative housing, where a group of future dwellers plans and self-manages the building of their house in the role of a building contractor [cf. Czischke, Carriou & Lang, 2020]. We focus on housing groups who pursue broader political goals, such as making housing policies more sustainable and just, and who use their project to showcase how housing can be practiced differently to meet these goals [Schikowitz & Pohler, 2024]. Here, then, we are concerned with activism where technoscientific knowledge is central (for instance with regard to best practice in sustainable housing design, or to sociological and urban studies knowledge on urban developments and policies) but which is not overtly centred upon it. While these groups are not primarily concerned with communicating knowledge per se, technoscientific knowledge is used as a basis for understanding housing and planning [Abbott, 2005] and as a means of legitimising calls for transformation and of realising alternatives [McFarlane, 2011]. As part of the 'social conversation about science', the case thus offers an instance of the ways in which meanings are given to technoscience as part of other interests, practices, and priorities, emphasising that science communication is not always explicitly labelled as such.

In what follows we discuss existing scholarship that has explored intersections between activism and science communication before introducing our case study and the methods used to engage with it. Focusing on how housing activists share knowledge about the technical and political issues with which they are concerned, we then describe, first, the forms of technoscientific knowledge that are relevant to and presented by these activists in online spaces; and, second, the ways in which they accomplish this communication. In closing we reflect on the implications of the findings.

Debates on science communication and/as activism

Discussion in this journal, in particular, has highlighted the interconnections between science (communication) and activism [see Bandelli, 2015, and the thematic collection this introduces]. In a series of commentaries authors reflect on the 'blurred boundaries' between science and activism, and the ways in which public communication of science may inevitably be activist in nature. These accounts emphasise in particular that the distinction between an 'objective' science, on the one hand, and 'political' or 'value-based' activity, on the other, is a false one. Research is always entangled with values [Isopp, 2015; Ottinger, 2015]; as such, both science and science communication "can in fact comply with rigorous epistemic standards and at the same time be activist in pursuing social and political

action" [Bandelli, 2015, p. 2]. The issue is thus not whether science communication can or should be associated with activism, but how to explore how this is realised in particular cases.

Other research has engaged with more traditional forms of activism, such as lay organising around environmental or health issues. While there is a long tradition of scholarship on such social movements [e.g. Epstein, 1997; Frickel et al., 2010] we are concerned here with work that has studied this as a form of science communication. Much of this research has framed activists as 'alternative communicators', positioning them as an alternative to mainstream science [Fähnrich, Riedlinger & Weitkamp, 2020; Maeseele, 2009; Ostherr, 2018; Feldman, 2020]. This includes debates on what is to be understood as 'alternative', which connotations the term invokes, and whether this notion reinforces the othering of everything which does not conform with 'normal' science communication carried out by scientists and professional communicators [Gregory, 2020; Venkateswaran, 2020]. While activists' science communication may not necessarily involve mobilising alternative epistemologies [Ottinger, 2022; Herrera-Lima, 2020], the communication activities of non-governmental organisations (NGOs) and other activist groups aim to direct public attention to specific developments which they deem problematic. Their communication serves both to 'inform, educate, alert and persuade publics' and, importantly, to construct "representations of society or the environment and so define[s] specific developments as problems that require societal and political attention, negotiation, decision making, and change" [Fähnrich et al., 2020, p. 2]. In this regard, drawing on the case of science communication related to queer activism, de Kauwe and Standen [2023] caution that simplifying too much risks to marginalize and silence the experiences of certain groups and to do more harm than good. Activist communication on technoscientific issues therefore plays a key role in agenda setting for broader public debate [Feldman, 2020; Herrera-Lima, 2020]. While some of these activities may be oppositional in nature — for instance with regard to skepticism of genetically modified organisms [Lukanda, 2020] or protest about vaccine mandates [Stoeckel, Carter, Lyons & Reifler, 2022] — a number of studies suggest that activism may often work to support, rather than contest or replace, institutional science [Windfeldt, 2020; Zhu & Horst, 2019; Feldman, 2020]. Activism may thus be 'questionably alternative': "NGOs are not necessarily communicating in opposition to universities or authorities" [Windfeldt, 2020, p. 7; cf. Venkateswaran, 2020].

