



Chapter 5

SOCIAL INTERACTION

5.1 Introduction

5.2 Being Social

5.3 Face-to-Face Conversations

5.4 Remote Conversations

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Objectives

The main goals of the chapter are to accomplish the following:

- Explain what is meant by social interaction.
- Describe the social mechanisms that people use to communicate and collaborate.
- Explain what social presence means.
- Give an overview of new technologies intended to facilitate collaboration and group participation.
- Discuss how social media has changed how we keep in touch, make contacts, and manage our social and working lives.
- Outline examples of new social phenomena that are a result of being able to connect online.

5.1 Introduction

People are inherently social: we live together, work together, learn together, play together, interact and talk with each other, and socialize. A number of technologies have been developed specifically to enable us to persist in being social when physically apart from one another, many of which have now become part of the fabric of society. These include the widespread use of smartphones, video chat, social media, gaming, messaging, and telepresence. Each of these afford different ways of supporting how people connect.

There are many ways to study what it means to be social. In this chapter, we focus on how people communicate and collaborate face-to-face and remotely in their social, work,

and everyday lives—with the goal of providing models, insights, and guidelines to inform the design of “social” technologies that can better support and extend them. A diversity of communication technologies is also examined that have changed the way people live—how they keep in touch, make friends, and coordinate their social and work networks. The conversation mechanisms that have conventionally been used in face-to-face interactions are described and discussed in relation to how they have been adapted for the various kinds of computer-based conversations that now take place at a distance. Examples of social phenomena that have emerged as a result of social engagement at scale are also presented.

5.2 Being Social

A fundamental aspect of everyday life is being social, and that entails interacting with each other. People continually update each other about news, changes, and developments on a given project, activity, person, or event. For example, friends and families keep each other posted on what’s happening at work, at school, at a restaurant or club, next door, in reality shows, and in the news. Similarly, people who work together keep each other informed about their social lives and everyday events, as well as what is happening at work, for instance when a project is about to be completed, plans for a new project, problems with meeting deadlines, rumors about closures, and so on.

While face-to-face conversations remain central to many social interactions, the use of social media has dramatically increased. People now spend several hours a day communicating with others online—texting, emailing, tweeting, Facebooking, Skyping, instant messaging, and so on. It is also common practice for people at work to keep in touch with each other via WhatsApp groups and other workplace communication tools, such as Slack, Yammer, or Teams.

The almost universal adoption of social media in mainstream life has resulted in most people now being connected in multiple ways over time and space—in ways that were unimaginable 25 or even 10 years ago. For example, adults average about 338 Facebook friends, while it is increasingly common for people to have more than 1,000 connections on LinkedIn—many more than those made through face-to-face networking. The way that people make contact, how they stay in touch, who they connect to, and how they maintain their social networks and family ties have irrevocably changed. During the last 20 or so years, social media, teleconferencing, and other social-based technologies (often referred to as *social computing*) have also transformed how people collaborate and work together globally—including the rise of flexible and remote working, the widespread use of shared calendars and collaboration tools (for example Slack, Webex, Trello, and Google Docs), and professional networking platforms (such as LinkedIn, Twitter, and WhatsApp).

A key question that the universal adoption of social media and other social computing tools in society raises is how it has affected people’s ability to connect, work, and interact with one another. Have the conventions, norms, and rules established in face-to-face interactions to maintain social order been adopted in social media interactions, or have new norms emerged? In particular, are the established conversational rules and etiquette, whose function it is to let people know how they should behave in social groups, also applicable to online social behavior? Or, have new conversational mechanisms evolved for the various kinds of social media? For example, do people greet each other in the same way, depending on whether they are chatting online, Skyping, or at a party? Do people take turns when online

chatting in the way they do when talking with each other face to face? How do they choose which technology or app to use from the variety available today for their various work and social activities, such as SnapChat, text messaging, Skype, or phone calls? Answering these questions can help us understand how existing tools support communication and collaborative work while helping to inform the design of new ones.

When planning and coordinating social activities, groups often switch from one mode to another. Most people send texts in preference to calling someone up, but they may switch to calling or mobile group messaging (such as WhatsApp, GroupMe) at different stages of planning to go out (Schuler et al., 2014). However, there can be a cost as conversations about what to do, where to meet, and who to invite multiply across people. Some people might get left off or others might not reply, and much time can be spent to-ing and fro-ing across the different apps and threads. Also, some people may not look at their notifications in a timely manner, while further developments in the group planning have evolved. This is compounded by the fact that often people don't want to commit until close to the time of the event, in case an invitation to do something from another friend appears that is more interesting to them. Teenagers, especially, often leave it until the last minute to micro-coordinate their arrangements with their friends before deciding on what to do. They will wait and see if a better offer comes their way rather than deciding for themselves a week in advance, say, to see a movie with a friend and sticking to it. This can make it frustrating for those who initiate the planning and are waiting to book tickets before they sell out.

A growing concern that is being raised within society is how much time people spend looking at their phones—whether interacting with others, playing games, tweeting, and so forth—and its consequences on people's well-being (see Ali et al., 2018). A report on the impact of the “decade of a smartphone” notes that on average a person in the United Kingdom spends more than a day a week online (Ofcom, 2018). Often, it is the first thing they do upon waking and the last thing they do before going to bed. Moreover, lots of people cannot go for long without checking their phone. Even when sitting together, they resort to being in their own digital bubbles (see Figure 5.1). Sherry Turkle (2015) bemoans the negative impact that this growing trend is having on modern life, especially how it is affecting everyday conversation. She points out that many people will admit to preferring texting to talking to others, as it is easier, requires less effort, and is more convenient. Furthermore, her research has shown that when children hear adults talking less, they likewise talk less. This in turn reduces opportunities to learn how to empathize. She argues that while online communication has its place in society, it is time to reclaim conversation, where people put down their phones more often and (re)learn the art and joy of spontaneously talking to each other.

On the other hand, it should be stressed that several technologies have been designed to encourage social interaction to good effect. For example, voice assistants that come with smart speakers, such as Amazon's Echo devices, provide a large number of “skills” intended to support multiple users taking part at the same time, offering the potential for families to play together. An example skill is “Open the Magic Door,” which allows group members (such as families) to choose their path in a story by selecting different options through the narrative. Social interaction may be further encouraged by the affordance of a smart speaker when placed on a surface in the home, such as a kitchen counter or mantelpiece. In particular, its physical presence in this shared location affords joint ownership and use—similar to other domestic devices, such as the radio or TV. This differs from other virtual voice assistants that are found on phones or laptops that support individual use.



Figure 5.1 A family sits together, but they are all in their own digital bubbles—including the dog!

Source: Helen Sharp

ACTIVITY 5.1

Think of a time where you enjoyed meeting up with friends to catch up in a cafe. Compare this social occasion with the experience that you have when texting with them on your smartphone. How are the two kinds of conversations different?

