

Article

The Computer is a Medium, Not a Tool: Collaborative Media Challenging Interaction Design

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Abstract: Collaborative media entail an emerging set of digitally mediated practices, characterized by collaborative communicative action within organically developing, cross-medial infrastructures. We argue that computers are increasingly turning from tools into (collaborative) media in everyday use, and that this shift poses a significant challenge to the discipline of interaction design. Particularly prominent aspects of the challenge include the way design processes are conceptualized and structured, and the way in which communicative perspectives take precedence over instrumental ones.

Keywords: collaborative media; communicative practices; infrastructuring; media design

1. Introduction: Interaction Design and Collaborative Media

This year marks the 25th anniversary of a quite remarkable contribution to the then-nascent literature of what we today would call interaction design research. In 1988, John Kammersgaard published the article “Four different perspectives on human-computer interaction” [1] in the *International Journal of Man-Machine Studies*, which was, at the time, one of the premier journals within the academic field of human-computer interaction. The article is a conceptual piece, a reflection on experience in systems development, and its fundamental argument is that designers as well as researchers would benefit from acknowledging a number of distinct perspectives on human-computer interaction. Those perspectives emerge from a two-by-two construction of individual/collective versus expression/content, and they are referred to as tool, media, dialogue partner and system.

According to Google Scholar, Kammersgaard's prescient work has been cited 74 times at the time of writing. This represents a fair level of recognition, albeit not the seminal status that the work arguably deserves. Writing at a time when computers were used only to support work, when only a small fraction of the population used computers on a regular basis and an even smaller fraction of that fraction had access to digital communication networks, when the Internet itself was a fragmented and emerging patchwork of competing protocols (on one of the present authors' own business card from the late 1980s, there were three *different* email addresses for the three parallel international infrastructures called UUCP, Bitnet and ArpaNet), Kammersgaard calmly states that when designing interactive digital systems, it would seem to make sense in most cases to apply the system as well as the tool and the media perspectives.

With hindsight, it is arguably fair to say that the institutional mechanics of academic silo construction have operated counter to Kammersgaard's intuition. To simplify only slightly, the literatures of human-computer interaction and subsequently interaction design started in system perspectives, where notions of efficiency and usability dominated, and then largely moved on to tool perspectives where individual users are empowered to effect change in the material and virtual worlds of their task domains—but always within an overall framework of instrumental action, where the user has a goal and the role of design is to provide purposeful ways for the user to attain the goal.

What is particularly remarkable is the absence of a *media* perspective in human-computer interaction and interaction design—a perspective where, according to Kammersgaard, the computer is considered as a medium through which people communicate with each other. The dominant intellectual tradition in academic interaction design is arguably strongly focused on individual users and their interactions with computers and other digital artifacts.

Simplifying (but again only slightly), the better part of the last decade has been spent in interaction design academia and practice negotiating the transition from efficiency and usability in the context of enterprise systems to user experience, emotional interaction, aesthetic interaction, hedonistic interaction, ludic interaction, funology [2–6] and other broader conceptions of quality in the emerging contexts of consumer products, leisure computer use, everyday services on the Web and most recently the mobile Internet and the Internet of Things. This transitional work must be deemed as largely successful, and the general sense is that interaction design has been able to keep up with technical and societal developments in the 2000s to become even more relevant and demanded than ever before.

Yet at the same time, the last five years have seen an explosive development in what is colloquially called “social media”, and today for most people and most of the time, the computer is indeed a medium for communicating with other people (rather than a system for efficient transactions or a tool for effecting change upon materials). Facebook has become a near-ubiquitous infrastructure in many demographics, counting a total of over 1 billion registered users. The volume of communicative online acts in the forms of short textual statements, photographs, music and voice recordings, videos and web clippings is increasing at exponential rates, only matched by the numbers of new online services hoping to become the preferred venues for all this computer-mediated communication.

People publish their thoughts on great and small things in life. They contribute news reports. They upload photographs, music and 3d-printable drawings for household objects. They hand-rip and share vintage sitcoms. They devote hours of leisure time to answer questions in highly particular fields of technical expertise. They create elaborate video mashups and machinima episodes, they curate the web

with great commitment, and they talk for hours with people they have never met. All of these communicative practices fall within what we call *collaborative media* [7], referring to an emerging cultural form of digital media characterized by the following traits [8] (to be elaborated in the following).

- Collaborative media are *forms for practice*, oriented towards action, open for interaction.
- Collaborative media offer a framework with *components* to combine and appropriate in different ways.
- Collaborative media entail close links between *media infrastructures* and *media texts*, essentially blurring the traditional media distinction between means of production and distribution on one hand and content on the other.
- Collaborative media are *cross-medial* and increasingly material, catalyzing convergence between traditional media channels and extending into the physical world beyond screens and loudspeakers.
- Collaborative media prioritize *collaboration*, thus actively promoting the engagement of the people formerly known as the audience [9] in not only consumption but also production and design.

Our main point is this: It seems clear that the communicative practices represented by collaborative media are hard to reconcile with the foundational values of interaction design. First, collaborative media communication is *not necessarily instrumental*. Consider the situation where you watch a YouTube video of a kitten and then like it. A mainstream (and slightly stereotypical) instrumental view on that situation would entail thinking about the action in terms of goals and fitness-for-purpose, perhaps actualizing questions of how the Like button should be designed to be easily detected and operated by the user. However, we find that level of consideration to be completely insignificant in relation to what the action means in a larger communicative context. What is the nature of your relation with the person posting the kitten video, and how might it develop? What does the action say about you in the short term? How does the action influence the consumption and production experiences of other users in the long term? How does the action relate to your actions in other collaborative media venues? The main attempt within interaction design to deal with issues such as these has been to extend the concept of usability with “sociability” [10]; another notable effort involved integrating activity theory and semiotics [11]; yet the analytical and transformative power of these moves have proven quite limited, which to us highlights the discrepancies in foundational values between instrumental and communicative action.