One focus for research has thus been how activists access, negotiate, and mobilise technoscientific knowledges. While in some cases activists make use of knowledge from their own research and/or that based on alternative epistemic norms [Ottinger, 2022; Rabeharisoa et al., 2014], the mobilisation of mainstream research and expertise continues to be central to much communication. Studies have indicated that activist engagement with science can be framed as 'strategic' [Soßdorf & Burgi, 2022]: while familiarity with the state of the art in relevant fields is presented as important, science may be primarily "used as a 'quiet' resource to prove that one is a serious opponent" [Fähnrich, 2018, p. 13] or is acquired in "indirect" and "idiosyncratic" ways [Unander & Sørensen, 2020]. Such work thus suggests that the epistemic practices of activists involve the assembly of relevant knowledge from various sources [Unander & Sørensen, 2020] and its use to legitimate or publicise their positions [Rohden, 2021; Soßdorf & Burgi, 2022]. At the same time, newer protest movements (such as Fridays for Future or Extinction

Rebellion) in particular often incorporate a deep respect for science, to the extent that they frame themselves as 'amplifiers' of scientific knowledge and present a 'deficit model' of existing, mainstream science communication [Rödder & Pavenstädt, 2023; Rohden, 2021].

It is clear, then, that both mainstream and alternative forms of technoscientific knowledge are central to the (communication) activities of activists. Much of this communication now takes place online. Activists use online media for communication and mobilisation [Ilten & McInerney, 2019], with 'networked protest' a key feature of emergent activist movements such as the March for Science or Fridays for Future [Ley & Brewer, 2018]. At least some studies have indicated sophisticated engagement with such media: activists are aware of the politics of digital tools and platforms whose corporate nature and data treatment might contradict their activist aims and values, and combine the use of different commercial and non-commercial media and platforms and offline activities so as to work around the problems that they see in them [Barassi, 2015; Ilten & McInerney, 2019]. Affordances of digital media such as hyperlinks are also central to the ways in which activist organisations may engage with technoscience, in that they offer a means both of 'pointing to resources' and legitimising the arguments that are made [Rohden, 2021].

The research that we present here is located at the intersections of the above literatures. We explore a case of activist activity — self-organised housing projects in Vienna oriented to intervention in housing development — to which technoscientific knowledges and expertise are central, but which is not oriented to a specific technoscientific problem or controversy. We are thus interested in how technoscience may be drawn upon, and communicated, in forms of activism that are not (framed as) responding to technoscientific issues or problems. In addition, we build on explorations of the use of digital media in activism described above, focusing on the online communications of activist groups. The central question that we ask is thus: how is technoscientific knowledge communicated through housing activists' use of online media?

Material and methods

Our case study focuses on housing activism in the city of Vienna, and in particular on two self-managed collaborative housing projects that aim to transform housing practices in urban planning. These groups have, at the time of the fieldwork, planned and organised the construction of buildings which include apartments, workshops, and other shared facilities, as well as spaces that they rent to civil society organisations and other users. The groups belong to the same umbrella organisation, which, like the individual groups, has an explicitly activist orientation. As a whole these projects seek to contribute to, and showcase, the development of housing and living in sustainable and socially just ways, for instance through decommodifying housing and realising collective ownership and decision-making. The umbrella organisation promotes and consults on housing projects to realise these principles. All of these projects draw on a specific financing model based on crowd funding rather than individual equity capital. The aim is to initiate a growing number of projects which 'prototype' [Corsín Jiménez, 2014] alternative ways of housing.

For these groups, public communication is central both to raising awareness for the political problems and aims they want to address, and to mobilising support and private loans for financing and realising their projects. As noted, these activist groups are not oriented to technoscientific issues per se: unlike cases of medical activism [Epstein, 1997; Rabeharisoa et al., 2014], citizen science [Ottinger, 2010], or pro-science activism such as the March for Science [Penders, 2017; Riesch, Vrikki, Stephens, Lewis & Martin, 2021], the trigger for the activism was not a public technoscientific controversy. Rather, the groups can be understood as engaging in prefigurative activism that seeks to enact the kinds of futures they are agitating for [Rollo, 2017] — in this case, equitable housing solutions. At the same time their public profiles and online activity make it clear that the issues with which they are concerned are technoscientific in nature, involving scientific knowledge and expertise and technical languages.