Comment

The nature of the conversations is likely to be very different with pros and cons for each. Face-to-face conversations ebb and flow unpredictably and spontaneously from one topic to the next. There can be much laughing, gesturing, and merriment among those taking part in the conversation. Those present pay attention to the person speaking, and then when someone else starts talking, all eyes move to them. There can be much intimacy through eye contact, facial expressions, and body language, in contrast to when texters send intermittent messages back and forth in bursts of time. Texting is also more premeditated; people decide what to say and can review what they have written. They can edit their message or decide even not to send it, although sometimes people press the Send button without much thought about its impact on the interlocutor that can lead to regrets afterward.

Emoticons are commonly used as a form of expressivity to compensate for nonverbal communication. While they can enrich a message by adding humor, affection, or a personal touch, they are nothing like a real smile or a wink shared at a key moment in a conversation. Another difference is that people say things and ask each other things in conversations that they would never do via text. On the one hand, such confiding and directness may be more engaging and enjoyable, but on the other hand, it can sometimes be embarrassing. It depends on the context as to whether conversing face-to-face versus texting is preferable. ■

5.3 Face-to-Face Conversations

Talking is something that is effortless and comes naturally to most people. And yet holding a conversation is a highly skilled collaborative achievement, having many of the qualities of a musical ensemble. In this section we examine what makes up a conversation. Understanding how conversations start, progress, and finish is useful when designing dialogues that take place with chatbots, voice assistants, and other communication tools. In particular, it helps researchers and developers understand how natural it is, how comfortable people are when conversing with digital agents, and the extent to which it is important to follow conversation mechanisms that are found in human conversations. We begin by examining what happens at the beginning.

- A: *Hi there.*
- B: *Hi!*
- C: *Hi.*
- A: *All right?*
- C: *Good. How's it going?*
- A: *Fine, how are you?*
- C: *Good.*
- B: *OK. How's life treating you?*

Such mutual greetings are typical. A dialogue may then ensue in which the participants take turns asking questions, giving replies, and making statements. Then, when one or more of the participants wants to draw the conversation to a close, they do so by using either implicit or explicit cues. An example of an implicit cue is when a participant looks at their watch, signaling indirectly to the other participants that they want the conversation to draw to a close. The other participants may choose to acknowledge this cue or carry on and ignore it. Either way, the first participant may then offer an explicit signal, by saying, “Well, I have to go now. I got a lot of work to do” or, “Oh dear, look at the time. I gotta run. I have to meet someone.” Following the acknowledgment by the other participants of such implicit and explicit signals, the conversation draws to a close, with a farewell ritual. The different participants take turns saying, “Goodbye,” “Bye,” “See you,” repeating themselves several times until they finally separate.

ACTIVITY 5.2

How do you start and end a conversation when (1) talking on the phone and (2) chatting online? Do you use the same conversational mechanisms that are used in face-to-face conversations?

Comment

The person answering the call will initiate the conversation by saying “hello” or, more formally, the name of their company/department. Most phones (landline and smartphones) have the facility to display the name of the caller (Caller ID) so the receiver can be more personal when answering, for example “Hello, John. How are you doing?” Phone conversations usually start with a mutual greeting and end with a mutual farewell. In contrast, conversations that take place when chatting online have evolved new conventions. The use of opening and ending greetings when joining and leaving is rare; instead, most people simply start their message with what they want to talk about and then stop when they have gotten an answer, as if in the middle of a conversation. ■

Many people are now overwhelmed by the number of emails they receive each day and find it difficult to reply to them all. This has raised the question of which conversational techniques to use to improve the chances of getting someone to reply. For example, can the way people compose their emails, especially the choice of opening and ending a conversation, increase the likelihood that the recipient will respond to it? A study by Boomerang (Brendan G, 2017) of 300,000 emails taken from mailing list archives of more than 20 different online communities examined whether the opening or closing phrase that was used affected the reply rate. They found that the most common opening phrase used “hey” (64 percent), followed by “hello” (63 percent), and then “hi” (62 percent) were the ones that got the highest rate of reply, in the region of 63–64 percent. This was found to be higher than emails that opened with more formal phrases, like “Dear” (57 percent) or “Greetings” (56 percent). The most popular form of sign-off was found to be “thanks” (66 percent), “regards” (63 percent), and “cheers” (58 percent), with “best” being used less (51 percent). Again, they found that emails that used closings with a form of “thank you” got the highest rate of responses. Hence, which conversational mechanism someone uses to address the recipient can determine whether they will reply to it.

Conversational mechanisms enable people to coordinate their talk with one another, allowing them to know how to start and stop. Throughout a conversation, further turn-taking rules are followed that enable people to know when to listen, when it is their cue to speak, and when it is time for them to stop again to allow the others to speak. Sacks et al. (1978), famous for their work on conversation analysis, describe these in terms of three basic rules.

Rule 1 The current speaker chooses the next speaker by asking a question, inviting an opinion, or making a request.

Rule 2 Another person decides to start speaking.

Rule 3 The current speaker continues talking.

The rules are assumed to be applied in this order so that whenever there is an opportunity for a change of speaker to occur, for instance, someone comes to the end of a sentence, rule 1 is applied. If the listener to whom the question or request is addressed does not accept the offer to take the floor, rule 2 is applied, and someone else taking part in the conversation may take up the opportunity and offer a view on the matter. If this does not happen, then rule 3 is applied, and the current speaker continues talking. The rules are cycled through recursively until someone speaks again.

To facilitate rule following, people use various ways of indicating how long they are going to talk and on what topic. For example, a speaker might say right at the beginning of his turn in the conversation that he has three things to say. A speaker may also explicitly request a change in speaker by saying to the listeners, “OK, that’s all I want to say on that matter. So, what do you think?” More subtle cues to let others know that their turn in the conversation is coming to an end include the lowering or raising of the voice to indicate the end of a question or the use of phrases like “You know what I mean?” or simply “OK?” Back channeling (uh-huh, mmm), body orientation (such as moving away from or closer to someone), gaze (staring straight at someone or glancing away), and gesturing (for example, raising of arms) are also used in different combinations when talking in order to signal to others when someone wants to hand over or take up a turn in the conversation.

Another way in which conversations are coordinated and given coherence is through the use of adjacency pairs (Schegloff and Sacks, 1973). Utterances are assumed to come in pairs in which the first part sets up an expectation of what is to come next and directs the way in which what does come next is heard. For example, A may ask a question to which B responds appropriately.

A: So, shall we meet at 8:00?
B: Um, can we make it a bit later, say 8:30?

Sometimes adjacency pairs get embedded in each other, so it may take some time for a person to get a reply to their initial request or statement.

A: So, shall we meet at 8:00?
B: Wow, look at them.
A: Yes, what a funny hairdo!
B: Um, can we make it a bit later, say 8:30?

For the most part, people are not aware of following conversational mechanisms and would be hard-pressed to articulate how they can carry on a conversation. Furthermore, people don't necessarily abide by the rules all the time. They may interrupt each other or talk over each other, even when the current speaker has clearly indicated a desire to hold the floor for the next two minutes to finish an argument. Alternatively, a listener may not take up a cue from a speaker to answer a question or take over the conversation but instead continue to say nothing even though the speaker may be making it glaringly obvious that it is the listener's turn to say something. Oftentimes, a teacher will try to hand over the conversation to a student in a seminar by staring at them and asking a specific question, only to see the student look at the floor and say nothing. The outcome is an embarrassing silence, followed by either the teacher or another student picking up the conversation again.

