Processlessness: Staying Open to Interactional Possibilities

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ABSTRACT
Technologies increasingly inhabit evermore mundane and personal settings, a fact that has caused some designers to reflect upon the emergent, inaccessible nature of context. We present the notion of *processlessness* as a design value. The examples given here are intended to provoke thought about current design priorities and practices, and spur design discourse regarding the issue of context. Two cases illustrate how the absence of process in mediating artifacts can make room for users to discover, construct, and reconfigure context through and around their technologies. This argument is related to the notion of Zensign, that what we omit from technology designs is as important as what we put in; by adding features to computational systems, designers might be removing interactional possibilities.

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INTRODUCTION
Years ago, Weiser predicted a future in which technologies would become so pervasive and ubiquitous that they would disappear into the fabric of everyday life [12]. Today, indeed, the use of technologies is no longer bounded in workplaces, but is increasingly integrated into every aspect of our lives. Consequently, context becomes critical in system design. How system designers view context and how they account for ever-changing context in system design is becoming a key focus of design discourse [2].

In response to this, researchers and designers have been trying to design systems to be open for appropriation and interpretation. For instance, Höök et al. suggest making the representation of systems' internal mechanisms transparent to users as a way to enable user appropriation [5]. Dourish lists three approaches for supporting continually manifested and interactionally defined context in system design [2]. He argues for making systems that display their context and support "deep customization" at the architectural level. In addition, he proposes separating information from the structure in which the information is organized.

In this work, we provide an additional way of thinking about designing technology that is open to multiple interpretations and appropriations. In opposition to the long established computer science tradition of system design that values the full capture and automation of processes, we support an alternative. At least on some occasions, the intentional omission of process can open up new possibilities for interactions and experiences. Processlessness in this sense can afford a wider range of contextualized meaning-making opportunities than process enforcement. Instead of making processes visible to the users [2,5] and creating internal mechanisms to enable deep customization [2], we add another alternative; we argue that leaving out automation and minimally embedding processes into the system are viable design approaches that designers should consider.

Drawing on the teaching of Tao Te Ching, "practice not-doing, and everything will fall into place [7]," and Zensign, the idea that what we leave out of a design is as important as what we put in it [11], we propose *processless design* as an important alternative to existing design thinking.

PROCESSLESS DESIGN
What do we mean by *processless design*? Imagine that you sit down to play a game of cards—physical cards, not digital ones. You start dealing a game of *Solitaire*, but you could very well take up a game of *Gin Rummy* with a friend or even make up your own card game. You choose to deal the cards and play according to your favorite house rules, and sometimes you choose to break those rules. In a different scenario, consider that you sit down to a computer to play cards, in which case you likely have to choose between a game of *Solitaire* or *Gin Rummy* by explicitly selecting the appropriate program. The digital card deck will be dealt for you, the cards can only be moved according to strictly encoded/embedded/implemented rules that cannot be negotiated or changed mid-game, you will be told when the game ends and if you have won or lost, etc. The difference between these scenarios is what concerns us in this note.

The design of the physical card deck provides affordances that allow the player to appropriate the cards in the deck

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flexibly. The game begins and ends, proceeds by rule or against it, and takes on meaning for which you, the user, are largely responsible. In contrast, the designers of the digital card game often encode, embed or somehow implement—and therefore solidify—the process of the game into the digital artifact, such that by playing with the cards you are subscribing to the rules, processes and world the designers have created for the users.

Physical card decks allow the values of the user to be brought to bear on such open questions as "what is (are) the purpose(s) of this game?" and "what rules should I follow and when?" These questions can be asked and answered in the context of playing the game. But in digital context, the answers to these questions are largely fixed and enforced.

Processless design does not suggest that interactional process is located solely in the artifact, and hence fully defined by the artifact's built-in features. Process as a larger phenomenon is always interactionally defined, managed, negotiated and recreated in the moments of use. People and artifacts co-define process as they constantly reconfigure each other in situ [10,13]. Yet, by trying to encode and rigidify the processes at design time, designers might be depriving individuals of opportunities to create more diverse, tailored, and appropriate processes in situ. In this sense, processless design is not about removing processes from holistic human-nonhuman interactions, but rather it is about redistributing some of the process-making activity to the users, times and places in which the artifacts are enacted.

As we describe in more detail in future sections, there is no such thing as pure processless design; all artifacts impose some form of process and meaning on their use. We are instead suggesting that there are degrees to which process can be embedded in a design. The notion of processlessness is proposed as design vocabulary that can help designers evaluate existing designs and inspire new ones.

PROCESSLESSNESS IN ACTION

This section reports two cases that inspired us to envision processless design.