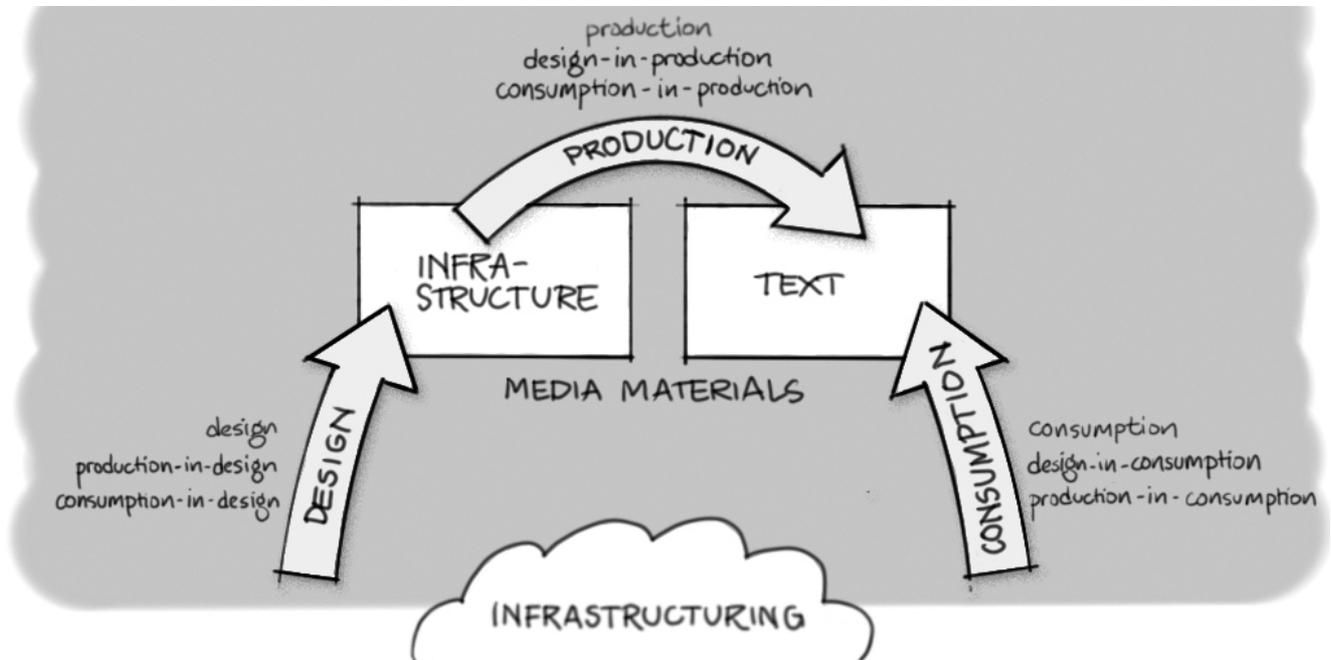
Secondly, the canonical beliefs on *how to arrange interaction design processes* are essentially off the mark when it comes to collaborative media. Doing fieldwork with a view towards identifying problems or opportunities requires either a context of instrumental use or an incremental notion of changing existing practices. Neither of those standpoints is relevant when it comes to emergent communicative practices in collaborative media. Creating lightweight prototypes and testing them with intended users in an iterative process before committing to implementation is a pointless activity in situations where use is fundamentally constituted by a critical mass of actual users and actual communicative practices, meaning that the whole notion of upstream explorative design preceding a set delivery date is voided.

Through arguments like these, we find that collaborative media represents a significant challenge to interaction design as currently practiced, researched and taught. This article is an attempt to substantiate that challenge, by introducing our own experience in the area of collaborative media and

what we consider to be takeaways for the interaction design discipline. We will sketch two examples, two design cases, that span a period of ten years as well as the spectrum ranging from disrupting established media structures to contemporary consumer products. This is followed by a discussion of implications and takeaways for interaction design practice, research and teaching. Before we move into those substantial parts, however, we need to introduce a conceptual framework for collaborative media that we have found to be fruitful.

When considering computers as media, we find that it makes sense to build from established communication models. Specifically, the academic discipline of media and communication studies has spent many years conceptualizing the media of its respective times; a particularly influential example is the encoding/decoding model proposed in 1980 by Hall [12]. Briefly, it deals with the question of how meaning is produced, transmitted and received in mass communication, identifying the distinctive moments of production, circulation, distribution/consumption and reproduction. Most prominent of those are the so-called discursive moments, *i.e.*, *production* where the event to be covered is translated into a “text” using a language (such as audiovisual forms in the case of TV) and *consumption* when the receiver makes sense of the “text.” Hall’s key contribution was to highlight the potential discrepancy between production (encoding) and consumption (decoding), opening the door to a broad range of studies and critiques based on the observation that the meanings people make of mediated messages cannot be predicted entirely from the form of the message or the intentions of its producers.

Figure 1. A model of collaborative media.