The empirical work we draw on is part of an ongoing multi-sited ethnography of collaborative housing in Vienna conducted by Andrea Schikowitz since 2018. While the dataset as a whole includes document analysis, participant observation of around 20 different public and semi-public events (including digital and in-person panel discussions, guided tours of housing projects and city development areas, exhibitions, and meetings), and eight in-person interviews with persons involved in housing projects, in this article we focus on the groups' online activities and the ways in which these incorporate communication of technoscientific knowledge. The empirical materials therefore consist of public online material (websites and social media) from the period September 2019–May 2022, as well as ethnographic fieldnotes that reflect on impressions and observations from these online spaces [Pink et al., 2016; Skågeby, 2011]. In addition, we draw on aspects of the interviews where speakers talk about their (online) communication and the use, management and exchange of different knowledges. In order to protect the anonymity of these groups, we will not give further details about them. Throughout, any direct quotes have been translated by us from the original German.

In keeping with digital ethnographic approaches, analysis sought emergent themes and patterns [Hine, 2015]. Based on initial open coding and a first thematic analysis, focussed coding was conducted that sought to explore what knowledges are communicated, in which ways, and how online media and digital tools were used and addressed. These codes were further analysed, differentiated and patterned, and interpreted in conversation with the literature on science communication as public sense-making, on activists as (alternative) science communicators, and on activists' online communication practices. The analysis aimed to identify and analyse the spectrum of knowledges mobilised in online communication, as well as the diverse online communication practices that are enacted. Rather than identifying the frequency of certain content or communication practices by a systematic content analysis, the aim was to develop a deeper understanding of some of the ways in which the housing activists engage in the online communication of technoscientific knowledge.

Findings: online communication by activists

In what follows we outline how the housing groups negotiate technoscientific knowledge, which we understand as encompassing scholarly knowledges from institutionalised research, including social sciences [Michael, 2006], as well as professional knowledge and skills. We first analyse what knowledges are

addressed, and how they are communicated, before addressing the online communication practices involved in this. Online science communication by these activists is, we suggest, contextual and reflexive: technical knowledges are always contextualised through the political issues with which the activists are concerned, whilst they constantly reflect on the means of communication that they are mobilising.

Communication of techno-scientific knowledges

In this section we consider how the two housing groups communicate different kinds of technoscientific knowledge online. Our overarching finding is that such knowledge is always contextualised — communicated in the light of the wider problems and arguments with which the activist groups are engaged. Communication is thus centred on techno-political issues, where technical expertise is always mingled with its social and political meanings and implications. We find that three kinds of knowledge are mobilised in the groups' public communication: first, they draw on knowledge and theories from the social sciences for establishing their problem framing and the techno-political issues with which they are concerned; second, they draw on technical, legal and financial knowledge to argue how their goals ought to be realised; and third, they use planning knowledge to establish their own projects as alternative solutions for the problems they address. In this way, the activists' communication is engaged in both issue formation and identity formation.

First, knowledge from social science — and especially from critical urban studies — is mobilised and communicated to frame and make sense of the problems and to establish the issues that the groups address: the dynamics and problems of urban development, and housing policies and markets in Vienna. For example, take this quote from the FAQ-section of the website of one of the groups:

> "What does speculation-free mean? The current situation of the Viennese real estate market is characterised by rising rent and property prices. According to Statistics Austria, in 2016 the purchase prices for apartments and houses rose by 8.5%. Housing space is increasingly treated as a mere investment, and its rate of return is an object of speculation. The result are high rents for old and new buildings, which require an increasing share of people's living expenses. We regard housing as a basic right, not as a commodity — also in growing cities. With our housing project we want to pose an alternative to the rapidly growing rent price development and create long-term secured spaces with affordable rent. Through our legal model, our house is protected against any valorisation and can never be sold as private property. In this way, the house is removed from the market." (Website)

Here, the notion 'speculation-free' is clearly explained and linked to the current situation of the Viennese real estate market, which is framed as problematic, backed up by official statistics. The housing project is presented as an alternative that counters these dynamics. Here and elsewhere in the material the housing groups' communication draws on concepts and theories from urban sociology, urban studies, and economics, and on expert opinions on how these dynamics work out in Vienna (e.g. by retweeting and forwarding posts by experts). However,

if technical terms are mentioned (such as, in another extract, the "use value" or "commodification" of housing), they are explained and rendered accessible, and connected to the groups' political aims. The groups thus refer to, and mobilise, knowledge from economics, urban theory, or climate science (for example), and use it to frame their position as activists, without directly referencing the underlying theories.