After school game club

In the winter and spring of 2008, we conducted an observational study at a local middle school in an effort to explore and compare the interactional properties of playground-like games [11] and computer-based ones. While these exploratory field observations served as a small-scale, complementary addition to a large, multi-year investigation on varying issues of computer-mediated coordination among co-located people (e.g., [6, 11]), the study provided us with an important opportunity to learn the rich, multifaceted nature of face-to-face interaction.

With permission from the school and a supervising teacher, two researchers attended the extra-curricular gaming club sessions once or twice a month for 6 months to observe and investigate how middle school students play various types of board/card games.

The gaming club was held every Wednesday after school hours. A typical session lasted an hour and a half to two hours. About 20 students regularly attended the gaming club. Students ranged from 11 years old to 16 years old, and from sixth grade to tenth grade. With help from the supervising teacher, we were able to get parents' consent and children's assent to video record the gaming sessions.

During a typical session, students were divided into three to four groups and played games of their choice. Groups were spread out and set up at different tables or seating areas in the classroom. In an attempt to construct the study in a minimally obtrusive manner, researchers refrained from engaging in any formal interactions with the students. By placing and fixing one video camera faced at one gaming area and leaving all other areas free from the recording, we were able to ensure that students who did not want to be video recorded could still participate in the gaming club.

Figure 1: Students and a teacher playing Settlers of Catan

Case 1 – a boy who kept playing the game

One afternoon, Aaron, Dale, Olivia and the supervising teacher decided to play a board game, *Settlers of Catan*. In this game, players take on the role of settlers, each trying to expand one's colony by building settlements, roads, and cities by acquiring and trading resources. Players are rewarded victory points as their colony grows, and the first player to acquire a pre-agreed number (typically ten) of points wins. A typical game board represents a hexagonal island composed of multiple hexagonal tiles of different land types that produce different types of resources.

Aaron, Dale and the teacher had previously played the game but Olivia seemed new to it. She asked the boys about the rules at the beginning of and throughout the session. The boys and the teacher helped her with the rules and strategies throughout the game. Players sat on a couch around a coffee table (Figure. 1).

Towards the end of the game, by acquiring the longest road card, a card worth two victory points, from Olivia, the teacher reaches 10 points for a win and declares that he has won. However, as the teacher declares his winning, Dale

challenges the teacher by showing the teacher and the group that he had already won the game five turns ago. Amused by Dale's lighthearted deception, the teacher says, "look at this guy," and the group laughs all together. This scene is portrayed in the transcription in Excerpt 1.

Teacher: I will build a road
..and I will
..turn in two more for another brick
..and build another road
..which unfortunately means that I get the longest road for the moment
((Teacher takes a longest road card from Olivia))
Teacher: wait two four six eight nine
..nine ten ***((Teacher counts his victory points))***
Dale: I beg to differ
Teacher: what do you mean
you already won?
Dale: yeah I won like five turns ago
Teacher: well you didn't declare it then
you didn't win officially
Dale: oh but.. we tie then
Teacher: look at this guy
((Everyone laughs))
Olivia: <X inaudible X>
Teacher: I guess that's the game
..probably perfectly timed too
..cause we need to we need to clean up
..did you want to take one more turn though?
((Teacher looks at Olivia))
Olivia: no
Teacher: ok let's go ahead
we just need to put our pieces away
Teacher: chu chu chu ch=eater=
Dale: haha what I.. I let you.. I let you guys
Teacher: cheater land
((Everyone laughs))

Excerpt 1: Transcript of Settlers of Catan gameplay

Strictly speaking, the game should have ended when Dale earned 10 victory points. Yet, Dale kept playing the game without announcing his winning, which in the end created a fun and extended game playing experience for the team. Even when the teacher says "chu chu chu ch=eater=", he says it in a playful tone, evidence that the group or at least the teacher was enjoying the extended gameplay. It is clear that for this group, winning was not the sole goal of playing the game. This becomes even more evident when the teacher asks Olivia if she wants to play one more turn. Again, at this moment, everyone in the group knows that the game has ended. Yet, the decision to play one more turn was left up to the group. The processes of computing the victory points and determining the end of the game were *not* embedded into the gaming artifacts, but left to the players to negotiate and decide.

Observing this group of players shifting and tweaking the rules of the game made us think about the limitations that digital games often impose on players. By encoding and enforcing the rules—those for keeping track of victory points, managing resource distribution, and determining the winner—into the system, we can certainly automate the entire process to make it faster, more efficient, and more accurate. Indeed, an online version of *Settlers of Catan* does keep track of victory points, manage resource distribution, and determine the winner. However such a *processful* system would not have given Dale a chance to conceal his win and continue playing the game. The purpose of playing the game is not just bound to determining the winner, but encompasses a wider range of possibilities. For Dale, whether it was for his own sake or for that of others, continuing the game play until someone declared his/her winning and countering the legitimacy of the winner was clearly another purpose of playing the game at the moment.