We find that this simple observation offers significant traction also for discussing interaction design in the context of collaborative media. However, as debated intensely in contemporary media studies, “new media” imply a fundamental blurring of the roles of producer and consumer. Moreover, as we pointed out above, the computer perceived as a medium is different from the mass media that Hall considered in the sense that producers (and distributors) are not the only ones who can influence the infrastructure. Rather, in collaborative media, people not only produce as well as consume “texts”, but

they also shape and modify the infrastructures carrying the “texts.” We have come to identify this shaping of infrastructures with *design*, and thus we arrive at a model (Figure 1) with three prominent moments: design, production and consumption.

Further, we accommodate the blurring of roles while still upholding the three prominent moments by identifying practices of production-in-design, consumption-in-design, design-in-production, consumption-in-production, design-in-production, and production-in-consumption. To make this a little more concrete, consider the example of the video-sharing site YouTube.

YouTube was launched in October 2005, but the original design moment started long before that with design processes leading to initial and subsequent versions of the site, including several beta versions before official launch. In those beta versions, video clips were of course uploaded and viewed by test users, which corresponds to the practices we call production-in-design and consumption-in-design.

The production moment has been going on in YouTube ever since its launch, consisting of people sharing original video clips as well as repurposed material from movies, TV shows and other sources. When a YouTube user styles her channel page as part of production, what she does is in effect to change the infrastructure in the sense that other users’ viewing experience will be affected. This is an example of the practice we call design-in-production. Similarly, a timely example of consumption-in-production (in the spring of 2013) would be when someone watches a number of Harlem Shake clips in preparation for creating her own version with her office mates.

The consumption moment is obviously dominated by consumption practices such as watching video clips or using YouTube as a free music jukebox. But by watching YouTube clips, people participate albeit unintentionally in the ongoing redesign of the infrastructure since the “most watched” list and similar features are based on viewers’ consumption practices: design-in-consumption. Finally, an example of production-in-consumption is simply when someone writes a comment on a video clip—it is a form of production that takes place within the moment of consumption.

2. Cases: Designing Collaborative Media

Following this introduction, we now move on to two examples of design cases. We have chosen examples that we have privileged access to, and the purpose is to substantiate what characterizes interaction design in the context of collaborative media. In terms of research methodology, the cases are different as one concerns a designer-researcher intervention whereas the other amounts to a more conventional analytical case study. More details on the cases and on issues pertaining to their scientific validity are available in [8]; see also section 4 below.

2.1. Avatopia: A Cross-Media Community for Societal Action

The first example, Avatopia, originated back in 2001 when one of the present authors (Löwgren) teamed up with national public service TV broadcaster SvT to explore the concept of public service in the then-emerging landscape of digital audiovisual media. The work is relatively well described in public sources [13]; the presentation here is focused on implications and challenges for the interaction design discipline.

For a brief introduction, the aim of Avatopia was to empower young teenagers who have authentic desires to change society for the better but who lack the necessary means. Specifically, we focused on activists outside major urban areas and the strategy was to create a cross-media spiral in which collaborative activist work in and through an online forum would be reported in broadcast TV, leading to increased public influence and growing engagement in the collaborative core community. The design process was a participatory one involving some 30 young teenagers from southern Sweden as well as SvT professionals and a team of researchers; it involved three major phases. The first phase addressed *concept development and detailed design*: The online forum (refer to Figure 2) supports collaborative activism by mediating communication and coordination; it is an audiovisual environment lending itself to the production of material for TV broadcast such as satirical animations, hearings with invited guests, interviews and statements by community members; the core community operates on principles of open dialogue, transparency and accountability; the TV broadcast from the Avatopia community is targeted at a young-teenager audience and mediated through professional journalistic practices.

Figure 2. Images from Avatopia. Top row: Initial concept workshop; TV launch mini-series. Bottom row: Inside the online forum.



The second phase amounted to *sociotechnical implementation*. A custom online forum was built and integrated with SvT hosting and broadcasting practices. The teenagers participating in the design

process completed the transition to becoming a core activist community, by means of activities such as workshops on norms and values, experimental activist interventions and eventually moving into the online forum as the pioneer community members.

In the third phase, a *launch strategy* was executed in which a TV mini-series of four half-hour episodes were broadcast (refer to Figure 2) where Avatopia community members would travel around southern Sweden and initiate societal interventions together with local activists, such as hacking shop window mannequins to more closely resemble real human bodies, serving hot dogs while informing about the production conditions in the meat industry, and staging a graduation ceremony where high school students graded their teachers. The end of the final episode, in September 2003, culminated in an invitation to join the community in the online forum. When curious viewers logged in, they were greeted by the community members that had featured in the mini-series and introduced to the norms and practices of the community.

In the last months of 2003, the Avatopia community exhibited slow but steady growth, in terms of number of active members as well as the ratio of substantial conversations and actual collaborative activism to meta-dialogue (“How do I change my avatar? Is it really OK to talk about activist interventions in here?”). The researchers were following the development and planning a longitudinal evaluation in the first half of 2004, when suddenly SvT suffered an unexpected budget cut and had to “concentrate on core business”, which regrettably did not include the Avatopia experiment.

For our purposes here, three salient observations stand out when Avatopia is considered as an interaction design project. First, out of the total effort spent by researchers facilitating and participating in the project, it is noticeable that no more than 60% was spent on what would at the time be considered proper interaction design and follow-on activities. This category mainly corresponds to the shaping of functions and appearance of the online forum, testing it and building it for deployment. The remaining 40% went into *enabling and supporting the social process* in which a motley group of geographically dispersed teenagers turned into an activist community with the ability to identify feasible societal issues and work together on addressing them. If we count also the unsalaried work of the non-professional participants, the ratio would be closer to 20/80 than to 60/40 between “technical” and “social” efforts.

