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# Participatory Sensemaking Through Visualising Conversations

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# Participatory Sensemaking Through Visualising Conversations

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Both conversations between people and finding ways to visualise complex phenomena are important topics for sensemaking in systemic design research. This presentation introduces the COCOnUT and TaCo projects, which together create a system which extracts words from conversations, visualises them using a diagrammatic approach, and enables participants to combine and annotate them in near-real time, using a tangible interface. Particularly in multi-stakeholder contexts such as democratic deliberation, or participatory policy-making, the ability for participants to see what is being said (and what has been said) by themselves and others and to investigate and interact with themes emerging from the conversation—ideas which have been re-stated or reframed, terms used to mean different things, different terms used to mean the same thing, ideas which should be grouped together, and so on – are all part of a process of understanding each other's understanding. Ongoing work will explore possibilities for this kind of tool as part of participatory sensemaking in design and conversation processes.

Keywords: systemic design, conversation, participatory sensemaking, natural language processing

RSD: Methods & Methodology, Mapping & Modelling

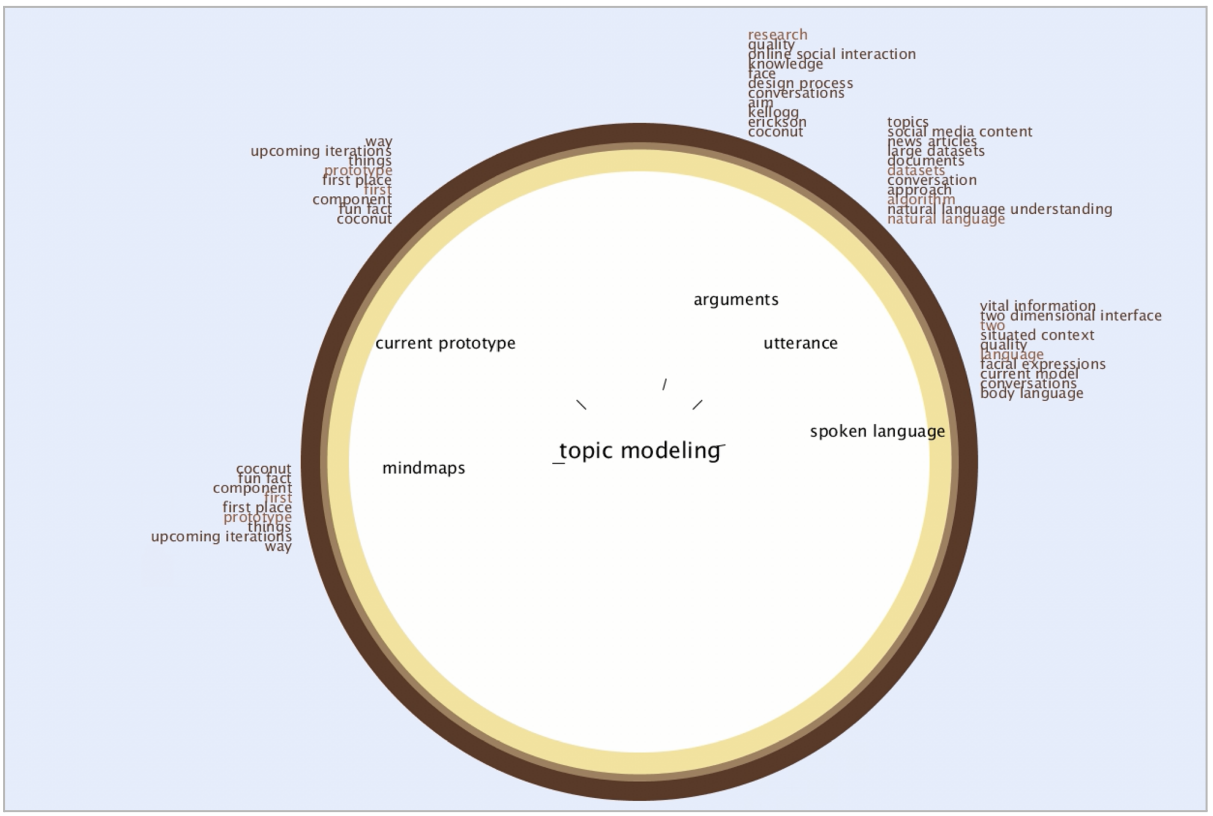


Figure 1. A screenshot of COCONuT, which visualises speech-to-text and key phrase extraction, as a starting point for a tangible interface, TaCo (see Figure 2).