Similarly, in personal conversations and interviews, members of the two housing projects often used social science concepts to make sense of their own experiences and concerns, for instance when reflecting on how their projects would foster gentrification processes and how that could be counteracted. In addition to the use of social science knowledge for making their own arguments, on social media they like, forward (or re-tweet), and comment on announcements of scientific talks, discussions, publications or media reports which deal with these topics from a critical perspective. Doing so, they strengthen debates that establish the issues that they care about as important.

Second, in addition to theory and terms from urban studies, technical, legal, and financial knowledge is drawn on to explain how the activists' goals would be accomplished, and to establish the groups' credibility and expertise. For example, through communicating technical details about the architecture, building techniques, and construction processes, the groups demonstrate that their projects are professional, solid (in all senses of the word), and carefully considered, and that they present "a secure investment opportunity" (website) for crowdfunding. The technicalities are communicated with the help of sketches, photographs, and maps, documenting the state of planning and construction of the housing projects. The groups always explain how these technical features support their social and political aims and issues, such as sustainability or living in community and creating spaces which are open to the neighbourhood.

Similarly, as the technical details of the specific legal, financing and organisational model of the housing projects are quite complex, communicating how they work out in practice is central to the groups' online communication. For example, in the following extract one of the groups explains its aims and goals in a way that interweaves personal, political, technical and social features, and that presents them as mutually reinforcing and inseparable:

> "We want to live in solidarity. That is why we plan and construct our house together. After completion the dwellers manage the house themselves. Our organisational and financial model allows people to live in our house autonomously, independently from financial reserve assets: the necessary equity capital is raised collectively by the house community and external supporters via private loans. A lively neighbourhood and everyday mutual help is important for us. This solidarity goes beyond the housing project. We offer space for cultural, social and socio-political initiatives, for refugees and for common-good oriented economic activities. Our house should be a meeting point for active neighbourhood in the house and its surroundings." (Website)

Here, they start with stating a normative aim ("We want to live in solidarity"), then explain the organisational and financial model for fulfilling this aim and how social

relations would support it (everyday mutual help), and finally link the individual aim with a broader planning goal (a lively neighbourhood, space for initiatives).

Crowd funding is vital, and a crucial aim of communication is to mobilise audiences to offer private loans. These legal and financial models are explained by splitting them up into "three easy steps" (website), and with the help of sketches and graphs. Again, political and technical arguments are linked in these descriptions, for instance by saying that instead of giving money to a bank, private loans would contribute to "realising a societally meaningful project", whereby "the people and goals of the project are known to the giver", and that a building which is located in a central location "builds real value" (all quotes are from one of the project's websites). Individual benefits (for the group members and the loan givers) and shared public benefits (the space which the project creates for cultural, political and social initiatives, and the wider planning goals which it realises) are framed as connected. As one group member argues in the interview: "If I want people to lend us money, I need to explain them the project, and I need to explain why this is a good thing, and why they should rather lend us money than putting it to the bank, and then you are already in a debate, in a very political debate." We thus see technical knowledge and expertise linked to normative goals, efforts to build trust in the groups and their projects, and the activists' project as a whole.

While communicating legal, technical, and financial details is a means to establish the groups' expertise and professionalism, they sometimes report their experiences with the public authorities and how they encounter hostility. In this way they hint at their alternative and subversive status with regard to the city administration, as well as the power and knowledge imbalances involved. Portrayals of challenges and difficulties are thus also a means of establishing their identity as belonging to an alternative sub-cultural community in opposition to 'mainstream' policies. Notably, aside from these reports on experiences with authorities, the groups' online communication rarely addresses their own experiential knowledges — including concerning coordinating themselves as a group — despite the fact that this is a crucial focus of their face-to-face communication. In contrast, online communication mainly refers to certified scientific and professional knowledge, rather than to experiential and tacit knowledge.