Secondly, even though Avatopia had a clear public launch date, it is equally clear that what was launched was *not a completed product* in any meaningful sense of the word. The online forum did offer a relatively robust set of tools and props, the broadcasting schedule had a weekly slot for the Avatopia show on Thursday nights and allocated journalists to produce the show, and there was a small core community embodying the norms and desires of the target audience, but whatever happened in Avatopia in terms of activism as well as public influence was to be determined by the organic growth and development of the community after the public launch. In a sense, the launch marked a starting point rather than an ending point; we (the researchers) had tried to create good conditions for community growth and, eventually, societal influence through our strategy of participatory-design-into-sustained-operation but there was certainly no deliverable result to be acceptance-tested against a design specification.

Finally, and related to the previous point, it is hard to identify the *designers* in the Avatopia project. The researcher with formal design training who convenes an initial workshop, where some twenty young participants build room-sized models of Avatopia worlds using chicken wire and disposable

cups? The movie maker on the research team who creates an animated music video to explore the visually eclectic style of the online forum? The fourteen-year-old boy who makes an avatar in the form of Potato Man and wears it for the online forum members as well as the TV audience to see while advocating freedom of speech? The girl who posts a note in the online forum asking for Avatopia members to join her in the fight against cruelty to animals in the cosmetics industry? These and many other participants arguably all served in the designer role at one point or another in the lifespan of the Avatopia community.

2.2. *Bambuser: Global Broadcasting for Anyone*

The second example is a more contemporary one, moving in the field of mass-market consumer products and thus addressing an “audience” on the order of millions rather than thousands. The mobile video broadcast service Bambuser was conceived in 2007, co-founded by Måns Adler who is a former colleague of the present authors and former member of our research environment (for a more exhaustive treatment of the Bambuser case, refer to [8]).

Bambuser caught the public eye in connection with the 2011 events of the Arab Spring, and specifically when it was used by Egyptians on the streets of Cairo to broadcast live coverage from Tahrir Square to be picked up and used as source materials by news outlets worldwide. The story leading up to those moments is worth recounting in brief.

In 2007, Adler and co-founder Jonas Vig felt that the time was ripe to make live video broadcasting generally available, similar to how text publishing was put within everyone’s reach through blog and microblog engines and how rich media such as images and recorded video clips had found their venues on sharing sites all over the Web. Their analysis was based on the increasing availability of mobile phones with the capability to capture video and communicate with the mobile Internet via broadband-speed connections. Recall, though, that the selection of good-enough phones at the time was quite limited, the concept of smartphones was not well-known, the iPhone 3G and the first Android phones were still more than a year away, and apps and app-stores were unheard of. Bambuser was envisioned as a service through which any user should be able to send a live video stream from a mobile phone to a web site where it would be viewable live as well as archived. It was motivated from the start on primarily ideological grounds, acknowledging the societal power of broadcast audiovisual media and working towards an equalization of access to the means of live-video production and distribution, and it is safe to say that it was designed for a technical infrastructure that was clearly not ubiquitous when the first prototypes were launched.

However, the rate of technical progress proved to be favorable and the unexpected explosion of app-centric architectures favored the designers since Bambuser is arguably one of the few services that actually need significant local processing in the phone. What is notable for our purposes here is how the design of Bambuser immediately was oriented towards finding a meaningful place in the by-then already emerging ecology of collaborative media. An example is the effort that was spent making Bambuser broadcasts part of the collaborative media content fabric, by providing convenient hooks to sharing through Facebook, Twitter and Jaiku as well as a dedicated player for embedding broadcasts in blog posts and the like. Another example, equally telling, is how the use of early prototypes quickly yielded the insight that broadcasting live also encouraged responding live. What happened was that

viewers of early Bambuser live broadcasts would use Twitter to communicate with the broadcaster, providing feedback and asking questions as well as requesting camera pans and the like. A live chat room was quickly added to the core Bambuser service to cater for this back-channeling and provide a more dynamic broadcasting and viewing environment.

Development of the technical service as well as the user base proceeded steadily, with a mixed bag of video broadcasts being archived on the web site including everything from children's birthday parties and travel reports to community TV and activist broadcasts. When the uprising in Egypt picked up speed in January 2011, however, Bambuser instantly occupied a new position in citizen journalism. Briefly, what happened was that news desks were flooded with tweets indicating the scale and force of the Tahrir demonstrations, but failed to verify the information reliably. Flickr images and YouTube clips were easy enough to locate, but raised questions as to authenticity and currency. It was only when journalists found multiple live broadcasts from Bambuser-using mobile phones in the square, showing simultaneous views of large crowds of protesters from different angles, that the news were deemed authenticated and massive reporting efforts were subsequently initiated.

Bambuser has continued to play similar roles in the ongoing conflicts in the Middle East and other areas of unrest in the world, and a formal collaboration was recently agreed with international news agency AP whereby Bambuser users can provide general rights for AP to distribute their video streams in return for proper accreditation and the possibility to follow-up in other media. At the same time, as can be expected from a service that enables live video streaming, it also engages a fair proportion of its estimated 300,000 active users in broadcasting all aspects of everyday life, from the earnest and artistic to the purely silly. If there is one trait that sets Bambuser videos apart, it would have to be a prevalence of mobile-oriented material—videos captured on the move, in the moment, out in the world as opposed to the stale bedroom smell of much other video blogging found online. This is presumably a lingering trace of Bambuser's mobile-first strategy compared to the implicit reliance on laptop webcams that many other online video services illustrate.