## The opportunity for visualising conversations

> As [Gordon] Pask loved to say: Once begun, conversations never end... Even if I forget what we said, my mental repertoire is forever changed, in the small or in the large, as a result of our conversation. (Pangaro, 2017)

Conversations are a topic of perpetual interest to systemic designers: from Donald Schön's (1992) notion of design being a kind of "reflective conversation" with a situation to cybernetic considerations around how meaning and understanding (and understanding of each other's understanding) are constructed, recursively (Sweeting, 2015; Glanville, 1993), to the wide variety of participatory design and discussion methods and tools developed within the systemic design community for the purposes

of provoking and guiding conversations (including language, e.g. Dudani & Morrison (2020), structured formats (e.g. Mages, 2017), and tangible approaches (e.g. Lockton et al., 2019). Visual approaches, most notably gigamaps (e.g. Sevaldson, 2021) but also icons and illustrations (e.g. Boehnert, 2018; Stoyko, 2019), are also central to the way that systemic designers engage with complexity.

Too often, conversations are hard to visualise for both participants themselves and others for whom the conversation may have important consequences. Despite the growing role of design for policy (Mortati et al., 2022; Landa-Avila et al., 2022), political deliberation and collaborative government decision-making processes (and indeed scientific discussion and even team meetings within organisations or between stakeholders) largely rely on written minutes (or perhaps a plethora of Post-It notes (Christensen et al., 2019)), the memories of participants or observers, video or audio recordings, or (increasingly) automatically generated transcripts which are context-free and do not preserve the interplay and interactions of the experience. The Covid-19 pandemic provides an example where conversation visualisation could have improved public engagement with science and policy-making: it has been a societal crisis characterised by an interplay between rapid societal change, technological development and intermittent crisis (van Prooijen & Douglas, 2017), and it highlights how modern conversation technologies (e.g. social media) are inherently intertwined with political deliberation.

Could better forms of facilitating conversations, visually or tangibly, help with constructive public engagement with—and citizen participation in—policy decision-making processes or other forms of conversation? While there are innovative approaches to deliberative technologies for fact-checking, online deliberation, opinion sharing and collective argumentation, and projects such as Democratic Replay (De Liddo et al., 2021)—an interactive interface for augmented video replays of election debates, aiming for constructive rather than confrontational discourse), there is an opportunity for a tool explicitly focused on participatory sensemaking, in real-time (i.e., while they are happening). Jaasma & Wolters (2017) designed [x]Changing perspectives, an interactive system to facilitate participatory sensemaking in interactions between multiple stakeholders around public issues, using physical “discussion tables”. They

distinguish between a “Systems” and “Lifeworld” context, in which reaching understanding requires “interactions crossing the boundaries” between these worlds. Adopting the enactive approach to sensemaking, they argue how we perceive and make sense of our surroundings by interacting in-and-with its physical and social environment in a continuous loop of perception and situated action. Here, ‘enactment’—defined by Varela et al. (1992)—specifies how this opposes the dominant view within cognitive psychology by which understanding occurs through creating mental representations. This suggests that an active participatory process in which people “do things together” during the conversation may benefit sensemaking. There are parallels here with some of the tangible making-based group methods within systemic design and the RSD community, such as Rygh & Clatworthy (2019) and Lockton et al. (2019), and work in new forms of physicalisation (e.g. Sauvé et al., 2022). There is, of course, lots of other work on approaches to deliberative democracy from outside design, e.g. Fishkin (1997) which should inform future work.

Recent developments in the accessibility of natural language processing, and the possibilities of incorporating it into designed tools, suggest opportunities for experimenting with and prototyping a new tool for visualising conversations with a physical format.

## Introducing COCOnUT and TaCo

This presentation (and subsequent working paper) will explore COCOnUT and further development, TaCo, two related projects by the first author, which, together, create a system which extracts words from conversations, visualises them, and enables participants to combine and annotate them in near-real time using a tangible interface.

