

Binding the Material and the Discursive with a Relational Approach of Affordances

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ABSTRACT

As Norman's vision of affordances developed twenty-six years ago is unable to address complex challenges faced by today's designers, we outline a view of affordances as discursive relations in HCI design. This argument is framed in the discussion of a larger trend of work beyond the HCI field, the scholarship on relational affordances from the fields of communication and organization studies. Through comparison and interrogation, we maintain a relational approach of affordances that bind the material and the discursive will help us to address design issues such as discursive power, cultural values, performed identities, mediated agency, and articulated voices in this increasingly globalized world and design culturally sensitive technology for transformation and emancipation. With a few cases, this paper deciphers the hidden power relationship of interaction design and suggests ways of we should design for social affordances.

Author Keywords

HCI; affordance; culture; ideology; identity; discursive; materiality; HCI4D; critical design; cross-cultural design.

ACM Classification Keywords

H.5.2. Information interfaces and presentation: User Interfaces—Theory and methods

INTRODUCTION

Since the term “affordances” was introduced to the HCI community as “perceived and actual properties of the thing” by Norman [44, p.9] twenty-six years ago, the concept of affordances has been one of the most influential concepts in the field. Following this tradition, abundant HCI work uses

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affordances, program functions, and product features interchangeably. Indeed affordance also receives high interest and much attention beyond the field, and researchers from multiple disciplines are attracted by its “constraining and enabling” feature that arises from the materiality of a technology [28, 30, 34, 36, 49, 62]. For example, communication scholars and sociologists welcome a middle position between technological determinism and social constructivism this feature brings as they endeavor to decipher the complex interactions between communication technology and the society. Organization theorists are fascinated by its utility and potential to explore the mutual constitution of technology and organizations through the technology appropriation process of information systems. In those literatures, the concept of affordances is treated in a relational manner, different from Norman's approach. Most interpret an affordance as one or more emergent properties rather than as intrinsic features of a technology. In this view, affordances arise from the interactions between the actor and his/her surrounding contexts—it is an “interaction quality” [56, p.74].

In this paper we look at the values and benefits a relational approach to affordances bring to the HCI community and discuss how these fresh insights inform design practices at a time when HCI designs must deal with a broader range of cultural, social, aesthetic, and ethical dimensions due, in part, to globalization. We argue that Norman's vision of affordances developed 26 years ago is unable to adequately address the complex challenges faced by today's HCI designers. Leaving aside rapid technological advancement, today's HCI landscape is dramatically different, influenced by heightening user participation in an increasingly globalized world. Issues such as identity, agency, power, structure, politics, and social justice compete for designer's attention alongside traditional metrics (e.g., effectiveness and efficiency) in our design process, as shown in research areas such as postcolonial computing [31, 32, 39, 47], feminist HCI [6, 7], and critical design [5, 8], along with new development in areas such as cross-cultural design [48, 56], ICT4D and HCI 4D [27, 57], and value sensitive design [11, 21, 41]. All these changes ask us to look beyond the view of affordances as intrinsic properties of technology and to adopt a more robust view of affordances that would

connect the material with the discursive for technology design.

Extending the work of Sun [53, 54, 55, 56]—one of the authors—on culture-sensitive design, we outline a view of affordances as discursive relations in HCI design to approach contested issues such as identity, agency, voice, and social justice in design situations where culture and political economy are foregrounded and where the feelings, attitudes, and emotions of individual users may be shadowed in structures of power, ideology, history, dominance, and epistemology. This argument is framed in the discussion of a larger trend of work beyond the HCI field, the scholarship on relational affordances from the fields of communication and organization studies. Through comparison and interrogation, we propose that a relational approach of affordances that bind the material and the discursive will help us to address design issues such as discursive power, cultural values, performed identities, mediated agency, and articulated voices in this increasingly globalized world and design culturally sensitive technology for transformation and emancipation. With a few cases, this paper deciphers the hidden power relationship of interaction design and suggests ways of how we should design for emergent affordances. It is also a response to the recent call for critical design methodology [5, 8].

Our goal here is to offer an initial articulation to start a cross-disciplinary conversation on culturally, socially, and ethically informed HCI design issues with the point of departure being the concept of affordances. Following the Vygotskian sociocultural approach, we see affordances as action possibilities in much the same way that Kaptelinin and Nardi [33] delineated in their mediated action perspective. In our case, we bring in key concepts from communication studies (i.e., a constitutive model of communication) and from organizational studies (i.e., materiality) to sketch a structured framework of affordances that begins to explore social abilities and constraints on both the macro level and micro level, particularly in cross-cultural design contexts. The exploration is intended to enrich the heated discussion on materiality in HCI [e.g., 30, 49, 62] by attending to the aspects of situatedness and structuration of affordances, issues important to culturally sensitive design, along with a view of materiality informed by organizational studies and sociology. This is an especially important step to draw our attention to critical, discursive design issues amidst an era of globalization. We hope this paper will sparkle more engaging conversation and inspire more work along these lines.

Ideology of the interface and the hidden power relationship of affordances

Technology has politics and is never value free [20, 43, 64]. As a matter of fact, the interface of a computing technology is the manifestation of its implicit politics and ideology. For example, Tayoma states that “(t)he fundamental GUI interface (files, pages, buttons) poses unique challenges in

HCI4D” [57]. The Macintosh’s desktop interface that is built on the discursive practices and cultural values of a white male office worker might not make sense to users outside of Western culture [50].

