Postdigital Efficiency in Interaction Design

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Abstract. The analysis discussed here of the making of Punchdrunk's productions *The Drowned Man* explores the influence of an immanent perspective on interaction design, where participants are primarily modelled in terms of their agency, rather than according to reductive demographic principles that enforce a transcendent perspective where participants are represented as fixed categories describing instrumentalised perspectives on identity. This aspect of the immanent perspective on interface design, which might also be termed postidentitarian, draws on the posthuman discourse and calls for a definition of efficiency that is based on extended and idiosyncratic agency, supported by detailed articulation of actions, and for the development of interactive systems that have enhanced capacity to parse and facilitate emergent interaction.

Keywords: Interface design, interaction design, postdigital design.

Introduction

A post-Cartesian, embodied definition of the 'user' or participant in interaction design as a cognitive component to be included in the materialities of computational technology repurposes a historical precedent. The term was initially employed to describe persons working with computing, or calculation (United States Congress 1890, 247), often performing repetitive mathematical operations to exacting standards. Early electronic computation was intended to enhance the exactitude of such operations and simultaneously relieving human workers, prone to boredom and inexactitude, of tasks that could be automated.

Within the transcendent digital mythos of intelligent systems that dominated the conception of technology in the latter part of the 20th century, the guiding ideology of efficiency, defined as the avoidance of wasting materials, time or energy, positions the user-participant as an inferior subject, imperfect and subject to the imperative of learning how to operate within systems in which their participation is already reductively modelled, or, less imperfectly, as compliant with a set of objectives closely defined by the system narrative. The conceptual reliance and incorporation of human agents in digital systems is established in computer science as the study and implementation of human-based computation, e.g. natural human computation or swarming platforms, both of which take a transcendent perspective on human participants; in the first example by instrumentalising pre-existing human behaviours (Estrada and Lawhead 2014), and in the second instance through outsourcing problem solution to crowds or swarms of human participants, regarded as collective intelligence in relation to specific problems (Rosenberg 2015). While superficially attractive as approaches to augmentation of digital computation via the inclusion of compartmentalised human computation, limitations are recognised and subject to critique, including the observation that participation in crowdsourcing platforms for generating solutions to specific problems can fall rapidly after an initial spike in interest, with the majority of activity being performed by small subgroups (often associated with the designers of the platform) driven by special interests who remain engaged throughout (Jafarinaimi et al. 2014). The efficiency of human-based computation – and participation – within a transcendent design paradigm thus warrants questioning.

In contrast to the transcendent perspective on efficiency of human-based computation in interaction design according to the aforementioned models, the analysis discussed here, based on an ethnographic study of the interaction design and making culture of the 'immersive' theatre company Punchdrunk, suggests an 'efficiency' that is also based on distributed agency and human participation, but which regards the moment of interaction and its design within an immanent perspective, or "method designing" (Interview with PD company 03 2014). In interaction designed within an

immanent perspective, the efficient interaction is based on optimised experience potential as a function of the dynamic and situated articulation of the interaction and response capacity of participants in the moving instance.

The interface: affording and regulating

The focus of the study of the interactive productions by theatre company Punchdrunk, with which the author worked as a researcher/designer 2010-2014, was to investigate Punchdrunk's interaction design and how it was experienced by participants, using ethnographic methods. The interaction design of Punchdrunk, which stretches across physical and digital interfaces, often with blended reality narratives, aims to envelop the audience participant physically and psychologically, while casting them as 'cameras' or editors of their own experience (Ersoy 2013). The physical theatre sets constructed by the company are generally realised in large disused buildings, with the last major productions (*Sleep No More* and *The Drowned Man*) comprising 100 and 170 fully realised, interactive installation rooms, respectively. Their digital (and multimedia) blended reality projects in recent years include *Silverlight* and *The Borough,* which are based on the diffusion of the boundary between the story world and physical world for one participant at a time. In the case of *Silverlight*, the story interface was carried by a game app for smartphone, and, in the case of *The Borough*, audio guides.