Other kinds of breakdowns in conversation arise when someone says something that is ambiguous, and the interlocutor misinterprets it to mean something else. In such situations, the participants will collaborate to overcome the misunderstanding by using repair mechanisms. Consider the following snippet of conversation between two people:

A: Can you tell me the way to get to the Multiplex Ranger cinema?
B: Yes, you go down here for two blocks and then take a right (pointing to the right), proceed until you get to the light, and then it's on the left.
A: Oh, so I go along here for a couple of blocks and then take a right, and the cinema is at the light (pointing ahead of him)?
B: No, you go down *this* street for a couple of blocks (gesturing more vigorously than before to the street to the right of him while emphasizing the word *this*).
A: Ahhhh! I thought you meant *that* one: so it's *this* one (pointing in the same direction as the other person).
B: Uh-hum, yes, that's right: *this* one.

Detecting breakdowns in conversation requires that the speaker and listener both pay attention to what the other says (or does not say). Once they have understood the nature of the failure, they can then go about repairing it. As shown in the previous example, when the listener misunderstands what has been communicated, the speaker repeats what they said earlier, using a stronger voice intonation and more exaggerated gestures. This allows the speaker to repair the mistake and be more explicit with the listener, allowing them to understand and follow better what they are saying. Listeners may also signal when they don't

understand something or want further clarification by using various tokens, like “Huh?” or “What?” (Schegloff, 1981), together with giving a puzzled look (usually frowning). This is especially the case when the speaker says something that is vague. For example, they might say “I want it” to their partner, without saying what *it* is they want. The partner may reply using a token or, alternatively, explicitly ask, “What do you mean by *it*? ” Nonverbal communication also plays an important role in augmenting face-to-face conversation, involving the use of facial expressions, back channeling, voice intonation, gesturing, and other kinds of body language.

Taking turns also provides opportunities for the listener to initiate repair or request clarification or for the speaker to detect that there is a problem and initiate repair. The listener will usually wait for the next turn in the conversation before interrupting the speaker in order to give the speaker the chance to clarify what is being said by completing the utterance.

ACTIVITY 5.3

How do people repair breakdowns when conversing via email? Do they do the same when texting?

Comment

As people usually cannot see each other when communicating by email or text, they have to rely on other means of repairing the conversation when things are left unsaid or are unclear. For example, when someone proposes an ambiguous meeting time, where the date and day given don’t match up for the month, the person receiving the message may begin their reply by asking politely, “Did you mean this month or June?” rather than baldly stating the other person’s error, for example, “the 13th May is not a Wednesday!”

When someone does not reply to an email or text when the sender is expecting them to do so, it can put them in a quandary as to what to do next. If someone does not reply to an email within a few days, then the sender might send them a gentle nudge message that diminishes any blame, for example, “I am not sure if you got my last email as I was using a different account” rather than explicitly asking them why they have not answered the email they sent. When texting, it depends on whether it is a dating, family, or business-related text that has been sent. When starting to date, some people will deliberately wait a while before replying to a text as a form of “playing games” and trying not to appear to be overly keen. If they don’t reply at all, it is a generally accepted notion that they are not interested, and no further texts should be sent. In contrast, in other contexts, double-texting has become an acceptable social norm as a way of reminding someone, without sounding too rude, to reply. It implicitly implies that the sender understands that the recipient has overlooked the first text because they were too busy or doing something else at the time, thereby saving face.

Emails and texts can also appear ambiguous, especially when things are left unsaid. For example, the use of an ellipsis (...) at the end of a sentence can make it difficult to work out what the sender intended when using it. Was it to indicate something was best left unsaid, the sender is agreeing to something but their heart is not in it, or simply that the sender did not know what to say? This email or text convention puts the onus on the receiver to decide what is meant by the ellipsis and not on the sender to explain what they meant. ■

5.4 Remote Conversations

The telephone was invented in the nineteenth century by Alexander Graham Bell, enabling two people to talk to one another at a distance. Since then, a number of other technologies have been developed that support synchronous remote conversations, including videophones that were developed in the 1960s–1970s (see Figure 5.2). In the late 1980s and 1990s, a range of “media spaces” were the subjects of experimentation—audio, video, and computer systems were combined to extend the world of desks, chairs, walls, and ceilings (Harrison, 2009). The goal was to see whether it was possible for people, distributed over space and different time zones, could communicate and interact with one another as if they were actually physically present.



Figure 5.2 One of British Telecom's early videophones

Source: British Telecommunications Plc

An example of an early media space was the VideoWindow (Bellcore, 1989) that was developed to enable people in different locations to carry on a conversation as they would do if they were drinking coffee together in the same room (see Figure 5.3). Two lounge areas that were 50 miles apart were connected via a 3-foot by 5-foot picture window onto which video images of each location were projected. The large size enabled viewers to see a room of people roughly the same size as themselves. A study of its use showed that many of the conversations that took place between the remote conversants were indeed indistinguishable from similar face-to-face interactions, with the difference being that they spoke a bit louder and constantly talked about the video system (Kraut et al., 1990). Other research on how people interact when using videoconferencing has shown that they tend to project themselves more, take longer conversational turns, and interrupt each other less (O’Connaill et al., 1993).

Since this early research, videoconferencing has come of age. The availability of cheap webcams and cameras now embedded as a default in tablets, laptops, and phones has



Figure 5.3 Diagram of VideoWindow system in use

greatly helped make videoconferencing mainstream. There are now numerous platforms available from which to choose, both free and commercial. Many videoconferencing apps (for example, Zoom or Meeting Owl) also allow multiple people at different sites to connect synchronously. To indicate who has the floor, screen effects are often used, such as enlarging the person who is talking to take up most of the screen or highlighting their portal when they take the floor. The quality of the video has also improved, making it possible for people to appear more life-like in most setups. This is most noticeable in high-end telepresence rooms that use multiple high-definition cameras with eye-tracking features and directional microphones (see Figure 5.4). The effect can be to make remote people appear more present by projecting their body movements, actions, voice, and facial expressions to the other location.

Another way of describing this development is in terms of the degree of telepresence. By this we mean the perception of being there when physically remote. Robots, for example, have been built with telepresence in mind to enable people to attend events and communicate with others by controlling them remotely. Instead of sitting in front of a screen from their



Figure 5.4 A telepresence room

Source: Cisco Systems, Inc.

location and seeing the remote place solely through a fixed camera at the other place, they can look around the remote place by controlling the “camera’s” eyes, which are placed on the robot and are physically moving it around. For example, telepresence robots have been developed to enable children who are in a hospital to attend school by controlling their assigned robots to roam around the classroom (Rae et al., 2015).