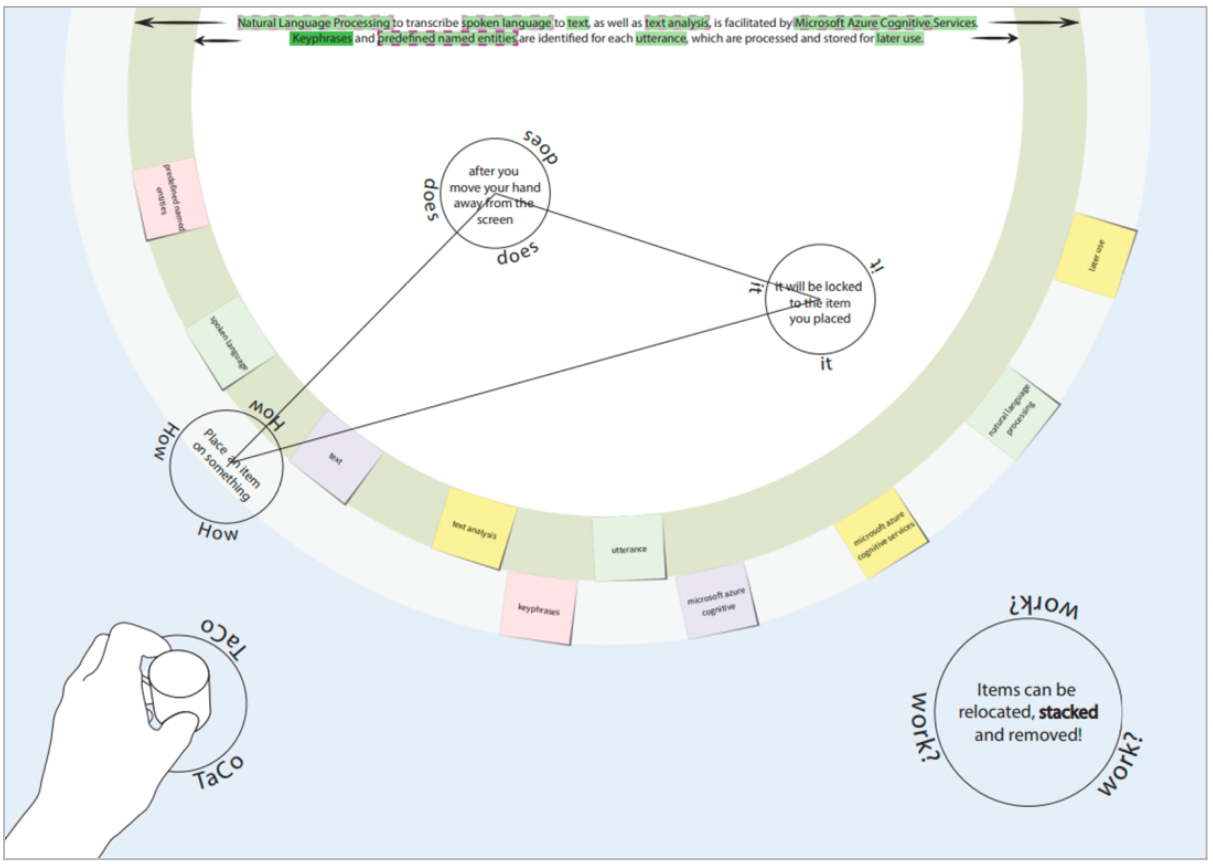


Figure 2. TaCo incorporates topic modelling from COCOnUT into a tangible interface, where words and phrases extracted from the conversation can be linked, combined, moved, and removed by participants in near real-time.

COCOnUT (correlated topic modelling of conversations through utterances), illustrated in Figure 1, makes use of natural language processing by Microsoft to transcribe utterances to text and identify their key phrases and entities, after which COCOnUT processes these to keep track of their relation to each other. In its approach to sensemaking for participants (users), rather than identifying topics from a large dataset of written documents, COCOnUT identifies topics from the utterances within a conversation, which are then stored and processed to generate mind maps using an algorithm selected by those conversing. In a nutshell, through correlated topic modelling in real-time, COCOnUT visualises how topical knowledge unfolds in conversations.