Third, the groups also mobilise urban planning knowledge to demonstrate how their own (and similar) projects can work as models for alternative solutions that are able to address the aforementioned issues in planning and housing that they aim to change. They present their projects as best-practice examples or models of how planning and housing could be done differently, while in their social media, they directly criticise local planning policies. This is done for example by posting announcements for research, exhibitions and competitions that address and include their projects as examples, such as in this social media post: "By the way, [expert name] will present current examples for anti-capitalist struggles around housing and public space in the frame of a lecture. And now, guess whom they mention at this occasion?" In addition, one of the groups posts on their website: "We are committed to share our knowledge — in talks, discussions or workshops. Approach us, if you want to host events about the topics of housing, commons, democratisation, ecological, social, economic sustainability, societal transformation, or a workshop for interested parties." Thus, when featuring research, the housing activists always link it to the issues they address, and to the kinds of solutions that

they want to bring forward, and they put them in contrast to the current policies for demonstrating their alternative stance and identity.

In sum, scientific and technical knowledges (specifically knowledge from social science, from legal and financial systems, and from architecture and construction) intertwine with political content within these activists' digital media: knowledge is used and communicated in order to constitute techno-political issues. Complex and technical information is presented, but is always explained and situated and plays a particular role: to signal the trustworthiness and expertise of the groups, to persuade audiences to mobilise to their causes, or to frame and delimit the issues they are engaged with. Technoscience is thus always contextualised in these activists' public communication. Rather than being presented in and of itself, it is woven into their arguments and concerns: they connect research and scientific knowledge to their own concerns and identities, they always present technical and normative arguments as entangled, and they show how their individual projects are connected with their broader political aims.

Online communication practices

In addition to the fact that the housing activists' communication of technoscientific knowledge is always contextual, we found that the nature of public communication was itself a focus of attention within the empirical material. Activist communication was thus reflexive, engaged with its own structure and characteristics, and designed to align with particular values. This reflexivity shaped the housing groups' online communication practices and spaces, and, as with the content that was featured, fed into the formation of alternative identities and issues. In the following, we first analyse how the housing activists use online tools and platforms, and second, explore their online communication style.

First, both groups use a mix of commercial and open source tools and platforms, in a manner structured according to their particular normative commitments. They have elaborate and professionally managed websites, and are present on the big social media platforms (Facebook, Twitter/X, and Instagram). As the groups' overall aim is to create spaces that are not based on neoliberal market dynamics, they often view the use of social media platforms and commercial digital tools as problematic. At the same time, reaching a broader audience and mobilising support and crowd funding requires online communication. While both groups use conventional commercial platforms, they thus also draw on alternative and open access tools and services to complement these and to circumvent features which they deem problematic — for example concerning privacy and the commercial use of user data. Examples include the use of embedded tools in websites that prevent data tracking, or using open source platforms for video conferences (e.g. during the lockdowns, when they held their open regulars' table or information events for potential new members online). As one group member explained in an interview, they constantly reflect on such choices: "so, which media do we use? In which ways do we use these media? How do we perhaps restrict the communication flow to a specific focus? What is currently important for us?"

When the groups do make use of commercial tools and platforms, they try to use them in transparent and responsible ways. For example, in addition to the legally

required data protection declaration on their websites, they also explain in detail how users can configure their settings to prevent tracking, disable cookies, and deactivate certain tools. They also address their concerns with certain platform politics and data use directly on social media. For instance, one of the groups' introductory material on a global social media platform explicitly addresses their unease about using this platform by writing "For us it was really not an easy decision to do a [platform] site, not all of us find that predominantly acceptable." They thus state that they only use the platform in a restricted way (e.g. by refraining from real-time communication), asking users to respect their concerns and not to post content that would undermine this limited use or expose details of group members who dislike using the platform. Further, they encourage offline ways to communicate: "Whoever wants to get to know us can come to the regulars' table." This explicit appeal to users to be aware of the implications of using commercial platforms was also present in other instances. Communication is thus part of a process of self-reflection and identity building, involving not only the content but also the means of communication.