Telepresence robots are also being investigated to determine whether they can help people who have developmental difficulties visit places remotely, such as museums. Currently, several of the activities that are involved in going on such a visit, such as buying a ticket or using public transport, are cognitively challenging, preventing them from going on such trips. Natalie Friedman and Alex Cabral (2018) conducted a study with six participants with developmental difficulties to see whether providing them each with a telepresence robot would increase their physical and social self-efficacy and well-being. The participants were taken on a remote tour of two museum exhibits and then asked to rate their experience afterward. Their responses were positive, suggesting that this kind of telepresence can open doors to social experiences that were previously denied to those with disabilities.

BOX 5.1

Facebook Spaces: How Natural Is It to Socialize in a 3D World?

Facebook’s vision of social networking is to immerse people in 3D, where they interact with their friends in virtual worlds. Figure 5.5 shows what it might look like: Two avatars (Jack and Diane) are talking at a virtual table beside a lake and with some mountains in the background. Users experience this by wearing virtual reality (VR) headsets. The goal is to provide users with a magical feeling of presence, one where they can feel as if they are together, even



Figure 5.5 Facebook’s vision of socializing in a 3D world

Source: Facebook

(Continued)

though they are apart in the physical world. To make the experience appear more life-like, users can move their avatar's arms through controls provided by the VR OculusTouch.

While big strides have been made toward improving social presence, there is still a way to go before the look and feel of socializing with virtual avatars becomes more like the real thing. For a start, the facial expressions and skin tone of virtual avatars still appear to be cartoon-like.

Similar to the term telepresence, *social presence* refers to the feeling of being there with a real person in virtual reality. Specifically, it refers to the degree of awareness, feeling, and reaction to other people who are virtually present in an online environment. The term differs from *telepresence*, which refers to one party being virtually present with another party who is present in a physical space, such as a meeting room (note that it is possible for more than one telepresence robot to be in the same physical space). Imagine if avatars become more convincing in their appearance to users. How many people would switch from their current use of 2D media to catch up and chat with friends in this kind of immersive 3D Facebook page? Do you think it would enhance the experience of how they would interact and communicate with others remotely?

How many people would don a VR headset 10 times a day or more to teleport to meet their friends virtually? (The average number of times that someone looks at Facebook on their phones is now 14 times each day.) There is also the perennial problem of motion sickness that 25–40 percent of people say that they have experienced in VR (Mason, 2017). ■

Telepresence robots have also become a regular feature at conferences, including the ACM CHI conference, enabling people to attend who cannot travel. They are typically about 5-feet tall, have a display at the top that shows the remote person's head, and have a base at the bottom holding wheels allowing the robot to move forward, move backward, or turn around. A commercial example is the Beam+ (<https://suitabletech.com/>). To help the robot navigate in its surroundings, two cameras are embedded in the display, one facing outward to provide the remote person with a view of what is in front of them and the other facing downward to provide a view of the floor. The robots also contain a microphone and speakers to enable the remote person to be heard and to hear what is being said locally. Remote users connect via Wi-Fi to the remote site and steer their Beam+ robot using a web interface.

A PhD student from the University College London (UCL) attended her first CHI conference remotely, during which time she gave a demo of her research every day by talking to the attendees using the Beam+ robot (see Figure 5.6). Aside from a time difference of eight hours (meaning that she had to stay up through the night to attend), it was an enriching experience for her. She met lots of new people who not only were interested in her demo but who also learned how she felt about attending the conference remotely. Her colleagues at the conference also dressed up her robot to make her appear more like her, giving the robot a set of foam-cutout arms with waving hands, and they put a university T-shirt on the robot. However, she could not see how she appeared to others at the conference, so local attendees took photos of her Beam+ robot to show her how she looked. She also commented how she could not gauge the volume of her voice, and on one occasion she accidentally set the volume control to be at its highest setting. When speaking to someone, she did not realize how loud



Figure 5.6 Susan Lechelt's Beam+ robot given a human touch with cut-out foam arms and a university logo T-shirt

Source: Used courtesy of Susan Lechelt

she was until another person across the room told her that she was yelling. (The person she was talking to was too polite to tell her to lower her voice.)

Another navigation problem that can occur is when the remote person wants to move from one floor to another in a building. They don't have a way of pressing the elevator button to achieve this. Instead, they have to wait patiently beside the elevator for someone to come along to help them. They also lack awareness of others who are around them. For example, when moving into a room to get a good spot to see a presentation, they may not realize that they have obscured the view of people sitting behind them. It can also be a bit surreal when their image starts breaking up on the robot "face" as the Wi-Fi signal deteriorates. For example, Figure 5.7 shows Johannes Schöning breaking up into a series of pixels that makes him look a bit like David Bowie!

Despite these usability problems, a study of remote users trying a telepresence robot for the first time at a conference found the experience to be positive (Neustaedter et al., 2016). Many felt that it provided them with a real sense of being at the conference—quite different from the experience of watching or listening to talks online—as happens when connecting via a livestream or a webinar. Being able to move around the venue also enabled them to see familiar faces and to bump into people during coffee breaks. For the

conference attendees, the response was also largely positive, enabling them to chat with those who could not make the conference. However, sometimes the robot's physical presence obstructed their view in a room when watching a speaker, and that could be frustrating. It is difficult to know how to tell a telepresence robot discreetly to move out of the way while a talk is in progress and for the remote person to know where to move that is out of the way as they have been told.

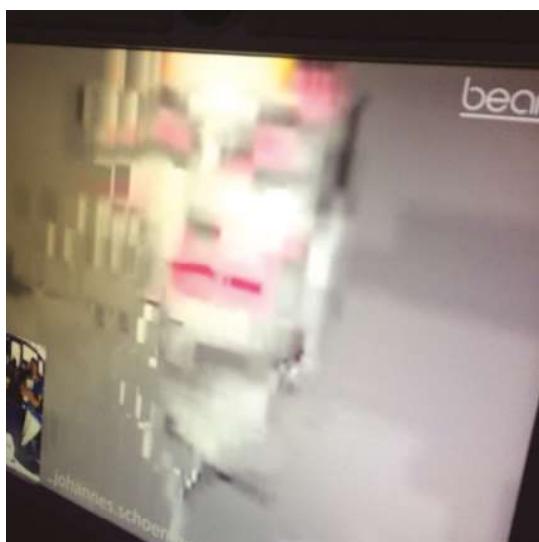


Figure 5.7 The image of Johannes Schöning breaking up on the Beam+ robot video display when the Wi-Fi signal deteriorated

Source: Yvonne Rogers

ACTIVITY 5.4

Watch these two videos about Beam and Cisco's telepresence. How does the experience of being at a meeting using a telepresence robot compare with using a telepresence videoconferencing system?

Videos

BeamPro overview of how robotic telepresence works—<https://youtu.be/SQCigphfSvC>
Cisco TelePresence Room EndPoints MX700 and MX800—<https://youtu.be/52lg0kh0FI>

Comment

The BeamPro allows the remote person to move around a workplace as well as sit in on meetings. They can also have one-on-one conversations with someone at their desk. When moving

around, the remote individual can even bump into other remote workers, in the corridor, for example, who are also using a BeamPro. Hence, it supports a range of informal and formal social interactions. Using a BeamPro also allows someone to feel as if they are at work while still being at home.