For the purpose of this paper, it is interesting to point out that Bambuser as a contemporary collaborative-media "product" was designed from the ground up to play a role in *societal communication practices*. If anything, we can note how the notion of democratization has deepened over the years from equalizing access towards a position of taking active part in societal change. For instance, the original designers have recently engaged with Egyptian and Syrian activists through contacts in person and via online media to provide training as well as moral and practical support [14]. Another example is how the two archives called Middle East and Occupy are actively promoted on the Bambuser web site at the time of writing.

2.3. Reflections on Designing Collaborative Media

What both of these examples show is, broadly speaking, that a collaborative media "product" has no meaning without its *critical mass of communicative practices*. And these practices are emerging rather than pre-designed. The original designers are initially in a privileged position, to be sure, where they can create blueprints and scaffolding structures for desirable communicative practices. The Avatopia example shows how such scaffolds sometimes play out in the realm of social community formation; in Bambuser, on the other hand, we saw how relatively early production-in-design and

consumption-in-design experiments led to the design decision of incorporating a live chat in the core service. Both examples also illustrate well how the overall design strategy entails creating tools, props, components and platforms to enable not only production but also ongoing design-in-production and design-in-consumption.

However, from a conceptual point of view, it is apparent that collaborative media do not afford the luxury of a well-defined design process culminating in a set of passed acceptance tests and a delivery. Rather, it is a puzzling picture that emerges of extended design processes with many stakeholders moving between design, production and consumption; of uncertainty as to who the designers are and what responsibilities they hold; of a multiplicity of ongoing communicative practices rather than a well-defined degree of fit with a uniform intended purpose; of the complex role of the new and emerging “product” within an intricate ecology of existing collaborative-media infrastructures and texts. In short, from a conventional interaction design point-of-view, working in collaborative media appears to be a bit of a mess, akin to what Redström in the context of design theory has called “design”-after-design [15].

In design theory, more generally, the disappearing role of the designer and the changing nature of design processes from delimited to ongoing have been part and parcel of the conceptual challenges for quite some time. We find the concept of *infrastructuring* from the field of participatory design to be particularly pertinent also for the purpose of coming to terms with collaborative media from a design perspective.

In a media perspective, infrastructures are what need to be in place for the production of media texts to be possible. Similar to the everyday notion, infrastructures in traditional media have been backgrounded and taken for granted to a great extent. In collaborative media, however, we have argued that *the infrastructures are within reach and open to modification* also in moments of production and consumption, similar to sociotechnical infrastructures in the context of participatory design with its ongoing, transformation-oriented design processes. The credit for using the word infrastructure as a verb and an activity in which designers can fruitfully engage goes to Star and Ruhleder [16], but more recently Karasti and Syrjänen [17] have advanced the concept of infrastructuring as a primary perspective on participatory design practice.

The blurring of boundaries between use and design characterizes both communities. Integration, local configuration, customization and redesign represent complex, densely structured courses of articulation work without clearly distinguishable boundaries. Participants’ embeddedness in various ensembles and activities provides them with a range of perspectives over use, tailoring, training, modification, maintenance, reuse and design. This allows the developing of systems by closely accounting for the ongoing development of the *raison d’être* activities with which technology development proceeds.

Transposing to the domain of collaborative media, what Karasti and Syrjänen are saying is that design not only precedes production and consumption but that infrastructures are continuously evolving. This resonates remarkably well with our experience and our view. On the role of the designer in such processes, Björgvinsson *et al.* [18] summarize as follows.

The [designer] role becomes one of infrastructuring agonistic public spaces mainly by facilitating the careful building of arenas consisting of heterogeneous participants,

legitimizing those marginalized, maintaining network constellations, and leaving behind repertoires of how to organize socio-materially when conducting transformative innovations.

To conclude this section, we have tried to show how our abstract notion of design, production and consumption moments over infrastructures and texts can play out in practical interaction design in the context of collaborative media, and how we can characterize such design processes on a general level. In the following sections, we examine the implications in more detail for interaction design practice, research and teaching.

3. Interaction Design Practice

If it were the case, then, that collaborative media imply a rather fundamental reconsideration of foundational assumptions in interaction design with respect to design processes as well as designer roles, what would the implications be for interaction design practice?

Fortunately, it turns out that this question does not lead into entirely uncharted territories. Contemporary design theory addresses several key topics that are remarkably closely related to the question we identify, and specifically, the situation within interaction design can be characterized as a main concern with what is oftentimes called “design beyond the object.” Even though academia has a fairly long history of challenging the identification of design with the shaping of material artifacts (more on this below), it is arguably fair to say that the wakeup call for professional interaction design and UX was the 2009–2010 Design Thinking hype [19], broadly stating that the discipline of design offers ways of working and seeing that can be beneficially employed also in other, non-design domains. The implication of this move was obviously that the traditional design focus of carefully shaping artifacts based on deep knowledge of design materials and human experience was challenged; processes inspired by designerly methods and approaches were initiated in all kinds of settings, from sustainable community development to policy-making and finance. Moreover, the emerging body of practices within the field called service design joined the beyond-the-object convergence with its focus on designing entire “user journeys”, including digital touch-points as well as sociotechnical and organizational structures.