In our experiences of working with under-represented users, we witnessed those moments of frustration and discomfort users had with well-intentioned designs. A native American user was disappointed and even upset to see that the artifacts of an online museum were chronicled with a colonist view of history rather than their own. A blind user felt isolated by a feature particularly requested by a nonprofit organization serving people with disabilities: “Text-only websites put me in the back of the bus”—comparing the experience of getting another web version with the experience of Rosa Parks, an African-American civil rights activist who refused to sit in the back of the bus during the time of segregation. A cultural stakeholder in an online archival collection published by a University library expressed concern that access to the artifacts, sacred objects to members of the community from which they originate, would be limited by an information architecture designed for Western scholars rather than community members. Those moments lead us to a riveting question: How might design features that aim to improve efficiency and effectiveness end up hurting a user’s feelings and morale, distancing him from his own community, isolating her from other users, and/or labeling him as “other”? In a search for answers to these questions, we came to realize that the current HCI language and terminology does not help to interpret these issues. We believe a view of affordances as dialogic, discursive relations can begin to help us to examine these types of design issues more closely and find ways to create alternatives to design process and workflow as well as novel solutions.

A RELATIONAL APPROACH OF AFFORDANCE

A relational approach of affordances is not entirely new. Sun [53] describes how affordances were defined in a relational way in Gibson’s original definition: an affordance is “equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment, and to the observer” [23, p. 129]. Affordances describe a three-way relationship between the environment, the organism, and an activity [4, 17]. Considering that Gibson’s goal for advancing the concept of affordances was to counter the dualism of meaning vs. action in modern psychology, it makes sense that affordances are mapped as relationships “within a frame of being and acting” [17, p.118]. Clearly, in the beginning, affordances were considered as emerging from the context of material encounters between actors and objects.

Insights from the communication field: A constitutive model of communication

Gibson's relational treatment of affordances is attractive to communication scholars and sociologists as it brings a fresh angle to study the role of technology in our lives, one of the fundamental research questions in communication studies. Hutchby [28] plays a key role in making Gibson's work accessible to the fields of communication studies, sociology, cultural studies, and organization studies [9]. He defines affordances as "functional and relational aspects which frame, while not determining, the possibilities for agentic action in relation to an object. In this way, technologies can be understood as artefacts which may be both shaped by and shaping of the practice humans use in interaction with, around, and through them" (p. 444). His view of affordances is "grounded in a conception of the *constraining*, as well as *enabling*, materiality of the technology as worldly object" (ibid, emphasis added); here, materiality is not necessarily related to something physical.

Hutchby's introduction is as influential to social scientists as Norman's work has been for the HCI design community. In the communication field, the notion of affordances "offers a reconciliation between the two opposing poles" (ibid) for people who are tired of the debate between technological determinism and social constructivism. Here the "constraints and unique possibilities" affordances offer can help us "avoid the arbitrariness of the radical constructivist position" and "evade the equally unilateral epistemology associated with technological determinism" [29, p. 33]. The opportunities brought by the affordances also works with an increasingly popular model of communication at that time, a constitutive model of communication that believes communication creates meanings rather than simply transmits. For example, a designer who expects users to use a technology as designed follows a transmission model of communication unconsciously. In contrast, a designer who embraces a constitutive model of communication would expect users to creatively modify the technology and include those opportunities in the design for the generation of new meanings. As a result, affordances become popular among communication scholars who explore the complex relationship between technologies and society (e.g., [3, 25, 42, 63]).

Two patterns surface from this discussion: First, as communication scholars are most interested in the grand issues of agency "in the causal flow between technology and society" [3, p. 24], attention to specific technologies' affordances shifts to the plural form of communication technologies (rather than a particular technology) for a larger group of users generally. This also occasions a shift toward the broader sociocultural context. In contrast, HCI studies of technology affordances often occur on the micro level—the immediate context [42]. Second, a relational affordances view looks beyond program functions to inspect the *social* capabilities that certain communication

technologies enable. Here the shift is toward an interest in social interactions surrounding (and giving rise to) affordances. Of course, these two patterns are consistent with the search for developing a synthetic perspective on the materiality of technology and its social uses. As a result, technology use narratives and case studies tend to illustrate various ways of connecting affordances with sociocultural issues such as agency, identity, and values on a macrosocial level with a constitutive model of communication [25, 63].

Maybe because of the tendency to inspect the grand issues of technology and society, the term "affordances" also tends to be invoked rather loosely by this group of scholars. Other than Hutchby [28, 29], affordances are often simplified and represented as "possibilities and constraints." In her data-grounded primer about digital media, Baym characterizes the affordances of digital media as "packages of potentials and constraints, for communication" [3, p. 17]. While this touches the essence, it remains rather vague for people unfamiliar with the concept, even after seeing her further explanation, "the social capabilities technological qualities enable" [3, p. 44]. Similarly, in an article that explores networked individualism [63], the key term "social affordance" that also appears in the title line is curtly summarized as "possibilities," lacking a sophisticated treatment we would see from some other work about social affordances we review below.

While the relational approach of affordances used in the communication field has its own weaknesses as described above, the application of a relational approach of affordances does bring something illuminating to HCI design. Particularly its discursive angle and strong orientation to social interactions of a technology and its favor for agency (both human agency and technological agency) [42] is something we search for in a more socially, aesthetically, and ethically-oriented HCI design. Within this context, it might be easier to understand why Norman's vision of affordances is critiqued as a narrow one. When technology is treated as a neutral and value-free vehicle to implement social change, its affordances may also be abstracted from its surrounding sociocultural contexts and placed in "a kind of no-man's land"[1].