In contrast, the Cisco telepresence room has been designed specifically to support meetings between small remote groups to make them feel more natural. When someone is speaking, the camera zooms in on them to have them fill the screen. From the video, it appears effortless and allows the remote groups to focus on their meeting rather than worry about the technology. However, there is limited flexibility—conducting one-on-one meetings, for example. ■

BOX 5.2

Simulating Human Mirroring Through Artificial Smiles

A common phenomenon that occurs during face-to-face conversations is mirroring, where people mimic each other's facial expressions, gestures, or body movements. Have you ever noticed that when you put your hands behind your head, yawn, or rub your face during a conversation with someone that they follow suit? These kinds of mimicking behaviors are assumed to induce empathy and closeness between those conversing (Stel and Vonk, 2010). The more people engage in mimicry, the more they view each other as being similar, which in turn increases the rapport between them (Valdesolo and DeSteno, 2011). Mimicry doesn't always occur during a conversation, however—sometimes it requires a conscious effort, while in other situations it does not occur. Might the use of technology increase its occurrence in conversations?

One way would be to use special video effects. Suppose that an artificial smile could be superimposed on the video face of someone to make them appear to smile. What might happen? Would they both begin to smile and in doing so feel closer to each other? To investigate this possibility of simulating smiling mimicry, Keita Suzuki et al. (2017) developed a technique called FaceShare. The system was developed so that it could deform the image of someone's face to make it appear to smile—even though they were not—whenever their partner's face began smiling. The mimicry method used 3D modeling of key feature points of the face, including the contours, eyes, nose, and mouth to detect where to place the smile. The smile was created by raising the lower eyelids and both ends of the mouth in conjunction with the cheeks. The findings from this research showed that FaceShare was effective at making conversations appear smoother and that the pseudo smiles appearing on someone's video face were judged to be natural. ■

5.5 Co-presence

Together with telepresence, there has been much interest in enhancing *co-presence*, that is, supporting people in their activities when interacting in the same physical space. A number of technologies have been developed to enable more than one person to use them at the same time. The motivation is to enable co-located groups to collaborate more effectively when working, learning, and socializing. Examples of commercial products that support this kind of parallel interaction are Smartboards and Surfaces, which use multitouch, and Kinect, which uses gesture and object recognition. To understand how effective they are, it is important to consider the coordination and awareness mechanisms already in use by people in face-to-face interactions and then to see how these have been adapted or replaced by the technology.

5.5.1 Physical Coordination

When people are working closely together, they talk to each other, issuing commands and letting others know how they are progressing. For example, when two or more people are collaborating, as when moving a piano, they shout instructions to each other, like “Down a bit, left a touch, now go straight forward,” to coordinate their actions. A lot of nonverbal communication is also used, including nods, shakes, winks, glances, and hand-raising in combination with such coordination talk in order to emphasize and sometimes replace it.

For time-critical and routinized collaborative activities, especially where it is difficult to hear others because of the physical conditions, people frequently use gestures (although radio-controlled communication systems may also be used). Various types of hand signals have evolved, with their own set of standardized syntax and semantics. For example, the arm and baton movements of a conductor coordinate the different players in an orchestra, while the arm and orange baton movements of ground personnel at an airport signal to a pilot how to bring the plane into its assigned gate. Universal gestures, such as beckoning, waving, and halting hand movement, are also used by people in their everyday settings.

The use of physical objects, such as wands and batons, can also facilitate coordination. Group members can use them as external thinking props to explain a principle, an idea, or a plan to the others (Brereton and McGarry, 2000). In particular, the act of waving or holding up a physical object in front of others is very effective at commanding attention. The persistence and ability to manipulate physical artifacts may also result in more options being explored in a group setting (Fernaeus and Tholander, 2006). They can help collaborators gain a better overview of the group activity and increase awareness of others' activities.

5.5.2 Awareness

Awareness involves knowing who is around, what is happening, and who is talking with whom (Dourish and Bly, 1992). For example, when attending a party, people move around the physical space, observing what is going on and who is talking to whom, eavesdropping on others' conversations, and passing on gossip to others. A specific kind of awareness is *peripheral awareness*. This refers to a person's ability to maintain and constantly update a sense of what is going on in the physical and social context, by keeping an eye on what is happening in the periphery of their vision. This might include noticing whether people are in a good or bad mood by the way they are talking, how fast the drink and food is being consumed, who has entered or left the room, how long someone has been absent, and whether the lonely person in

the corner is finally talking to someone—all while we are having a conversation with someone else. The combination of direct observations and peripheral monitoring keeps people informed and updated on what is happening in the world.

Another form of awareness that has been studied is *situational awareness*. This refers to being aware of what is happening around you in order to understand how information, events, and your own actions will affect ongoing and future events. Having good situational awareness is critical in technology-rich work domains, such as air traffic control or an operating theater, where it is necessary to keep abreast of complex and continuously changing information.

People who work closely together also develop various strategies for coordinating their work, based on an up-to-date awareness of what the others are doing. This is especially so for interdependent tasks, where the outcome of one person's activity is needed for others to be able to carry out their tasks. For example, when putting on a show, the performers will constantly monitor what each other is doing in order to coordinate their performance efficiently. The metaphorical expression *close-knit teams* exemplifies this way of collaborating. People become highly skilled in reading and tracking what others are doing and the information to which they are paying attention.

A classic study of this phenomenon is of two controllers working together in a control room in the London Underground subway system (Heath and Luff, 1992). An overriding observation was that the actions of one controller were tied closely to what the other was doing. One of the controllers (controller A) was responsible for the movement of trains on the line, while the other (controller B) was responsible for providing information to passengers about the current service. In many instances, it was found that controller B overheard what controller A was saying and doing and acted accordingly, even though controller A had not said anything explicitly to him. For example, on overhearing controller A discussing a problem with a train driver over the in-cab intercom system, controller B inferred from the conversation that there was going to be a disruption in the service and so started to announce this to the passengers on the platform before controller A had even finished talking with the train driver. At other times, the two controllers kept a lookout for each other, monitoring the environment for actions and events that they might not have noticed but that could have been important for them to know about so that they could act appropriately.

ACTIVITY 5.5

What do you think happens when one person in a close-knit team does not see or hear something, or misunderstands what has been said, while the others in the group assume that person has seen, heard, or understood what has been said?