Related to the appeals for user compliance, for one of the two groups this went beyond the digital to incorporate other formats, involving a patchworked combination of different digital and material tools, and online and offline practices, for engaging users. For instance, the group provides a combination of a digital calendar, email, text messages, printed forms, and a physical mailbox on site for managing the use of their public facilities. Digital communication and coordination tools are used to give an overview, while physical devices (such as noticeboards and mailboxes) are used to keep control over certain data, and other communication means such as emergency phone numbers and contact persons living on site are used as a back-up. On their webpage they explain how to combine these formats to book and use the facility, and ask users to keep to this procedure. This involves trust, as for example they ask users on their website not to share the phone numbers from the physical on-site bill-board online, or to respect the time of those in charge and only contact them in cases of emergency. They thus manage shared processes by appealing to people's self-responsibility and compliance, rather than relying on technical means alone, again demonstrating a concern for the modalities of communication.

Second, regarding the activists' online communication practices and style, a striking feature is that both groups' online communication is carefully and thoughtfully designed and actively managed. The websites use a distinct graphical style, which corresponds to the language used, the pictures, and the group identity. They provide extensive information on their websites, feature news sections or blogs with updates on project development and events, and they update these sections regularly. The social media accounts of both groups are also actively managed and regularly updated. Both have a public relations team which manages, amongst other things, online communication, and the two groups coordinate their (offline and online) communication strategies and mutually feature and amplify their posts. This demonstrates the centrality of online communication for the housing activists. Convincing their audiences to support their projects and their political aims is not only accomplished by mobilising technoscientific knowledge, but also by professional communication practices and skills.

The use of digital platforms closely relates to how each group presents themselves. Content and modes of communication correspond to each group's identity in meaningful ways — for instance, one of the groups, which has a more irreverent way of framing itself, frequently uses humour and memes on its website and social media. Both groups use sub-cultural codes (such as specific slogans and aesthetics) that are recognisable for those who belong to the same scene, but they are not foregrounded and thus they would not confuse broader audiences. In this way, the groups simultaneously display professional credibility and their alternative identities. So, they carefully balance a professional presence directed at public authorities, potential funders, and broader publics with the display of their anti-capitalist values and identity directed at sub-cultural audiences that might support, cooperate with or participate in the activities which the project offers.

In sum, activist communication is self-consciously reflected upon and designed to align with specific values and practices. Its form is thus a key part of the message: in arguing for justice and solidarity in urban development, these activists find means of communicating that also support these ways of interacting and organising. Communication is thus a constitutive part of the activists' identity, not just a technique for getting a message across to a public audience. We thus regard the housing activists' online communication practices as reflexive — the purpose, content and means of communication are always linked, and communication practices are recurrently scrutinised.

Discussion: activist communication as contextual and reflexive

In the previous sections we have discussed how housing activists communicate technoscientific knowledges through their online activities. They mobilise interdisciplinary knowledge and expertise (from social sciences, urban studies, urban planning, economics, architecture, engineering, or legal and organisational studies) to make sense of the problems they aim to address, as well as possible solutions and ways of communicating about them. Knowledge and expertise is thus always related to political values and identities. We also found that (digital) means and tools of communication are not regarded as neutral but as political, and that they are reflected upon and managed accordingly. In what follows we reflect on some implications of these findings. As a guide to the reader, this is summarised in Figure 1.

One crucial point is that scientific and technical knowledges are central to these activists' online communication, but that such knowledges are never framed as important for communication in and of themselves. Rather, they are always contextualised and/or mobilised for particular purposes. As we saw repeatedly, activist communication is exactly of techno-political issues, where technical expertise is always mingled with its social and political meanings and implications [cf. Herrera-Lima, 2020]. This entanglement of the scientific, technical and political does not, however, diminish or delegitimise any of these aspects, but rather contributes to the credibility of the claims made. Technoscientific knowledge is presented by the groups to argue for the salience of the issues they are concerned with, to present themselves as trustworthy, or to bolster support (for instance). To think of activists as science communicators is thus to move even further away from a model of science communication as information transfer, towards framing it as public sense-making [Bucchi & Trench, 2021; Davies et al., 2019], in which issues [Marres, 2007] are more important than concrete knowledge claims.