It should be noted that framing affordances in the context of a "causal flow between technology and society" is especially likely to downplay the values of relational affordances. According to Slack and Wise [51], a causal approach is reductive, failing to account for "the contingent play of a wider variety of factors," or "a set of dynamic, changing, and interrelated connections or relations" (p.116).

Insights from the organization studies field: Materiality towards situatedness and structuring

While communication scholars and sociologists integrate technological agency and human agency through a relational approach of affordances to focus on social

interactions on a macroscopic level, researchers from organization sciences and information systems pursue a similar approach to examine organizations on both a macroscopic and microscopic level, developing a sophisticated relationship between materiality and social interaction [19, 34, 35, 36, 38, 59]. Due to their object of inquiry (work practices and the systems that support them), their inspections of technological affordances are more closely aligned to HCI research in terms of scope and unit(s) of analysis.

Organizational theorists share a similar interest with communication scholars in studying the co-constitution processes of technology and sociocultural contexts. They approach organizational contexts as “structures” [24] but understand that the dual influence of technology and action are both in play [16, 45]. Affordances are advocated as “a promising approach to overcome the subject-object and agency-structure dichotomies that have stifled much of the research at the intersection of technology and organizations” in earlier frameworks such as structuration [24], practices, or emergent views [19, p. 237].

This goal is achieved through a sophisticated conceptualization of materiality. Influenced by “the material turn” in social science and built on Hutchby’s early work [28] in which he characterizes materiality as “constraining and enabling,” a group of information systems researchers regard materiality as the “capabilities that afford or constrain action,” which is what makes digital artifacts *material* [34]. To build the argument, Leonardi illustrates that the connotation of materiality for digital artifacts includes any of the three dimensions: the physical matter, the practical instantiations of abstract ideas, and/or something that has significance for a current task. It is the last two dimensions that make digital artifacts (e.g., software) material even though they may lack physical substance. Therefore, “materiality is not a causal force of social outcomes but a fundamental human condition tied to the material anchorage of human agents and what is often perceived as the inexorable reality that everything that happens cannot but happen in a ‘here and now’ (the leitmotif of situatedness)” [36, p. 9]. Clearly, materiality cannot be reduced as technical features and conditions, but it is deeply embedded in an activity: “materiality is not a property of artifacts, but a product of the relationships between artifacts and the people who produce and consume them.” Therefore materiality orients towards both situatedness and structuring forces.

Being relational from its nature, this treatment of materiality bends towards “the material conditions and material consequences” related to sociocultural considerations of design practices [62, p. 57]. It aligns with one aspect of “the material turn” that is being unfolded in the HCI field. In addition to this aspect, the material turn in the HCI also includes the attention to the material nature of

computation and that to the material interactions driven by ubiquitous computing and tangible interactions [49].

In this context, affordances are regarded as “constituted in relationships between people and the materiality of the things with which they come in contact” [59, p.146]. Out of the constitutive relationship, materiality stays stable, “independent of people, but affordances do not” [34]. On the one hand, materiality as a constraint provokes similar technology use (and thus affordances) across organizations: an email client is used for email communication between users. On the other hand, materiality as a generative resource enables diverse and unique uses (and thus affordances) for individual users across different contexts: an email client functions as a personal calendar system. A rough metaphor would see the materiality of technology as a picture frame, and a variety of affordances cultivated by that technology as those pictures that could be fit in the frame. Clearly an affordance approach based on materiality introduces more room to handle structuring forces and cultural influences in organizations.

However, this approach still has a few rough spots, which surface when taking social interactions into account as organization researchers reflect [19]. First, we need a hierarchy model of affordances that could address multiple levels of IT design issues. What vocabulary could be used to pinpoint broad social interactions and more immediate use actions neatly? Second, for a relational affordance approach that aims to connect and reconcile a Cartesian perspective (e.g., the subject-object, structure-agency, and determinism vs. voluntarism) to be used in “a truly relational manner,” it needs to encompass a variety of social influences in the structural context. One big problem in these types of organization studies is that individual users may disappear in the crowd. Most of the time users are reduced into faceless, one-dimensional human being, collapsed into a social role such as “patients” or “customers.” Their feelings, values, identities, and even pains may go unnoticed in organizations. Indeed the concept of materiality itself tends to focus more on the situatedness rather than structuring forces, and so it is not common to see or hear the struggles of individual users experience within structures of discursive power.

AFFORDANCES AS DIALOGIC, DISCURSIVE RELATION FOR CULTURALLY SENSITIVE DESIGN

A relational approach to affordances is not a novelty in the HCI field, either. Informed by activity theory, a group of scholars [1, 4] advances a relational view of affordances. [4] asserts that “[a]ffordances are not properties of objects in isolation, but of objects related to subjects in (possible) activities” (p. 59). Following this line of inquiry, researchers explore how affordances arise from actions and serve as properties of interactions between people and technologies [33, 53, 54, 55, 56, 61].

This group of researchers cites two problems with the view expressed in Norman's early work: First, affordances are regarded as technology properties that derive from an artifact, and it is "a one-dimension relationship only centering on an artifact" [56, p. 73]. Second, this view tends to discount sociocultural influences during interactions as a consequence of the qualities of a network being placed only on one tool (or actor). Yet we should apply a historical perspective to understand the limitation of Norman's view. When Norman claims affordances as "the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used" [44, p. 9], he strips away rich contextual influences by reducing complex relations to intrinsic properties of interactive technologies. However, he emphasizes the role of designers in the design process by treating affordances as designed features, and points out that one of the designer's goals is to make design cues clearer. Therefore this vision has advanced the field by linking affordances to interface design directly when the focus of the field was previously more on usability rather than on user experience.