Comment

The person who has noticed that someone has not acted in the manner expected may use one of a number of subtle repair mechanisms, say coughing or glancing at something that needs to be attended to. If this doesn't work, they may then resort to stating explicitly aloud what

(Continued)

had previously been signaled implicitly. Conversely, the unaware person may wonder why the event hasn't happened and, likewise, look over at the other team members, cough to get their attention, or explicitly ask them a question. The kind of repair mechanism employed at a given moment will depend on a number of factors, including the relationship among the participants, for instance, whether one is more senior than the others. This determines who can ask what, the perceived fault or responsibility for the breakdown, and the severity of the outcome of not acting there and then on the new information. ■

5.5.3 Shareable Interfaces

A number of technologies have been designed to capitalize on existing forms of coordination and awareness mechanisms. These include whiteboards, large touch screens, and multitouch tables that enable groups of people to collaborate while interacting at the same time with content on the surfaces. Several studies have investigated whether different arrangements of shared technologies can help co-located people work better together (for example, see Müller-Tomfelde, 2010). An assumption is that shareable interfaces provide more opportunities for flexible kinds of collaboration compared with single-user interfaces, through enabling co-located users to interact simultaneously with digital content. The use of fingers or pens as input on a public display is observable by others, increasing opportunities for building situational and peripheral awareness. The sharable surfaces are also considered to be more natural than other technologies, enticing people to touch them without feeling intimidated or embarrassed by the consequences of their actions. For example, small groups found it more comfortable working together around a tabletop compared with sitting in front of a PC or standing in a line in front of a vertical display (Rogers and Lindley, 2004).

BOX 5.3

Playing Together in the Same Place

Augmented reality (AR) sandboxes have been developed for museum visitors to interact with a landscape, consisting of mountains, valleys, and rivers. The sand is real, while the landscape is virtual. Visitors can sculpt the sand into different-shaped contours that change their appearance to look like a river or land, depending on the height of the sand piles. Figure 5.8 shows a AR sandbox that was installed at the V&A museum in London. On observing two young children playing at the sandbox, this author overheard one say to the other while flattening a pile of sand, "Let's turn this land into sea." The other replied "OK, but let's make an island on that." They continued to talk about how and why they should change their landscape. It was a pleasure to watch this dovetailing of explaining and doing.

The physical properties of the sand, together with the real-time changing superimposed landscape, provided a space for children (and adults) to collaborate in creative ways. ■



Figure 5.8 Visitors creating together using an Augmented Reality Sandbox at the V&A Museum in London

Source: Helen Sharp

Often in meetings, some people dominate while others say very little. While this is OK in certain settings, in others it is considered more desirable for everyone to have a say. Is it possible to design shareable technologies so that people can participate around them more equally? Much research has been conducted to investigate whether this is possible. Of primary importance is whether the interface invites people to select, add, manipulate, or remove digital content from the displays and devices. A user study showed that a tabletop that allowed group members to add digital content by using physical tokens resulted in more equitable participation than if only digital input was allowed via touching icons and menus at the tabletop (Rogers et al., 2009). This suggests that it was easier for people who are normally shy in groups to contribute to the task. Moreover, people who spoke the least were found to make the largest contribution to the design task at the tabletop, in terms of selecting, adding, moving, and removing options. This reveals how changing the way people can interact with a surface can affect group participation. It shows that it is possible for more reticent members to contribute without feeling under pressure to speak more.

5 SOCIAL INTERACTION

Experimentation with real-time feedback presented via ambient displays has also been shown to provide a new form of awareness for co-located groups. LEDs glowing in tabletops and abstract visualizations on handheld and wall displays have been designed to represent how different group members are performing, such as turn-taking. The assumption is that this kind of real-time feedback can promote self and group regulation and in so doing modify group members' contributions to make them more equitable. For example, the Reflect Table was designed based on this assumption (Bachour et al., 2008). The table monitors and analyzes ongoing conversations using embedded microphones in front of each person and represents this in the form of increasing numbers of colored LEDs (see Figure 5.9). A study investigated whether students became more aware of how much they were speaking during a group meeting when their relative levels of talk were displayed in this manner and, if so, whether they regulated their levels of participation more effectively. In other words, would the girl in the bottom right reduce her contributions (as she clearly has been talking the most) while the boy in the bottom left increase his (as he has been talking the least)? The findings were mixed: Some participants changed their level to match the levels of others, while others became frustrated and chose simply to ignore the LEDs. Specifically, those who spoke the most changed their behavior the most (that is, reduced their level) while those who spoke the least changed theirs the least (in other words, did not increase their level). Another finding was that participants who believed that it was beneficial to contribute equally to the conversation took more notice of the LEDs and regulated their conversation level accordingly. For example, one participant said that she "refrained from talking to avoid having a lot more lights than the others" (Bachour et al., 2010). Conversely, participants who thought it was not important took less notice. How do you think you would react?



Figure 5.9 The Reflect Table

Source: Used courtesy of Pierre Dillenbourg

An implication from the various user studies on co-located collaboration around tabletops is that designing shareable interfaces to encourage more equitable participation isn't straightforward. Providing explicit real-time feedback on how much someone is speaking in a group may be a good way of showing everyone who is talking too much, but it may be intimidating for those who are talking too little. Allowing discreet and accessible ways for adding and manipulating content to an ongoing collaborative task at a shareable surface may

be more effective at encouraging greater participation from people who normally find it difficult or who are simply unable to contribute verbally to group settings (for example, those on the autistic spectrum, those who stutter, or those who are shy or are non-native speakers).

How best to represent the activity of online social networks in terms of who is taking part has also been the subject of much research. A design principle that has been influential is *social translucence* (Erickson and Kellogg, 2000). This refers to the importance of designing communication systems to enable participants and their activities to be visible to one another. This idea was very much behind the early communication tool, Babble, developed at IBM by David Smith (Erickson et al., 1999), which provided a dynamic visualization of the participants in an ongoing chat room. A large 2D circle was depicted using colored marbles on each user's monitor. Marbles inside the circle conveyed those individuals active in the current conversation. Marbles outside the circle showed users involved in other conversations. The more active a participant was in the conversation, the more the corresponding marble moved toward the center of the circle. Conversely, the less engaged a person was in the ongoing conversation, the more the marble moved toward the periphery of the circle.

Since this early work on visualizing social interactions, there have been a number of virtual spaces developed that provide awareness about what people are doing, where they are, and their availability, with the intention of helping them feel more connected. Working in remote teams can be isolating, especially if they rarely get to see their colleagues face to face. When teams are not co-located, they also miss out on in-person collaboration and valuable informal conversations that build team alignment. This is where the concept of the “online office” comes in. For example, Sococo (<https://www.sococo.com/>) is an online office platform that is bridging the gap between remote and co-located work. It uses the spatial metaphor of a floor plan of an office to show where people are situated, who is in a meeting, and who is chatting with whom. The Sococo map (see Figure 5.10) provides a



Figure 5.10 Sococo floor plan of a virtual office, showing who is where and who is meeting with whom

Source: Used courtesy of Leeann Brumby

bird's-eye view of a team's online office, giving everyone at-a-glance insight into teammates' availability and what's happening organizationally. Sococo also provides the sense of presence and virtual "movement" that you get in a physical office—anyone can pop into a room, turn on their microphone and camera, and meet with another member of their team face to face. Teams can work through projects, get feedback from management, and collaborate ad hoc in their online office regardless of physical location. This allows organizations to take advantage of the benefits of the distributed future of work while still providing a central, online office for their teams.