Case 2 – a man who made cartoons while he worked

In the previous example, we explored how a non-computational gaming activity can offer much flexibility and suggested that its computational counterpart greatly constrains that activity by embedding process. But is there an alternative for computational systems? Is it even possible to mimic real-world flexibility in computational systems that are by their very nature process-oriented? We address these questions with one example of a computational system that accomplishes flexibility by leaving room for users to build their own processes and meanings around it.

Our example rests in a system called Reboard [1]. Unlike the previous examples, Reboard is not a gaming system. This choice is intentional, and allows us to show that the notion of removing processes from computer systems is relevant beyond the domain of playful games. Reboard is a system intended primarily for work and the workplace.

ReBoard is a networked camera system that augments traditional, non-digital whiteboards. When one writes or hangs new content on the whiteboard, ReBoard takes a new picture of the board and saves it on the network. These successive snapshots of the whiteboard are made available through one touch interactions that enable the user to print the image to paper or to view, email, save, or share the image in digital format.

In a study of Reboard in an office environment, researchers found that a number of unique and unforeseen processes, or "workflows," were opened up by the flexible nature of the system [1]. One particularly interesting use of ReBoard was one user's playful appropriation of the sequential still shots produced by the system to create a cartoon animation. In an episode that spanned multiple weeks and more than a dozen scenes, the user illustrated an alien walking across the board accompanied by a spaceship that hovered and blasted (that is, erased) unneeded board content (Figure 2).

By providing a set of primitive functionalities relatively unhindered by process, ReBoard enabled the user to recast the system from a whiteboard capture tool for work to a hand-drawn animation tool for play. This is similar to the way that one might recast physical cards in a deck as ob-

jects for stacking (as when building a *House of Cards*) or tossing (as when playing the game *Cards in the Hat*). The system made room for user-defined processes to develop and flourish around it.

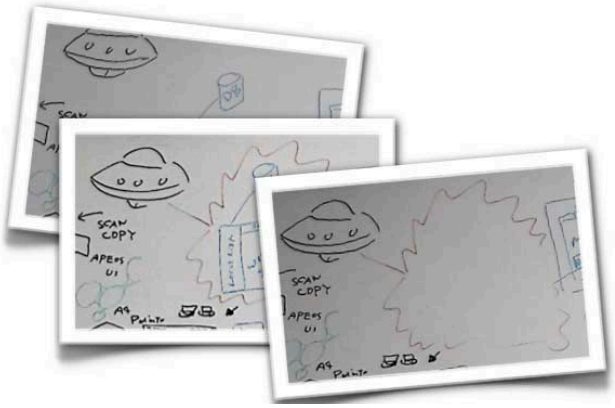

Figure 2: Three frames from an animated whiteboard

Is ReBoard fully processless? We think not. By definition, ReBoard operates in predefined ways according to the coded design intentions of its programmers. For that matter, neither are a physical deck of cards and a *Settlers of Catan* board game completely devoid of process. These artifacts have constraining affordances that (in Don Norman's [8] sense of the word) suggest certain modes of interaction and (in Gibson's [4] sense of the word) physically enable and disable other interactions. Even so, ReBoard abstains from obtruding the kind of process "features" that might be suggested by simplistic implications from the study of its use. If one took the example above as motivation for adding increased support for animation, the multiple other uses of the system that were observed would likely become less apparent and even less possible. Thus, the matter of being *processless* as opposed to *processful* is one of degrees.

CONCLUSION

It is not just the *structure* of information, as Dourish suggests, that "emerges in the course of a users' interaction, rather than having to be specified all at once or in advance (p.27, [2])." We have shown that *processes* around the artifacts also emerge in the course of users' interaction.

Processless design is related to Sengers and Gaver's idea of staying open to interpretation [9] and Gaver's idea of viewing ambiguity as a resource for design [3], in that they all support leaving room for multiple interpretations of the designed artifacts. Yet, the idea of processless design differs from the other two in at least three ways. First, processless design does not necessarily draw attention to the limits of the system's interpretation and includes no explicit call for reflection or differentiated experience on the part of the user. Second, processless design describes the mechanism by which designers can encourage user participation in meaning-making—by explicitly leaving out process. Third, processless design is not just about the interpretative relationship between the user and the artifact; it is also about appropriation, or how individuals create and negotiate activities around the artifacts.

Contrary to intuition and somewhat paradoxically, by adding more features to computational systems, designers might actually be removing interactional possibilities. We believe that processless design can support the ability of users to construct more spontaneous, opportunistic and meaningful experiences.

"*A designer knows he has achieved perfection not when there is nothing more to add, but when there is nothing left to take away." - Antoine de Saint-Exupéry*

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