A rather telling example of this development is found in the recent Interaction Awards 2013 event. Organized by the leading professional interaction-design association IXDA, the Interaction Awards event was inaugurated in 2012 and represents a juried selection of best practice in professional interaction design. The ceremony is co-located with the annual IXDA conference, attracting a fairly large and international crowd, and the production value is relatively high to reflect the ambition level in terms of the significance of the Interaction Awards. For our purposes, it is interesting to note that the jury for the 2013 event initiated a special award, *i.e.*, a jury prize, called the Future Voice Award [20] and described as “a way for us to recognize work that inspires us to lift our heads from the work immediately in front of us, and consider the view from a higher altitude, a further depth, and a more distant horizon all at once.” The 2013 Future Voice Award was, significantly, given to Project H, a community development project in 2010–2011 where designers Emily Pilloton and Matthew Miller moved their studio to a poor rural county in North Carolina, working with the citizens on issues of low income, educational challenges and limited opportunities. The work ended up not in a conventional interaction-design treatment such as an online forum or a suite of digital tools, but rather in a

non-digital social intervention focusing on reinventing the shop class of the local high school. In the motivation for the choice [20], Interaction Awards jury chair Marc Rettig writes:

The Future Voice Award recognizes work that demonstrates the profound potential of Interaction Design, which at its heart deals with the dynamics and depth of human relationship and conversation. Recognizing its recipient celebrates evidence of what Interaction Design could choose to become.

It remains to be seen what impact this award is going to have on professional interaction design and UX communities, but it is already significant that an organization with the ambitions of IXDA highlights a clear-cut case of (non-digital) social innovation as an indication of what interaction design could choose to become.

Returning to academic roots briefly, it is worth pointing out that the present development “beyond the object” has been foreseen and conceptualized in academic design theory for quite some time. This is perhaps most prominent in the field of *participatory design*, where the role of the designer has been a primary issue ever since the seminal projects in emancipatory participatory design for workplaces in the 1970s and onwards. Briefly, when a designer aims to create a collaborative process with stakeholders representing multiple constituencies, treating these stakeholders as experts in their respective domains, it is obvious that (a) mutual learning and collateral action need to replace traditional notions of designers studying people’s practices and then transforming their insights genius-style into appropriate artifacts, and that (b) when it comes to decision-making power and “final say”, agonistic processes of ongoing constructive conflict are more likely than discrete-time notions of clients acceptance-testing final delivery products.

Within academic participatory design, this discourse has grown in complexity and scope as participatory design has moved out of the narrow workplace-emancipation focus towards heterogeneous stakeholder populations in public realms of everyday life, towards approaches to social innovation such as Living Labs. A representative example is the recent Latourian notion of design things [21]; another typical conceptualization of contemporary participatory design is the notion of infrastructuring that we introduced in the previous section.

We find that what we present here as the collaborative media challenge is closely related to larger developments in contemporary and near-future interaction design practice: Beyond artifact form and function towards intervening in social and communicative processes. We foresee an emerging direction in interaction design practice that is structured according to the ideals of infrastructuring and similar concepts, and that thus accommodates collaborative media along with other key concerns through a holistic focus on communicative and other social practices.

4. Interaction Design Research

So far, we have suggested a shift within the discipline of interaction design “away from the object” towards social and communicative intervention. If this proves to be accurate, then the implications for scholars in academic interaction design might be considerable.

First, we want to emphasize that we use the term “social and communicative intervention” earnestly, meaning among other things that predicting future use by testing prototypes with

representative user groups becomes a less relevant approach for interaction-design research. Instead, we find it essential to *engage through intervention into actual and ongoing processes of change and transformation*. This stance does not preclude experimentation, to be sure, but it is important to realize that such experiments are also real in the sense that they engage actual stakeholders, they support and counteract multiple agendas, and they cannot be undone. For instance, the development of the Avatopia community was certainly an experiment exploring a possible future scenario for public-service television, but at the same time it had real and tangible consequences for the people involved, including some of the young teenagers whose subsequent career and life choices were to some degree influenced by their 2001–2003 experience of taking part in building Avatopia.

Research is generally expected to produce knowledge, and from that point of view all the other potential outcomes of social and communicative interventions—such as changing society, furthering economic growth, or curing ailments—are secondary. A reasonable question might be what it means to produce academically appropriate *knowledge contributions* from the kinds of interventions we talk about. On a general level, that question has been a priority for over half a century in the social sciences, in relation to approaches such as action research and participatory action research. Working methods and quality criteria from such fields, such as notions of trustworthiness, groundedness and criticizability, are obviously relevant also for our concerns. However, we find that it is possible to go slightly further due to the specific nature of interaction design.

In our view, interaction design research should be seen as an instance of *design research*, which is generally characterized by the emphasis on design practice as part of the knowledge production processes. This implies that interaction design researchers are seen as designer-researchers, *i.e.*, scholars mastering and practicing design in the context of knowledge production, and consequently that the knowledge contributions from interaction design research include design knowledge, *i.e.*, knowledge that can be appropriated by other designer-researchers and used generatively as well as analytically and critically.

In recent years, a methodological debate is starting to emerge within interaction design based on these assumptions. The current state of the art with respect to design-research influenced methodology might be characterized as tentative; however, we find significant potential in conceptualizations such as intermediate-level knowledge [22] and programmatic interaction design research [23] and we are reasonably optimistic about the growth of a scholarly interaction-design research community engaged in knowledge production based on design-research perspectives.