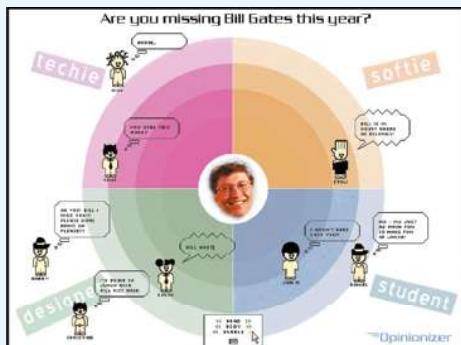
BOX 5.4

Can Technologies Be Designed to Help People Break the Ice and Socialize?

Have you ever found yourself at a party, wedding, conference, or other social gathering, standing awkwardly by yourself, not knowing who to talk to or what to talk about? Social embarrassment and self-consciousness affect most of us at such moments, and such feelings are most acute when one is a newcomer and by oneself, such as a first-time attendee at a conference. How can conversation initiation be made easier and less awkward for people who do not know each other?

A number of mechanisms have been employed by organizers of social events, such as asking old-timers to act as mentors and the holding of various kinds of ice-breaking activities. Badge-wearing, the plying of drink and food, and introductions by others are also common ploys. While many of these methods can help, engaging in ice-breaking activities requires people to act in a way that is different from the way they normally socialize and which they may find equally uncomfortable or painful to do. They often require people to agree to join in a collaborative game, which they may find embarrassing. This can be exacerbated by the fact that once people have agreed to take part, it is difficult for them to drop out because of the perceived consequences that it will have for the others and themselves (such as being seen by the others as a spoilsport or party-pooper). Having had one such embarrassing experience, most people will shy away from any further kinds of ice-breaking activities.

An alternative approach is to design a physical space where people can enter and exit a conversation with a stranger in subtler ways, that is, one where people do not feel threatened or embarrassed and that does not require a high level of commitment. The classic Opinionizer system was designed along these lines, with the goal of encouraging people in an informal gathering to share their opinions visually and anonymously (Brignull and Rogers, 2003). The collective creation of opinions via a public display was intended to provide a talking point for the people standing beside it. Users submitted their opinions by typing them in at a public keyboard. To add color and personality to their opinions, a selection of small cartoon avatars and speech bubbles were available. The screen was also divided into four labeled quadrants representing different backgrounds, such as techie, softie, designer, or student, to provide a factor on which people could comment (see Figure 5.11).



(a)



(b)

Figure 5.11 (a) The Opinionizer interface and (b) a photo of it being used at a book launch party

Source: Helen Sharp

When the Opinionizer was placed in various social gatherings, a honey-pot effect was observed. By this it is meant the creation of a sociable buzz in the immediate vicinity of the Opinionizer as a result of an increase in the number of people moving into the area. Furthermore, by standing in this space and showing an interest, for example visibly facing the screen or reading the text, people gave off a tacit signal to others that they were open to discussion and interested in meeting new people.

There are now a number of commercial ice-breaking phone apps available that use artificial intelligence (AI) matchmaking algorithms to determine which preferences and interests shared among people make them suitable conversational partners. Wearable technology is also being developed as a new form of digital ice-breaker. Limbic Media (<https://limbicmedia.ca/social-wearables/>), for example, has developed a novel pendant device colored with LED lights for this purpose. When two people touch their pendants together, the effect is for them to vibrate. This coming together action can break the ice in a fun and playful way. ■

This video features Limbic Media's novel type of social wearable being used at the 2017 BCT Tech Summit: <https://vimeo.com/216045804>.

A range of other ambient-based displays have been developed and placed in physical work settings with the purpose of encouraging people to socialize and talk more with each other. For example, the Break-Time Barometer was designed to persuade people to come out of their offices for a break to meet others they might not talk with otherwise (Kirkham et al., 2013). An ambient display, based on a clock metaphor, shows how many people are currently in the common room; if there are people present, it also sends an alert that it would be a good time to join them for a break. While the system nudged some people to go for a break in the staff room, it also had the opposite effect on others who used it to determine when breaks weren't happening so that they could take a break without their colleagues being around for company.

5.6 Social Engagement

Social engagement refers to participation in the activities of a social group (Anderson and Binstock, 2012). Often it involves some form of social exchange where people give or receive something from others. Another defining aspect is that it is voluntary and unpaid. Increasingly, different forms of social engagement are mediated by the Internet. For example, there are many websites now that support pro-social behavior by offering activities intended to help others. One of the first websites of this ilk was GoodGym (www.goodgym.org/), which connects runners with isolated older people. While out running, the runners stop for a chat with an older person who has signed up to the service, and the runner helps them with their chores. The motivation is to help others in need while getting fit. There is no obligation, and anyone is welcome to join. Another website that was set up is conservation volunteers (<https://www.tcv.org.uk/>). The website brings together those who want to help out with existing conservation activities. By bringing different people together, social cohesion is also promoted.

Not only has the Internet enabled local people to meet who would not have otherwise, it has proven to be a powerful way of connecting millions of people with a common interest in ways unimaginable before. An example is retweeting a photo that resonates with a large crowd who finds it amusing and wants to pass it on further. For example, in 2014, the most retweeted selfie was one taken by Ellen DeGeneres (an American comedian and television host) at the Oscar Academy Awards of her in front of a star-studded, smiling group of actors and friends. It was retweeted more than 2 million times (more than three-quarters of a million in the first half hour of being tweeted)—far exceeding the one taken by Barack Obama at Nelson Mandela’s funeral the previous year.

There has even been an “epic Twitter battle.” A teenager from Nevada, Carter Wilker-son, asked Wendy’s fast-food restaurant how many retweets were needed for him to receive a whole year’s supply of free chicken nuggets. The restaurant replied “18 million” (see Figure 5.12). From that moment on, his quest became viral with his tweet being retweeted more than 2 million times. Ellen’s record was suddenly put in jeopardy, and she intervened, putting out a series of requests on her show for people to continue to retweet her tweet so her record would be upheld. Carter, however, surpassed her record at the 3.5 million mark. During the Twitter battle, he used his newly found fame to create a website that sold T-shirts promoting his chicken nugget challenge. He then donated all of the proceeds from the sales toward a charity that was close to his heart. The restaurant also gave him a year’s supply of free chicken nuggets—even though he didn’t reach the target of 18 million. Not only that, it also donated \$100,000 to the same charity in honor of Carter achieving a new record. It was a win-win situation (except maybe for Ellen).

Another way that Twitter connects people rapidly and at scale is when unexpected events and disasters happen. Those who have witnessed something unusual may upload an image that they have taken of it or retweet what others have posted to inform others about it. Those who like to reach out in this way are sometimes called *digital volunteers*. For example, while writing this chapter, there was a massive thunderstorm overhead that was very dramatic. I checked out the Twitter hashtag #hove (I was in the United Kingdom) and found that hundreds of people had uploaded photos of the hailstones, flooding, and minute-by-minute updates of how public transport and traffic were being affected. It was easy to get a sense



Figure 5.12 Carter Wilkerson's tweet that went viral

of the scale of the storm before it was picked up by the official media channels, which then used some of the photos and quotes from Twitter in their coverage (see Figure 5.13). Relying on Twitter for breaking news has increasingly become the norm. When word came of a huge explosion in San Bruno, California, the chief of the Federal Emergency Management Agency in the United States logged on to Twitter and searched for the word *explosion*. Based on the tweets coming from that area, he was able to discern that the gas explosion and ensuing fire was a localized event that would not spread to other communities. He noted how he got better situational awareness more quickly from reading Twitter than by hearing about it from official sources.