The landscape has changed dramatically after two and half decades. HCI design approaches are more and more culturally, socially, aesthetically, and ethically informed. As a result, a reductive vision of affordances as intrinsic design features will not help us to address many crucial design issues in this increasingly globalized world where social media and social computing play a more important role. Particularly in contexts such as cross-cultural design and HCI4D when culturally-sensitive designs are involved, and when values, identities, power, and voices need to be addressed, we must have a relational approach to affordances that follows a constitutive model of communication for meaning creation (as applied by communication scholars) and that originates from the materiality towards both the situatedness and structuring to bind the subject-object and agency-structure dichotomies.

To address culturally sensitive design issues, Sun [56] defines affordances thus: "Affordances describe the action possibilities posed by an artifact in use and associate the artifact with practices. They emerge as the material and the discursive are fused together during technology use." Here affordances are characterized as relations that come from the fusion of the material and the discursive, not the material and the social—a dualism we commonly see in the literature of science and technology studies. Since the material is further elaborated in the previous section, we turn here to look at the discursive more closely. While discourse is social itself, it further emphasizes a tendency towards a) design concerns for discursive power, cultural values, performed identities, mediated agency, and articulated voices, and b) design situations which constitute "a layer of embedded cultural power relationships (or culturally negotiated positions of power and subordination) atop already pervasive power structures in society,

organizations, and designer-user relationships" [39, p. 75]. As a *critical* design approach, an emphasis on the discursive resonates with heuristics for the proposal of critical design [5]. In addition, the discursive dimension is connected with the communicative nature of a technology. Its innovation suggests an active process of meaning construction according to the constitutive model of communication, which values the constructive subjectiveness of individual users arising from the intersection of the material and the discursive.

Affordances are a key component of the Culturally Localized User Experience (CLUE) approach [56], a design philosophy and methodology to create culturally sensitive design for local users. This framework places concrete use activities on center stage, a component that is often missing in current cross-cultural design literature and practice. In the CLUE framework, Sun regards local culture as the dynamic nexus of contextual interactions that manifests numerous articulations of practices and meanings to replace a taxonomic view of culture. The framework advocates a holistic, integrated vision that takes user experience as both situated action and constructed meaning. It proposes a dialogical, cyclical design process to integrate action and meaning in cross-cultural design in order to make a technology usable and meaningful to local users.

As a significant extension of the CLUE, the view of affordances as discursive relations suggests the three traits:

Affordance as dialogic relation

Relations surfacing from affordances are dialogic. As Sun describes, "dialogicality is a key feature here as affordance comes from the milieu of the artifact, user, and activity" [56, p. 74]. This dialogic character comes from the intellectual tradition of Bakhtin's work [2], rhetorical genre theory [40, 52], and a constitutive model of communication. As a dialogic relation, technological affordance unfolds and develops as a result of the interplay of habituated uses and sociocultural influences. For example, LINE, the mobile messaging application developed in Japan, began an interesting feature for mobile chat apps to show the status of a message and informs users whether a message is read or not. This creates pressures for users on the receiving end, but it seems to work well with Japanese users who value the courtesy of responding messages in a timely fashion.

Binding the material and the discursive

Regarding affordances as discursive relations binds materiality and discursive power, integrating action and meaning, and articulating "the contingent interplay of a wider variety of factors" to create sensible designs in local cultural contexts.

This view represents a three-way dialogic relationship between a technology, a user, and a user's concrete activity, situated in a specific context. Sun [56] claims affordances arise from a dual mediation process—mediation of action

and mediation of meaning— as part of a “mediation property” (p. 225). This suggests that the process of binding the material and the discursive is to connect the situatedness and the constructiveness of technology use, and therefore to integrate action and meaning for creating designs that are at once sensitive to local discursive culture and conscious of power relationships of that structure, aiming for transformation and emancipation. In this regard, technical features cannot be neutral since affordances are inherently value-laden, particularly in the context of globalization where there exists much power and struggle. A goodwill design does not necessarily help or (emotionally) support the targeted users, as shown in the case of text-only web versions for blind users.

Instrumental affordance and social affordance

A structured model of affordance helps to address design issues at different levels of scope. Based on an activity theory model [4], a three-level affordance structure consists of operational affordance, instrumental affordance, and social affordance. Different levels of affordance interact and evolve through the process of technology enactment in the milieu of technology, user, and activity. Social affordances arise out of instrumental affordances through user’s interactions in local contexts, and thus the same instrumental affordance might lead to different social affordances and support different social uses when affordances are realized in different contexts. Furthermore, different local cultures will nurture different social affordances. Here, “social” refers to social interactions on various levels including the individual, the community, and the society level and cultural level as related to the discursive aspect of human action. Issues of agency, identity, dominance, ideology, and power often are associated with social affordances but occasioned and encountered in concrete terms in instrumental affordances.