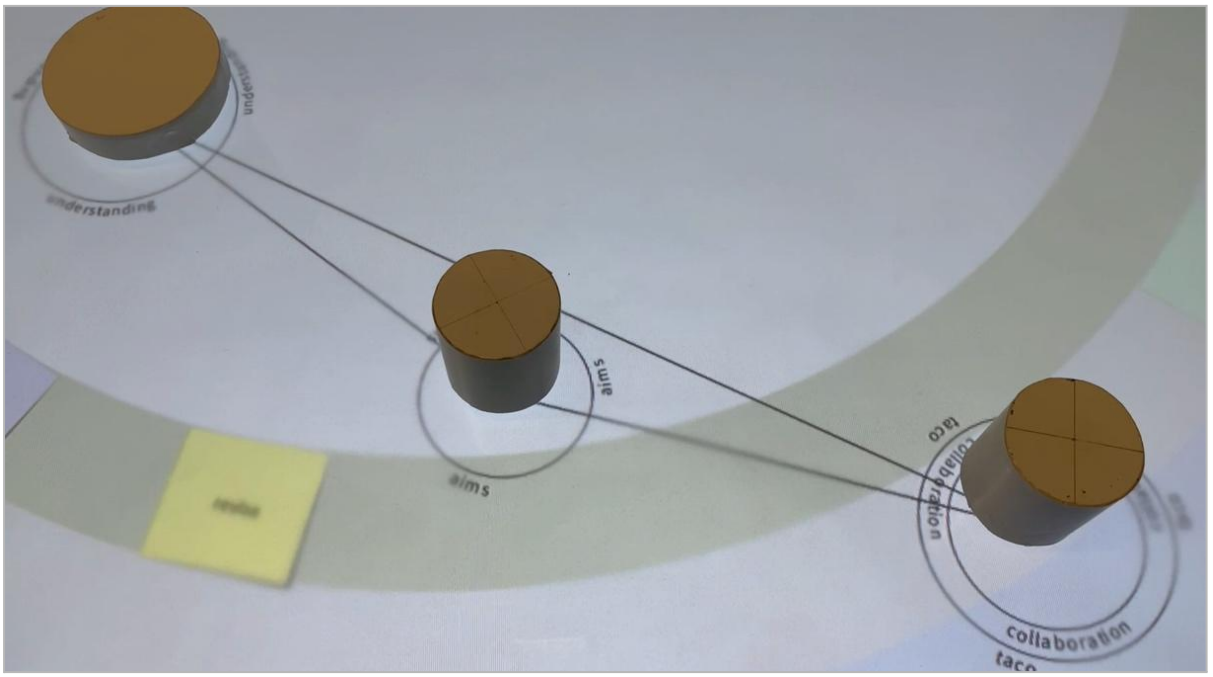


Figure 3. A close-up of the TaCo prototype. Here, the words ‘understanding’ and ‘aims’ have been linked together, and in turn, each linked to a stack of ‘collaboration’ and ‘taco’.

In turn, TaCo (tangible conversing) physicalises a conversation - participants can move physical "blocks" which can be used to link, combine, move, and remove elements from the conversation while it is happening: on a horizontal monitor, words and phrases can be rearranged, annotated, and adjusted by those conversing in real-time. Participants can group particular concepts together by “stacking” them (echoing concepts of variety in, for example, Stafford Beer’s work). A Kinect sensor detects the position of the blocks, and the system updates the display accordingly. Figure 2 shows an outline of the interface, while Figures 3 and 4 show the TaCo prototype in use. As an ongoing project, there are many questions which can be investigated around both the ways in which conversations can be visualised and how, in practice, the presence of a system such as TaCo within a conversation might change the way people interact and affect how sensemaking happens.


Figure 4. The TaCo prototype in use, with participants having a conversation about the prototype itself and seeing the words and phrases appear on screen as they speak.

## Towards participatory sensemaking

This research aims to explore how we may capture and visualise meaning expressed in spoken language during participatory sensemaking processes. The COCOnUT/TaCo project explores novel approaches to designing with spoken language towards facilitating participatory sensemaking practices that:

1. start from the point of public input
2. generate visual and physical outputs that are easy to interpret
3. enable participants to generate meaning together
4. are perceived as legitimate by individuals not directly involved in these
5. aim to facilitate constructive rather than confrontational discourse

While this is a nascent line of enquiry, as the project and subsequent innovations develop and evolve, we will explore the use of this kind of approach in more kinds of conversations and situations, including practical applications in deliberative democracy and for conversation around systems. We look forward to exploring the systemic design community's ideas and perspectives here.

True participatory sensemaking – defined by Jaegher & Di Paolo – is achieved when "the generated meaning cannot be assigned to either participant alone". This has parallels with concepts of emergence and discussions of parts and wholes in systems thinking and systemic design, and also (potentially) helps highlight and dissolve some of the power structures within conversations among stakeholders with different societal positions or presumed influence.

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