Clearly, the immediacy and global reach of Twitter provides an effective form of communication, providing first responders and those living in the affected areas with up-to-the-minute information about how a wildfire, storm, or gas plume is spreading. However, the reliability of the tweeted information can sometimes be a problem. For example, some people end up obsessively checking and posting, sometimes without realizing that this can start or fuel rumors by adding news that is old or incorrect. Regulars can go into a frenzy, constantly adding new tweets about an event, as witnessed when an impending flood was announced (Starbird et al., 2010). While such citizen-led dissemination and retweeting of information from disparate sources is well intentioned, it can also flood the Twitter streams, making it difficult to know what is old, actual, or hearsay.



Figure 5.13 A weather warning photo tweeted and retweeted about a severe storm in Hove, United Kingdom

BOX 5.5

Leveraging Citizen Science and Engagement Through Technology

The growth and success of citizen science and citizen engagement has been made possible by the Internet and mobile technology, galvanizing and coordinating the efforts of millions of people throughout the world. Websites, smartphone apps, and social media have been instrumental in leveraging the reach and impact of a diversity of citizen science projects across time and geographical zones (Preece et al., 2018). Citizen science involves local people helping scientists carry out a scientific project at scale. Currently, thousands of such projects have been set up all over the world, whereby volunteers help out in a number of research areas, including biodiversity, air quality, astronomy, and environmental issues. They do so by engaging in scientific activities such as monitoring plants and wildlife, collecting air and water samples, categorizing galaxies, and analyzing DNA sequences. Citizen engagement involves people helping governments, rather than scientists, to improve public services and policies in their communities. Examples include setting up and overseeing a website that offers local services for community disasters and creating an emergency response team when a disaster occurs.

Why would anyone want to volunteer their time for the benefit of science or government? Many people want to learn more about a domain, while others want to be recognized for their contributions (Rotman et al., 2014). Some citizen science apps have developed online mechanisms to support this. For example, iNaturalist (<https://www.inaturalist.org/>) enables volunteers to comment on and help classify others' contributions. ■

DILEMMA

Is It OK to Talk with a Dead Person Using a Chatbot?

Eugenia Kuyda, an AI researcher, lost a close friend in a car accident. He was only in his 20s. She did not want to lose his memory, so she gathered all of the texts he had sent over the course of his life and made a chatbot from them. The chatbot is programmed to respond automatically to text messages so that Eugenia can talk to her friend as if he were still alive. It responds to her questions using his own words.

Do you think this kind of interaction is creepy or comforting to someone who is grieving? Is it disrespectful of the dead, especially if the dead person has not given their consent? What if the friend had agreed to having their texts mashed up in this way in a “pre-death digital agreement”? Would that be more socially acceptable? ■

In-Depth Activity

The goal of this activity is to analyze how collaboration, coordination, and communication are supported in online video games involving multiple players.

The video game *Fortnite* arrived in 2017 to much acclaim. It is an action game designed to encourage teamwork, cooperation, and communication. Download the game from an app store (it is free) and try it. You can also watch an introductory video about it at https://youtu.be/_U2JbFhUPX8.

Answer the following questions.

1. Social issues
 - (a) What is the goal of the game?
 - (b) What kinds of conversations are supported?
 - (c) How is awareness of the others in the game supported?
 - (d) What kinds of social protocols and conventions are used?
 - (e) What types of awareness information are provided?
 - (f) Does the mode of communication and interaction seem natural or awkward?
 - (g) How do players coordinate their actions in the game?
2. Interaction design issues
 - (a) What form of interaction and communication is supported, for instance, text, audio, and/or video?
 - (b) What other visualizations are included? What information do they convey?
 - (c) How do users switch between different modes of interaction, for example, exploring and chatting? Is the switch seamless?
 - (d) Are there any social phenomena that occur specific to the context of the game that wouldn't happen in face-to-face settings?
3. Design issues
 - What other features might you include in the game to improve communication, coordination, and collaboration?

Summary

Human beings are inherently social. People will always need to collaborate, coordinate, and communicate with one another, and the diverse range of applications, web-based services, and technologies that have emerged enable them to do so in more extensive and diverse ways. In this chapter, we looked at some core aspects of sociality, namely, communication and collaboration. We examined the main social mechanisms that people use in different conversational settings when interacting face to face and at a distance. A number of collaborative and telepresence technologies designed to support and extend these mechanisms were discussed, highlighting core interaction design concerns.

Key Points

- Social interaction is central to our everyday lives.
- Social mechanisms have evolved in face-to-face and remote contexts to facilitate conversation, coordination, and awareness.
- Talk and the way it is managed are integral to coordinating social interaction.
- Many kinds of technologies have been developed to enable people to communicate remotely with one another.
- Keeping aware of what others are doing and letting others know what you are doing are important aspects of collaboration and socializing.
- Social media has brought about significant changes in the way people keep in touch and manage their social lives.

Further Reading

boyd, d. (2014) *It's Complicated: The Social Lives of Networked Teens*. Yale. Based on a series of in-depth interviews with a number of teenagers, danah boyd offers new insights into how teenagers across the United States, who have only ever grown up in a world of apps and media, navigate, use, and appropriate them to grow up and develop their identities. A number of topics are covered that are central to what it means to grow up in a networked world, including bullying, addiction, expressiveness, privacy, and inequality. It is insightful and covers much ground.

CRUMLISH, C. and MALONE, E. (2009) *Designing Social Interfaces*. O'Reilly. This is a collection of design patterns, principles, and advice for designing social websites, such as online communities.

GARDNER, H. and DAVIS, K. (2013) *The App Generation: How Today's Youth Navigate Identity, Intimacy, and Imagination in a Digital World*. Yale. This book explores the impact of apps on the young generation, examining how they affect their identity, intimacy, and imagination. It focuses on what it means to be app-dependent versus app-empowered.

ROBINSON, S., MARSDEN, G. and JONES, M. (2015) *There's Not an App for That: Mobile User Experience Design for Life*. Elsevier. This book offers a fresh approach for designers, students, and researchers to dare to think differently by moving away from the default framing of technological design in terms of yet another “looking down” app. It asks the reader instead to look up and around them—to be inspired by how we actually live our lives when “out there” app-less. They also explore what it means to design technologies to be more mindful.

TURKLE, S. (2016) *Reclaiming Conversation: The Power of Talk in a Digital Age*. Penguin. Sherry Turkle has written extensively about the positive and negative effects of digital technology on everyday lives—at work, at home, at school, and in relationships. This book is a very persuasive warning about the negative impacts of perpetual use of smartphones. Her main premise is that as people—both adults and children—become increasingly glued to their phones instead of talking to one another, they lose the skill of empathy. She argues that we need to reclaim conversation to relearn empathy, friendship, and creativity.