AFFORDANCES UNFOLDING IN A MURKY GROUND OF TIPPING POWER RELATIONSHIP

Technology affordances unfold in this praxis of use and develop as a result of the interplay of habituated uses and sociocultural influences, usually shadowed in certain power relationship. Originating from materiality, technology affordances do not come from the void. The traits of “enabling and constraining” imply certain positions, gestures, and power relationships that comes from the network, or as [36] describes: “a fundamental human condition tied to the material anchorage of human agents” and “the inexorable reality that everything that happens cannot but happen in a ‘here and now’.” And this is why we say technology has politics, and interfaces manifest hidden ideologies of which designers and users might not be fully aware.

Many goodwill designs seem to nurture good instrumental affordances, but they can miss the complexities of social affordances. In a service-learning project to develop a

CMS-based website for a local nonprofit organization that serves people with disabilities, the client required students to develop a text-only web version to complement the current one as their website has been critiqued by vision-impaired users due to accessibility problems. However, our user research found that the text-only version often suffers from poor content maintenance and out-of-date information. As we interviewed vision-impaired users, one blind user announced firmly that he did not want to access a text-only website because he felt he was placed in the back of the bus. Instead he asked student designers why not aim for an accessible website and thus a more inclusive design for everyone from the beginning. In this case, a goodwill design that intends to make blind user’s browsing experience easier ended up strengthening the digital divide that already existed and further marginalized the user group it was created to serve. This reminds us to be careful to attend to multiple levels of affordance.

Affordances also may come with unequal relations of power, and user agency in the network is a process of power distribution: some groups of users are privileged while some might be ignored, marginalized, or even oppressed. Lewis [37] points out the decline of the newspaper business and subsequent job losses of journalists and editors is a result of the tension between the ideology of the journalism profession and the ideology of arising digital platforms for news-making, and of the collide of “a one-way publishing mindset” and “a multi-way network.” For the entire 20th century, the cultural logic of the journalism profession is journalists’ control for information, i.e., “journalists, acting in their normative roles, ought to wield gatekeeping control over news content on behalf of society” (p. 845). In contrast, the emerging digital media platform promotes a logic of openness and participation that affords ordinary users opportunities to take part in news-making and distribution. However, those opportunities for parajournalists (or citizen journalists) take information control away from news professionals and may displace many of them out of the workforce, which makes professionals wonder how much control they would need to give up to encourage civic participation even though they embrace the ideal. This case clearly shows affordances are not designed features. Particularly, social affordances are not the same for every user, and sometimes one man’s meat is another man’s poison.

Facebook Japan case: Ideology, power, and capitalism

A view of affordances as discursive relations could inform design practices on both the micro level and macro level for wise intervention strategies. In this age of globalization when power is transferred from “the colonial state” to “more remote international corporations whose sole responsibility is to their shareholders” [14], the relationship between discursive power and local values are made even more intricate through technological affordances. The recent development of the Facebook Japan website tells a

compelling story of how cross-cultural design practices are complicated by power and political economy.

As the U.S.-based Facebook has rapidly risen to be the world's largest social networking website with a billion users [12], many local SNS websites were kicked out of the game [15]. However, Facebook had a difficult battle to win the hearts of Japanese Internet users due to its distinctive feature that require users to use real names for profiles. This feature, which made Facebook a huge success in American culture where it originated, conflicts with Japanese Internet culture, where users like to use pseudonyms to interact with each other either for bonding with old friends or for bridging new connections with a different conceptualization of privacy. Over 75% of Japanese social media users chose to use pseudonyms around the time of 2009 [46], a feature supported by the top Japanese SNS website Mixi at that time. Consequently Facebook's penetration rate had been stagnant at 3% for a long time until fall 2011, long after a Japanese version was released in 2008 and after a Facebook office was opened in Tokyo in September 2010.

Facing such strong resistance from local users, the global IT giant Facebook determined to conquer this strategically important online market—Japan has been on the top three list of the largest markets globally for advertising, including mobile advertising [18]. Facebook pushed forward with bold localization initiatives while sticking to their real-name policy. As a result, the technological affordances of Facebook Japan site began to unfold and develop, incorporating habituated uses and sociocultural influences. It finally claimed victory over the local service Mixi in September 2012 after morphing into a professional networking site for Japanese users, similar to LinkedIn, as local users are more comfortable using their real names for professional networking. Facebook Japan peaked at 17.12 million users by the end of 2012, but that number has since dropped to 13.78 million by June 2013, a decline of 19.5% drop in less than half a year [58].

This case shows the tension between power and discourse behind cross-cultural design is never settled, and colonial relationships still persist [31]. They do not just affect users in developing countries but everywhere, including an affluent country with a well-developed, unique and independent Internet culture as Japan. An unfortunate design message that was promoted in the Facebook Japan case—that only one social networking modality can be honored in the global village—is perhaps more alarming and disturbing than similar cases occurring in other developing countries. The impression is one of digital colonialism: that a local social network service is doomed before this juggernaut no matter how hard local users fight. This message, inadvertent though it may be, also conflicts with the design goal of “pluralism” we would like to advocate in the third wave of HCI research [6, 10, 26].

The tipping of power relations can indeed be driven by the greed of capitalism and, at the same time, sheltered by the

political economy of social media [22]. Facebook provides a free platform for its users to share their social network experiences with friends, and it makes profits through targeted advertising with the commodification of their data. van Dijck [60] expounds that the real-name policy is a tool for a platform owner like Facebook to access, control, and utilize user's data for business revenues in the era of big data. The business goal is packaged in an ideology that advocates a uniform and authentic online identity for integrity, because multiple identities or an inauthentic identity fails to meet advertiser's “truthful” requirements and would hurt “the clarity and coherence” of the data. In fact, the redesign of the Facebook Timeline feature is one that clearly aligns with business goals to improve the process of data gathering and data analysis. As a result, “(t)he linear, narrative structure dominating the visible user interface not only cajoles more information out of the user but also channels data input into a more uniform format” (p. 206).