Secondly, collaborative media represent a specialized subset of the discussion above in the sense that the focus is specifically on communicative practices. This implies that the academic discipline of *media and communication studies* becomes a core part of producing knowledge on collaborative media. Much scholarly effort has already been devoted to studying digitally mediated communication based on concepts and theories from media and communication studies, mostly collected under the heading of “new media” studies (refer to [8] for a survey). It is arguably the case that media and communication studies offer many of the foundational concepts needed for understanding also collaborative media. However, from a practical standpoint of doing research, the key challenge is that media and communication studies is traditionally an analytical and critical discipline, drawing on values from the social sciences and humanities, devoted to studying existing communicative practices. If our arguments above are appropriate, then the implication is that media and communication studies

need to embrace an interventionist stance in order to produce meaningful and relevant knowledge on collaborative media (cf. similar positions advanced in [24–26]).

This is precisely what we have been trying to do for the last fifteen years, and our approach has been one of joining forces between interaction design and media and communication studies in a collaborative exploration of what it would mean if the computer were a medium rather than a tool. As in most cases of multidisciplinary collaboration, the gestation period has been extended, with many examples of clashing cultures and incompatible language games. In retrospect, however, we find the investment worthwhile since we are now starting to see signs of transdisciplinarity: Concepts and constructs that emerge in our joint work and that are equally relevant for both of our mother disciplines, yet do not represent simple transpositions of existing ideas. An example touched upon in this article would be how the notions of infrastructure from media and communication studies and infrastructuring from interaction design form a new constellation in the context of collaborative media, with some new and specific connotations that serve generative as well as analytical roles in knowledge production processes.

5. Interaction Design Teaching

When we talk about interaction design teaching in the following, we refer to the context of academic higher education. In such contexts, there are close relations between research and teaching which is also the reason for treating the two in the same section. Further, we are going to be assuming *studio-based teaching* as commonly practiced in design education.

When teaching an interaction design studio in general, the atomic unit is always the design project. Students work individually or in teams with design assignments chosen to illuminate the topic currently in focus, and teachers do most of their work by demonstrating exemplary design practice, critiquing student work, posing questions and suggesting alternatives intended to extend the students' horizons and repertoires. The field of interaction design in general is moving towards a studio-based didactics, and this development is of course highly desirable as well as non-controversial.

However, we find that the subject of collaborative media poses a number of specific challenges for interaction design teaching. First, and following from our arguments above, designing collaborative media in a meaningful way requires *interventions into practice*. However, this, as any advanced-level design teacher knows, is a notorious can of worms. The work required by teachers and students to establish and uphold collaborative structures with external constituencies is considerable and sometimes in vain; there are significant risks associated with exposing student projects to a number of external factors outside the control of the teachers; practical issues such as scheduling become difficult in view of the poor compatibility between academic calendars and external processes; legitimate external interests in IPR may conflict with the academic ideals of knowledge sharing and transparency; the list goes on.

Secondly, due to the rapidly emerging nature of the collaborative media field, we sometimes find that teachers are put in uncomfortable positions. Studio-based teaching is more or less based on the venerable *master-apprentice* relationship, where students to some degree engage in willing suspension of disbelief in order to lay a foundation of practical knowing by imitation, before a critical and independent proficiency can gradually grow [27]. When it comes to collaborative media, however, it is

not uncommon that students bring relatively sophisticated communicative practices in, e.g., social media to the studio and find it hard to regard their teacher as a “master” of such practices. This is not a new dilemma, to be sure, but it requires a certain level of experience and maturity on behalf of the teacher to turn the threat to the traditional knowledge asymmetry into a pedagogical asset, for instance by making sure to put the students’ practical knowing into play while at the same time focusing on providing reflective and critical perspectives that help the students widen their horizons.

Finally, we made the point earlier that collaborative media essentially require the coordinated efforts of two academic disciplines: interaction design, and media and communication studies. In the relatively stable context of a multidisciplinary research group, that is an easy point to state, but the context of teaching is often another matter. Ideally, you would like to have students from the two disciplines engage in joint work over extended periods of time, but in practice this often turns out to be impossible for scheduling and formal curriculum reasons. Treating the two groups separately, on the other hand, often actualizes the long stretches of catching-up that are necessary for design students to grasp analytical and critical concepts from media and communication studies, and conversely for media and communication students to become proficient in designerly ways of working with communicative interventions.

6. A Challenge to Interaction Design

We conclude that collaborative media represent a significant challenge to interaction design, in terms of key concerns and ways of working as well as the nature of expertise and the role of the designer. More specifically, we have argued that major manifestations of the challenge comprise the structure of design processes and the fundamental distinction between instrumental and communicative perspectives.

This distinction in particular evokes the issue of how collaborative media appears to transgress academic disciplines. It is certainly the case that interaction design has a long history of eclecticism—of importing concepts and constructs from other academic disciplines in ways that are sometimes less than fully sensitive to the originating contexts. We suggest that a more respectful approach is needed here, where interaction design and media and communication studies represent two equally important parts of the work towards what might eventually become a transdisciplinary field of knowledge and practice. We hope to have provided some illustrations of what such an approach could mean.

We have also noted how the challenge of collaborative media ties in with other emerging challenges in interaction design. What does it mean, for instance, that design is moving beyond the object towards social and communicative intervention? Is the interaction designer of the future a generic infrastructuraler, process facilitator, change agent? Or should we insist on the significance of the interaction designer’s familiarity with the digital materials, complemented with a strong sense of appropriate and desirable qualities in the kinds of practices being addressed (such as the communicative practices that collaborative media are particularly conducive to)? These are clearly open questions at the time of writing, and the answers will only grow from collective experience as the interaction design community is increasingly addressing social and communicative intervention as a field of inquiry and practice. However, it should be noted that our personal preferences lie in the latter direction rather than the former.