In Punchdrunk's methodology, both single-participant projects like *The Borough*, and large-scale productions like *SNM* and *TDM* conceptualise audiences as material to the completion of interaction. The main focus of this research was the large-scale physical productions, as robust, three-dimensional, interactive storyworlds, populated on a regular night by up to 600 participating audience members plus a cast of 35 performers and an additional backstage and stagehand crew of 55. The scale of these productions has contributed to producing a pragmatic and artistic approach to modelling participants that is applicable to interaction design as a broader discipline. In interviews with company members, the flows and forces created by audiences are often discussed in terms resembling fluid dynamics (Interview with PD company 01 2014). Audiences (who number 400-600 per performance in the large shows) operate within the interactive system as co-opted agents in a 'mirror choreography', the larger flows of which being shaped and timed by the architecture and detail of the set and the coordinated movements of the cast across the space. Black Masks, acting narratively within the set in the double capacity of stagehands and moderators of audience interaction, mediate between the authorable part of the productions (set and cast), and the emergent part (participating audience members).

Conceiving of the audience as material to the completion of interaction suggests that the interaction design of the company could be considered as part of the proposed "psychotechnics" of cognitive capitalism (Parikka 2012, 73), although Punchdrunk's work is differentiated by key acentric features, including the conceptual modelling of participants as agents, independent of their identity-as-category. In place of identity, Punchdrunk models audience members in terms reflecting the distributed agency of the posthuman discourse (Hayles 2002; Braidotti 2013) and Deleuzes's "postidentitarian philosophy of difference" (Cull 2012, 17). Participation is anonymous, with audience members being masked and asked not to speak while navigating a deliberately disorientating experience, the aim of which is to destabilise quotidian identity. Questions of identity and subject-event relationship thus emerged as central to this analysis, with a bifurcation forming around whether the designed interaction occurs within an immanent or a transcendent perspective. The immanent subject-event relationship in interaction design can be defined as close range and emergent, with the particular qualities and topographies of the moment of interaction being critical to its unfolding. Bearing upon this unfolding are the possibilities within both interface and participant, many of which by necessity having to remain unarticulated, that lend the moment of interaction qualities that simultaneously intrigue and frustrate. Surplus experience potential emerges in interviews as key to the attraction of the interfaces designed and built by Punchdrunk. Together with the scope of the sets, surplus experience potential is given physical form by a depth of detail that offers apparently inexhaustible affordances. This allows the audience to suspend disbelief, and participants who claimed to be 'cynical' about alternative forms of theatre and performance felt supported and reassured by the level of detail:

> It felt like…it was a high, yeah, because of the detail of the sets. It made me feel like I had more trust in them to give me a good experience. So, you know, I was really impressed by…the different sets, the thick sands, the desert set was really cool, and the attention to detail in the rooms (Interview with PD audience 02 2014).

The richness of detail counters the narrative of optimisation via reduction of resolution, and generates, together with the deprioritisation of identity, conditions of possibility for participants that are characterised by their undefined extension. To achieve a sufficient level of detail across the sets to engender this response, one part of the production team designs and builds the sets and the detail, while the other creates the choreography and performances in tandem. The design team, within which the author participated for the build of *The House Where Winter Lives* and *The Drowned Man,* subdivides architecture and detail, with the former division primarily focusing on the shaping of the physical space, and the latter on the creation and layering of texture and 'dressing' of the set with tactile and interactive detail. The performance and choreography team rehearse on other premises until the performance space is sufficiently formed for on-site rehearsals. From that point, actors/dancers, as well as set and detail designers, devise and develop the production on-site.