A view of affordances as discursive relations could inform design practices on both the micro level and macro level for intervention. On the micro level, Facebook improves instrumental affordance with design features such as the Timeline to make user task of updating one's status easier. Therefore, they enhance the social affordance of presenting and staging one's identity online, but purposefully ignore the affordance of networking in anonymity. Why? From the macro level, while it is technically feasible to nurture for social affordances that resonate with local preference for certain mode of privacy, Facebook chose not to due to the discursive reality (the ideology of promoting an American social networking mode in postcolonial conditions) combined with the material reality (truthful data required by the quest for profit). As a result, we see a troubled design that excels in effectiveness and efficiency across the globe but fails to articulate the voices of certain local users.

Indeed, seeing the discursive power on the macro level will help designers come up with wise intervention strategies overall. In this case, an exploration solely on the micro level would lead to a naïve recommendation that a better design could be devised at the time when Facebook Japan would respect local cultural values fully, outlined in the early work by one of us [56, p. 251]. However, the findings from the macro level indicate that that might hardly happen considering the commercialistic nature of a transnational corporation. Therefore a set of design strategies and tactics that only address the micro level will not be successful here.

A critical understanding of how the material and the discursive are tied together in this case does not suggest that we have to submit to the pervasive ideology and power structure. Instead, as HCI designers, we are interested in how to bring this understanding to our design process in order to empower our users. Considering the enabling and constraining characteristics of materiality, as users are

“cajoled” to present their truthful user data most of the time, they also learn how to better present and stage themselves for self-promotion. Platform owners like Facebook may need to respond to user’s needs as users can choose not to stay as long as there is more than one SNS from which to choose. For example, users could choose to maintain multiple online identities across platforms. In our personal transnational experiences, we found it more efficient to maintain different identities by utilizing different SNS technologies.

CONCLUSION

One of the design challenges we face is how to best address issues such as discursive power, cultural values, performed identities, mediated agency, and articulated voices in this increasingly globalized world in order to design culturally sensitive technology for transformation and emancipation. While we have seen the increasing appreciation for the value and role of culture in HCI design, many times culture is treated in a taxonomic manner. And the influence of power relationships has only been emphasized recently through the proposal of postcolonial computing [31, 32, 39, 47]. This might explain why much of HCI4D work stays on the instrumental level, lacking a critical and reflexive perspective. The ambition of designing for the bottom of the economic pyramid cannot be truly achieved if we ignore power struggles in those contexts and only seek technologically sound solutions. Similarly, the same empathy is needed when we design for minority user groups locally. The instrumental affordance a designer plans for may not cultivate the social affordances that would empower users and transform lives for the better.

We present our preliminary explorations on affordances as discursive relations in this paper. Building on Sun’s view of affordances as “a dialogic relation” to inform design across cultures [56], we further develop it into a view of discursive relations to particularly address critical design issues concerning identity, power, and discourse at this stage of the globalization process when power is transferred from old colonial states to transnational corporations [14]. The discursive view of affordances is primarily informed by a constitutive model of communication and a sophisticated treatment of materiality. The former brings insights to HCI design practices to examine the complex interactions between interactive technologies and the broader society surrounding issues such as agency, identities, and voices. The latter, as a reflection and an uptake of the material turn that is happening in the HCI field [e.g., 30, 49, 62] and beyond. Therefore we outline the three traits of affordances and conduct an exploration on a few cases. While most of the intellectual roots presented here are credited to the fields of communication, sociology, and organizational studies, we see they can also be traced to software studies and critical computing, and critical studies of media technologies prior to computing technology.

We hope this article will raise awareness of the struggles of identity, agency, power, ideology, and dominance in the design process through the lens of relational affordances among the HCI community. When we design a technological product, we are not just making users’ lives easier with a more efficient or effective product, nor are we merely making them happier so that they would resonate with the lifestyle the product promotes. We must also be conscious of design consequence that the introduction of the particular product will influence. We may tip the balance of a power relationship and change the status quo as well.

As a result, we will not conclude this paper with detailed design implications, but instead we will end by pointing to a positive example of systems design that takes positive social change as its primary goal.

The Mukurtu project (mukurtu.org) is a community development initiative, started in Australia for the Warumungu Aboriginal community. It has produced a web-based content-management system and a set of ethical processes for tailoring guidelines for archiving and sharing information via the CMS. The aim of the project is to provide indigenous community groups with digital resources for cultural heritage preservation as well as providing the means to do this work in accordance with community values. The project leaders recognized, from the outset, that archival work is value-laden and that information systems often have built-in assumptions about access and representation that can threaten the core goals of cultural heritage preservation work. Where communities’ ability to represent themselves—via descriptions and images of artifacts, places, and people—become threatened, so do core human values of individual and collective sovereignty.

Arguably the most innovative features of the Mukurtu CMS lie in an administrative layer (sitting on top of the popular Drupal CMS) that grants users the ability to establish customized cultural protocols for what can be seen, shared, and edited [13]. These protocols form the baseline logic for each archive/cultural heritage project developed in the tool. The result is a new workflow for the process of creating a web-based repository of digital objects that begins with setting access preferences rather than by propagating a default set of roles, permissions, and views. As the project leader Kimberly Christen reflects, those features challenge the idea that “information wants to be free,” a deeply Western value that tends to grant access and write access privileges to the powerful in ways that can seriously endanger the rights of indigenous groups to represent themselves [13].