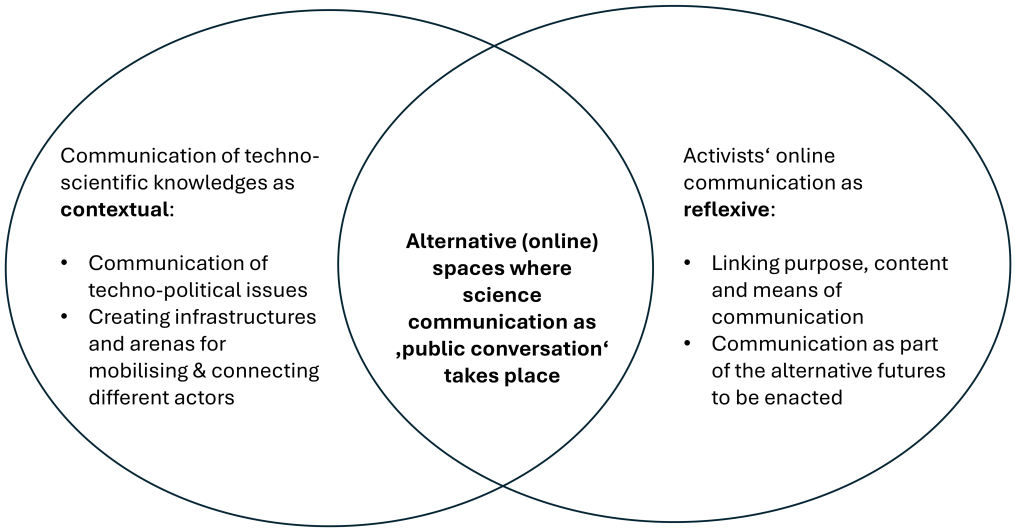

Figure 1. Visual summary of the implications of the findings.

Indeed, we might regard these activists as knowledge brokers [Meyer, 2010] whose communication activities mediate between science and practice, broader urban audiences and sub-cultural communities, individual and collective solutions, commercial platforms and alternative digital tools, and digital and material practices. One aspect of this is that they often use a dual communication strategy to address more than one audience at once. They use discrete cues — for instance to social science theories or cultural references — that are recognised by insiders (such as social scientists, professional planners, or members of a sub-culture), but do not confuse or alienate broader audiences. Similarly to Feldman [2020], who argues that the use of humor and memes in the *School Strike for Climate* movement is a way to combine emotions with scientific knowledge in order to "engage with other participants or observers at protests in a language they know best" [Feldman, 2020, p. 4], the use of humor and memes allows the activists to reach multiple audiences.

Another aspect of the activists' mediating practices is that while they do post content about their own projects, a large portion of their social media communication consists of disseminating knowledge from others — they post and forward information about publications, media reports, events, and projects, selecting these according to their group identities, values, and aims. In this way, they establish themselves and their online channels as a communication platform which brings together knowledges and actors oriented to specific issues. This mediating role of their online communication mirrors the status of the groups' physical locations. Their communal rooms and public facilities are often used to host events such as panel discussions about housing-related topics, in which some of the group members participate, besides representatives of the city administration, urban researchers, and other experts. In similar ways, the housing activists' online communication can be characterised as infrastructural [cf. Le Dantec & DiSalvo, 2013] — they do not only participate in the 'social conversation about science', but also participate in building the spaces and arenas in which this conversation takes place. In this way, they secure themselves a place at the table by providing the table, and by doing so they gain a certain influence in shaping which voices are amplified, which problem framings are strengthened, and which issues

are created. Thus, their public communication is not only contextual, it also creates and shapes the context to which it refers.

This context for the 'social conversation about science' includes scientists and other actors who are mobilized to contribute to the discussion of and developing of solutions for the issues that are central to the housing activists' activities. Herrera-Lima [2020] argues that by seeking collaboration with scientists, socio-environmental activists in Latin America not only aim to engage people in science, "but also to engage and involve the scientists with the social problems" [Herrera-Lima, 2020, p. 3]. Feldman [2020] similarly discusses how young climate activists strengthen their position and credibility against criticism that challenges their authority by drawing on the support of "respected adult power, such as labour unions and scientific institutions" [Feldman, 2020, p. 3]. In similar ways, housing activists mobilise supporting voices from science and established democratic institutions by inviting and citing them, to strengthen the legitimacy of their own position. By doing so, they involve these actors into the 'social conversation about science' centering on and amplifying the techno-political issues that are of concern for the activists.