Attention to minute detail is key to both teams, with iterations continuing throughout the run to both set and acting in response to observations made during live performances. Distributed agency characterises the development of detail, with individual actors and designers in direct contact with the interface and audience participants being at liberty to respond and adjust to materials and situations that are presented during the creation and running of the production, thus building the layers of meaning that support audience participation and exploration:

> Because the details are so…the wrong detail could shatter everything, and the right detail could… You know, the wrong word is like playing the wrong note in the key, it just doesn't… But then the right way can be so suggestive, just draw you into that world in such a powerful way. It's just…all about details and accumulation of many, many, many, many details; and many, many small decisions, and the decisions that haven't been made, as well, the decisions not to do something; that would be the expected thing to do. The notes that we aren't playing, or beats that we aren't playing, those are really important decisions (Interview with PD company 01 2014).

Layered detail is here identified as key to the psychological immersion of participants, which is followed through in the performance of an often overlooked, but important part of Punchdrunk's interaction design. The Black Masks, who would normally be regarded as stagehands, are important components of the responsive capacity of the interface in a regulating role, that has been formulated to support the overarching narrative of distributed cognition. They are dressed and masked in black, and stay hidden within the already dark set until intervention or guidance is needed, giving audience members who encounter them the impression of diffused agency, with the 'set' extending and blending with their own agency:

> I definitely felt like most of the decisions, like the control was kind of in somebody else's hands, and I had a diminished control […] Like being a spectator and an actor all at once […] the stuff you do have to decide on is completely personal, but where your body is isn't […] I wanted to be in the machine, in the software, I wanted to work with the algorithm, however you want to put it. I wanted to function, I didn't want to be the glitch that was in the bar, I wanted to function along with the rest of the machine that was going on, that was also a narrative (Interview with PD audience 02 2014).

The psychological immersion experienced by this participant was enhanced by the sense of distributed agency and the diffusion of personal boundaries within the set that occurred through the regulation of their actions by Black Masks. This response conforms with the sublime experience that results from the impact of entrapment and the experience of entanglement in the artwork-as-trap (Chow 2012, 47), discussed in some detail below. The postidentitarian difference suggested by Cull as informative of immanence is here exemplified by the extended agency of the interface, blending with the agency of the participant. Although emergent in unscripted situations, this particular form of merging-with and regulation-of audience actions is based on responsive articulation, much like set design and acting are, with emphasis placed on haptic interaction. Words are not used; the Black Masks are silent, and invisible apart from if and when their interventions are necessary. Their training incorporates techniques with which they can blend in with, and influence the embodied narratives of individual audience members, without pulling them out of psychological immersion:

> So you don't walk with the usual gait. Very slow and sort of within keeping with the show […] you want to blend in, so if you start, you can't run […] it's very calm, almost like someone's about to brush past you. And then you can…what we normally do, is going up behind them, hands on their shoulders and grip, and just gently pull back,

and you get them to move […]. And there was another thing where, if you wanted to walk with someone, you could sort of run…so, put your arm down, just put your arm down by your side. You would do that and just lead them, keep that elbow contact, so all your forearm is touching […]. You're keeping them quite close to you, and you would be able to steer them as well, with that forearm contact (Interview with PD company 02 2014).

A postdigital efficiency that draws on the posthuman discourse needs to open the 'Wizard of Oz' curtain in interaction design that obscures the human processes that are required to complete interactions and produce immanent responses (Dow et al. 2007, Dixon et al. 2012), whether they occur under the control of the designed experience or are outsourced to user-participants. Participant computation, currently often outsourced as an externality, comprising not just cognitive labour but also drawing on the social and cultural narratives that bear upon the cognitive processes of participants, needs to be incorporated and accommodated within the factors regarded as material to interactive systems; particularly as they allow for an alternative 'optimisation' or extension of experience potential. To this end, participants are better modelled in terms of their agency, i.e. their extended capacity. Modelling participants as data objects will, by virtue of the differential nature of the human condition, be reductive, with the process of reduction being informed by representational hierachies. In an alternative view, the interaction may be regarded as an instantaneous articulation of the entanglement of system and participant narratives extending beyond the instance of interaction, thus potentiating the experience of emergence. Achieved not through the impossible articulation of all possibilities but through the design of interactions that narratively hold the complexity of possibility in their detail, the excess experience potential that results from this approach to interaction design generates a different form of efficiency, the effects of which can be seen in the unusual degree of commitment to the experience that is demonstrated by Punchdrunk audiences.