How can we not only change the world, but change the world *for the better*?

REFERENCES

1. Albrechtsen, H., Andersen, H. H. K., Bødker, S., & Pejtersen, A. M. (2001). *Affordances in Activity Theory and Cognitive Systems Engineering*: Riso National Laboratory, Roskilde.
2. Bakhtin, M., M. (1981). *The Dialogic Imagination Four Essays*. Austin: University of Texas Press.
3. Baym, N. (2010). Personal connections in the digital age. UK, Polity.
4. Baerentsen, K., & Trettvik, J. (2002). An Activity Theory Approach to Affordance. In *Proc. NordiCHI '02*, ACM, 51-60.
5. Bardzell, J., and Bardzell, S. (2013). What is “critical” about critical design? In *Proc. CHI '13*, ACM, 3297-3306.
6. Bardzell, S. (2010). Feminist HCI: Taking stock and outlining an agenda for design. In *Proc. CHI '10*, ACM, 1301-1310.
7. Bardzell, S. & Bardzell, J. (2011). Towards a feminist HCI methodology: social science, feminism, and HCI. In *Proc. CHI '11*, ACM, 675-684.
8. Bardzell, S., Bardzell, J., Forlizzi, J., Zimmerman, J., & Antanitis, J. (2012). Critical design and critical theory: the challenge of designing for provocation. In *Proc. DIS '12*, ACM, 288-297.
9. Bloomfield, B, Latham, Y, & Vurdubakis, (2010). Bodies, Technologies and Action Possibilities: When is an Affordance? *Sociology* 44(3). 415-433.
10. Bødker, S. (2006). When second wave HCI meets third wave challenges. *Proc. of NordiCHI'06*, ACM Press.
11. Borning, A. and Muller, M. (2012). Next Steps for Value Sensitive Design. In *Proc. CHI '12*, ACM, 1125-1134.
12. Chilana, P., Holsberry, C., Oliveira, F., Ko, A. (2012). Designing for a billion users: A case study of Facebook. In *Proc. CHI '12*, ACM, 419-431.
13. Christen, K. (2012). Does Information Really Want to be Free? Indigenous Knowledge Systems and the Question of Openness. *International Journal of Communication*, 6, 2870-2893.
14. Choudry, A., Majavu, M., & Wood, L. (May 2013). Struggles, strategies and analysis of anticolonial and postcolonial social movements. *Interface*, 5(1),1-10.
15. Cosenza, V. (December 2013). World map of social networks. <http://vincos.it/world-map-of-social-networks/>
16. DeSanctis, G., and Poole, M. S. (1994). “Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory,” *Organization Science* (5:2), pp. 121-147.
17. Dourish, P. (2001). *Where the action is*. Cambridge, MA: MIT Press.
18. eMarketer. (August 3, 2012). US to Top Japan as World’s Biggest Mobile Ad Market. <http://www.emarketer.com/newsroom/index.php/top-japan-worlds-biggest-mobile-ad-market/>
19. Faraj, S. & Azad, B. The materiality of technology: An affordance perspective. In Leonardi, P., Nardi, B. & Kallinikos, J. (eds), *Materiality and Organizing: Social Interaction in a Technological World* (pp, 237-258). New York: Oxford University Press.
20. Friedman, B. (Ed.). (1997). *Human values and the design of computer technology*. New York: Cambridge UP.
21. Friedman, B., and Nathan, L.P. (2010). Multi-lifespan information system design: A research initiative for the HCI community. In *Proc. CHI '10*, ACM, 2243-2246.
22. Fuchs, C. (2012). The political economy of privacy on Facebook. *Television & New Media* 13 (2): 139-159.
23. Gibson, J. J. (1979). *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.
24. Giddens, A. (1984). *The Constitution of Society*. Berkeley, CA: University of California Press.
25. Graves, L. (2007). The affordances of blogging: A case study in culture and technological effects. *Journal of Communication Inquiry* 31, 4, 331-346.
26. Harrison, S. Tatar, D. and Sengers, P. (2007). The three paradigms of HCI. *Ext. Abstracts CHI 2007*, ACM.
27. Ho, M., Smyth, T., Kam, M., & Dearden, A. (2009). “Human-computer interaction for development: The past, present, and future,” *Information Technologies & International Development*, 5(4), URL: <http://itidjournal.org/itid/article/view/420/188>.
28. Hutchby, I. (2001a). “Technologies, Texts and Affordances,” *Sociology* (35:2), pp. 441-456.
29. Hutchby, I. (2001b). *Conversation and technology: From the telephone to the Internet*. Cambridge, UK: Polity Press.
30. Jung H, & Stolterman E. (2012). Digital form and materiality: propositions for a new approach to interaction design research. In *Proc. NordiCHI '12*, ACM, 645- 654.
31. Irani, L. Dourish, P. (2009) Postcolonial interculturality. In *Proc. IWIC 2009*, ACM Press, 249-252.
32. Irani, L., Vertesi, J. Dourish, P., Philip, K., Grinter, R. (2010). Postcolonial Computing: A Lens on Design and Development. In *Proc. CHI '10*, ACM, 1311-1320.
33. Kaptelinin, V., and Nardi, B. (2012). Affordances in HCI: Toward a mediated perspective. In *Proc. of CHI '12*, ACM, 967-976.
34. Leonardi, P. M. (2010). Digital materiality? How artifacts without matter, matter. *First Monday*, 15(6). Retrieved from <http://firstmonday.org>