A second key finding was the degree to which activist communication was reflexive. The groups explicitly reflected, in their public online communication, on how this communication should be organised, and on how this aligned with their values and commitments. This extended to the ways in which their online communication spaces intersected with the housing projects as material spaces which also host physical events and meetings. Again, communication was not regarded as purely instrumental but as deeply cultural. Platforms, formats, and modes of interacting are not neutral, but embed particular values; as such, engagement with how best to use such platforms and formats becomes a way that activist groups can start to realise the futures that they are seeking to promote. Just as the groups' housing projects seek to develop 'prototypes' where new ways of living together can be tested out [Corsín Jiménez, 2014], their online communication can similarly be seen as socio-material interventions into urban infrastructures/fabrics that are experimenting with different ways to build and use communication spaces. Both their housing projects and their communication practices aim to create alternatives, but they do so by building on existing infrastructures and tools, and by using and combining them in new ways.

There are thus a number of implications for science communication scholarship that emerge from this exploration of this instance of activist engagement with and communication of technoscientific knowledges. In line with other studies of science-oriented activism, it is clear that these activist groups are strategic with regard to their communication of technoscientific knowledge: they are not concerned with communicating knowledge for the sake of it, but mobilise it in order to craft particular arguments or demonstrate credibility [cf. Epstein, 1997; Fähnrich, 2018; Soßdorf & Burgi, 2022; Feldman, 2020; Herrera-Lima, 2020]. There is thus a fundamental difference to at least some forms of professional science communication, in which the aim is to communicate and engage publics with science in and of itself. At the same time the ways in which the activist groups handle and communicate technoscience offer some interesting insights for science communication practice. That technoscientific knowledge is always contextualised — put into the context of its place within wider social, political, economic, and

normative dimensions — emphasises the point, made in the literature [cf. Bandelli, 2015; Isopp, 2015; Ottinger, 2015], that science is never value-free, and suggests an interesting model for science communication practice. What might it mean to more explicitly frame technoscientific context in the light of its public meanings, uses, and implications — to communicate technopolitical issues [Marres, 2007], rather than technoscientific content? Doing so would not only allow us as analysts to think of science communication as the public conversation about science [Bucchi & Trench, 2021], but to re-imagine our work as practitioners in this way too, and to find innovative ways of contributing to such conversations.

Similarly, the constant reflexivity of (these) activists regarding the form and content of their communication offers inspiration for other forms of science communication practice. As others have also suggested [Barassi, 2015; Ilten & McInerney, 2019], activists are intensely aware of the values embedded in the channels and modalities that they use to communicate, and find ways of doing so that align with their positions and political commitments without foreclosing broader impact media altogether. Such reflexivity is certainly present in other instances of science communication, but explicit and consequent engagement with and reflection on the media used, and the affordances and limitations of these, is perhaps less usual. One aspect of contextualising communication may thus involve acknowledging that its form is not independent from its content and message, and reflecting on the values implied by particular channels and formats. Doing so might help to highlight the situatedness of any communication practice, and to understand the diversity of ways in which the 'social conversation about science' can be realised.

Conclusion

Taking the view that science communication comprises the diverse activities that make up the social conversation about science in particular societies, we have explored a case of urban activism, the online activities of two groups of housing activists in Vienna, Austria. While their activism is not centred on a particular public technoscientific controversy (instead being oriented to the realisation of just and sustainable housing and urban development), we have shown that technoscientific knowledge is central to it and to the ways in which they communicate. As science communicators, their activities are contextual and reflexive: they communicate technoscientific knowledge within its social, political, economic, and normative contexts, and incorporate reflection on their communication practices. The case both offers insights into the diverse ways and sites in which public conversations about science take place, and inspiration for practice with regard to how other forms of science communication might similarly contextualise knowledge and reflect on its modalities.

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