To return to where we started, history has arguably proven Kammersgaard right: Today, the computer is mostly a medium. Designing media is something else than designing tools, as we hope to have shown here. Interaction design has been defined in many ways; a fairly generic suggestion [28] is “shaping digital things for people’s use.” As a scholarly community, we need to reconsider much of what we know about that shaping as digital things increasingly turn into collaborative media infrastructures.

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References

1. Kammersgaard, J. Four different perspectives on human-computer interaction. *Int. J. Man-Mach. Stud.* **1988**, *28*, 343–362.
2. McCarthy, J.; Wright, P. *Technology as Experience*; MIT Press: Cambridge, MA, USA, 2004.
3. Norman, D. *Emotional Design: Why We Love (or Hate) Everyday Things*; Basic Books: New York, NY, USA, 2004.
4. Fishwick, P. *Aesthetic Computing*; MIT Press: Cambridge, MA, USA, 2008.
5. Gaver, W. Designing for Homo Ludens. *I3 Mag.* **2002**, *12*, 2–6.
6. Blythe, M.; Overbeeke, K.; Monk, A. *Funology: From Usability to Enjoyment*; Springer: London, UK, 2004.
7. Löwgren, J.; Reimer, B. Designing Collaborative Media: A Challenge for CHI? In *CHI '12 Extended Abstracts on Human Factors in Computing Systems*; ACM Press: New York, NY, USA, 2012; pp. 31–40.
8. Löwgren, J.; Reimer, B. *Collaborative Media: Production, Consumption and Design Interventions*; MIT Press: Cambridge, MA, USA, in press.
9. Rosen, J. The people formerly known as the audience. 2006. Available online: http://archive.pressthink.org/2006/06/27/ppl_frmr.html (accessed on 6 May 2013).
10. Preece, J. Sociability and usability in online communities: Determining and measuring success. *Behav. Inf. Technol.* **2001**, *20*, 347–356.
11. Bødker, S.; Bøgh Andersen, P. Complex mediation. *Hum.-Comput. Interaction* **2005**, *20*, 353–402.
12. Hall, S. Coding and Encoding in the Television Discourse. In *Culture, Media, Language*; Hall, S., Hobson, D., Lowe, A., Willis, P., Eds.; Unwin Hyman: London, UK, 1980; pp. 128–138.
13. Gislén, Y.; Löwgren, J.; Myrestam, U. Avatopia: A cross-media community for societal action. *Pers. Ubiquitous Comput.* **2008**, *12*, 289–297.

14. Messieh, N. Live-streaming service Bambuser goes from Egypt's revolution to its elections. *The Next Web*, 29 November 2011. Available online: <http://thenextweb.com/me/2011/11/29/live-streaming-service-bambuser-goes-from-egypts-revolution-to-its-elections/> (accessed on 6 May 2013).
15. Redström, J. RE:Definitions of use. *Des. Stud.* **2008**, *29*, 410–423.
16. Star, S.L.; Ruhleder, K. Steps toward an ecology of infrastructure: Design and access for large information spaces. *Inf. Syst. Res.* **1996**, *7*, 111–134.
17. Karasti, H.; Syrjänen, A.-L. Artful Infrastructuring in Two Cases of Community PD. In *Proceedings of the 8th Conference on Participatory Design: Artful Integration: Interweaving Media, Materials and Practices—Volume 1*; ACM Press: New York, NY, USA, 2004; pp. 20–30.
18. Björgvinsson, E.; Ehn, P.; Hillgren, P.-A. Agonistic participatory design: Working with marginalised social movements. *CoDesign* **2012**, *8*, 127–144.
19. Brown, T. *Change by Design*; HarperCollins: New York, NY, USA, 2009.
20. Rettig, M. Interaction Awards “Future Voice Award” and Studio H: Why? *Interaction Design Association*, 7 February 2013. Available online: <http://www.ixda.org/node/33781> (accessed on 6 May 2013).
21. Binder, T.; de Michelis, G.; Ehn, P.; Jacucci, G.; Linde, P.; Wagner, I. *Design Things*; MIT Press: Cambridge, MA, USA, 2011.
22. Löwgren, J. Annotated portfolios and other forms of intermediate-level knowledge. *Interactions* **2013**, *20*, 30–34.
23. Hallnäs, L.; Redström, J. *Interaction Design: Foundations, Experiments*; Swedish School of Textiles: Borås, Sweden, 2006.
24. Koskinen, I. Two solitudes: Design as an approach to media research. *Nord. Inf.* **2006**, *28*, 35–47.
25. Kember, S.; Zylinska, J. *Life after New Media: Mediation as a Vital Process*; MIT Press: Cambridge, MA, USA, 2012.
26. Bolter, J.; Engberg, M.; MacIntyre, B. Media studies, mobile augmented reality, and interaction design. *Interactions* **2013**, *20*, 36–45.
27. Schön, D. *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions*; Jossey-Bass: San Francisco, CA, USA, 1987.
28. Löwgren, J. Interaction design. *The Encyclopedia of HCI*, 2012. Available online: http://www.interaction-design.org/encyclopedia/interaction_design.html (accessed on 6 May 2013).