35. Leonardi, P. M. (2011). When flexible routines meet flexible technologies: Affordance, constraint, and the imbrication of human and material agencies. *MIS Quarterly*, 35, 147–167.
36. Leonardi, P., Nardi, B. & Kallinikos, J. (2013). *Materiality and Organizing: Social Interaction in a Technological World*. New York: Oxford UP.
37. Lewis, S. (2012). The tension between professional control and open participation. *Information, Communication & Society*; 15(6) 836-866.
38. Markus, ML, & Silver, MS. (2008). A Foundation for the Study of IT Effects: A New Look at DeSanctis and Poole's Concepts of Structural Features and Spirit. *Journal of the Association for Information Systems*, 9(10/11), 609-632.
39. Merritt, S. & Stolterman, E. (2012). Cultural hybridity and participatory design. *PDC' 2012*, 73-76.
40. Miller, C. R. (1984). Genre as Social Action. *Quarterly Journal of Speech*, 70(2), 151-167.
41. Nathan, L. P., & Friedman, B. (2010). Interacting with policy in a political world: Reflections from the Voices of the Rwanda Tribunal project. *interactions*, 17(5), 56-59.
42. Neff, G., Jordan, T., & McVeigh-Schultz, J. (2012). Affordances, Technical Agency, and the Politics of Technologies of Cultural Production. *Journal of Broadcasting & Electronic Media* 56(2), pp. 299–313,
43. Nissenbaum, H. (2005). Values in Technical Design. In *Encyclopedia of Science, Technology and Ethics*. New York: Macmillan.
44. Norman, D. A. (1988). *The Design of Everyday Things*. New York: Basic Books.
45. Orlikowski, W. J. (1992). The Duality of Technology: Rethinking the Concept of Technology in Organizations. *Organization Science*, 3(3), 398-427.
46. Orita, A., & Hada, H. (2009). Is that really you?: an approach to assure identity without revealing real-name online. In *Proc. of the 5th ACM workshop on Digital identity management*, ACM, 17-20.
47. Philip, K., Irani, L., Dourish, P. (2012). Postcolonial Computing: A Tactical Survey. *Science, Technology, & Human Values*, 7(3), 3-29.
48. Rau, P., Plocher, T., & Choong, Y. (2012). *Cross-cultural design for IT products and services*. Boca Raton, FL: CRC Press.
49. Robles, E., and Wiberg, M. (2010). Texturing the “Material Turn” in interaction design. In *Proc TEF 10*, ACM, 137-144.
50. Selfe, C. L., & Richard J. Selfe, J. (1994). The Politics of the Interface: Power and Its Exercise in Electronic Contact Zones. *College Composition and Communication*, 45(4), 480-504.
51. Slack, J. D., & Wise, J. M. (2005). *Culture + Technology: A primer*. New York: Peter Lang.
52. Spinuzzi, C. (2003). *Tracing Genres through Organizations: A Sociocultural Approach to Information Design*. Cambridge, MA: MIT Press.
53. Sun, H. (2004). *Expanding the scope of localization: A cultural usability perspective on mobile text messaging use in American and Chinese contexts*. Doctoral dissertation, Rensselaer Polytechnic Institute, Troy, NY. http://www.localisation.ie/resources/Awards/Theses/sun_diss.pdf.
54. Sun, H. (2006). The triumph of users: Achieving cultural usability goals with user localization. *Technical Communication Quarterly*, 15(4), 457-481.
55. Sun, H. (2009) Designing for a dialogic view of interpretation in cross-cultural IT design. In *Proc. HCI International 2009*, 4, Springer-Verlag, 108-116.
56. Sun, H. (2012). *Cross-cultural technology design: Creating culture-sensitive technology for local users*. New York: Oxford UP.
57. Tayoma, K. (2010). Human-Computer Interaction and Global Development. *Foundations and Trends in Human-Computer Interaction*, 4(1), 1-79.
58. Torres, I. (June 6, 2013). Japanese netizens seen moving away from Facebook. Available at <http://japandailynews.com/japanese-netizens-seen-moving-away-from-facebook-0630137/>
59. Treem, J.W. & Leonardi, P.M. (2012). Social Media Use in Organizations: Exploring the Affordances of Visibility, Editability, Persistence, and Association. *Communication Yearbook*, 36, 143-189.
60. van Dijck, J. (2013). ‘You have one identity’: performing the self on Facebook and LinkedIn. *Media, culture, & society*, 35(2), 199-215.
61. Vyas, D., Chisalita, C., & van de Veer, G. (2006). Affordance in interaction. In *Proc. of the 13th European conference on Cognitive ergonomics*, ACM, 92-99.
62. Wiberg, M., Ishii, H., Dourish, P., Vallgård, A., Kerridge, T., Sundström, P, Rosner, D., and Rolston, M. (2013). Materiality Matters. *Interactions* 20, 2, 54-57.
63. Wellman, B., Hasse, A., Boase, J., Chen, W., Hampton, K., Diaz, I., & Miyata, K. (2003). The Social Affordances of the Internet for Networked Individualism. *Journal of Computer-Mediated Communication*, 8, 3, 0-0.
64. Winner, L. (1980). Do Artifacts Have Politics? *Daedalus*, 109(1), 121-136.