Embodied responses by participants

Audience responses: action descriptors	Percentage of total
Descriptors of cognitive processes (e.g. understand, learn, figure out, discover, find out, think, believe, suppose, guess)	31.8
Descriptors of embodied exploration (e.g. walk, move, wander, lead, run, chase, see, look, gaze, watch, feel, sense, experience)	26.7
Descriptors of synthesised/processed actions (e.g. talk, describe, articulate, pretend, dance, create, work, challenge, question, build, design, control, adapt, decide, contact, approach)	23.8

Table 1. Action descriptors extracted from interviews by the author with participants (n=12) in Punchdrunk's *The Drowned Man* 2013-2014. Subcategories of extracted action descriptors were grouped into three overarching categories; descriptors of primarily cognitive processes, descriptors of embodied exploratory activities, and descriptors of processed and synthesised actions in response to the interactive environment.

The prevailing sense of intrigue, driven by the impossibility of exhausting all possible avenues in a given moment of interaction, that draw large numbers of audiences throughout production runs lasting 1-5 years (with many audience members returning dozens of times), evidences the 'efficiency' of narrative complexity and the careful balance of satisfaction and frustration in Punchdrunk's interaction design. The combined effect of complexity, satisfaction and frustration can be compared with Chow's concept of the artwork as a trap in which the captivated audience fulfils the trap's design (Chow 2012, 43). Thus ensnared, the audience is subject to the sublime experience from the compund experience of impact of entrapment and fear of annihilation, or dissolution of self, within the trap (Chow 2012, 47). Within the 'traps' presented by Punchdrunk productions, participants respond with action strategies that are primarily

associated with understanding and exploration through cognitive and embodied extension, closely followed by processed and synthesised responses to the situations they experience (table 1).

This analysis was based on discourse analysis of interviews with participants in the production and experience of Punchdrunk's interactive systems. Action descriptors were extracted to identify key features experienced as important, and descriptors with similar or closely associated meaning were grouped in subcategories. Subcategories of action words were organised in larger groups, forming three overarching categories that describe different types of actions. The largest group of action descriptors were those associated with processes of a primarily cognitive nature; e.g. problem solving and reflection. The second largest group of action words described embodied explorative actions, involving perception and physical movement. The third largest group was formed by descriptors of actions that were expressions of process or synthesis in response to the given circumstances. The three groups were relatively close in size, with the cognitive actions forming just under 1/3 of action descriptors, and the other two forming just over and just under 1/4 of action descriptors (table 1). Taken together, the three groups describe a general tendency to gather and process information for responsive expression, which, against the background of excess experience potential generating what was described as trust and the suspension of disbelief, suggests that significant and persistent voluntary participant engagement as a postdigital 'efficiency' metric in interface design can be regarded as a product of the facilitation of emergent behaviours.

Conclusion

The expression of actions in relation to affordances offering cognitive challenge, affordances for sensory and embodied experience and opportunities for creative expression in response to the situation in this study (live participation in Punchdrunk's *The Drowned Man*) was fairly balanced and together formed over 80% of action descriptors. As participants in this study all framed their experience in positive to extremely positive terms, these groups of action descriptors (seeking to understand; embodied and sensory exploration; responsive or adaptive expression) may be proposed as key emergent behaviours in successful immersive interaction design. Participants, conceptualised as essential parts of the interaction in Punchdrunk's interaction design, perform as such in their capacity to search for, compose, synthesise and respond to information embedded within the interface, and could be viewed as 'computers' (as per the 19th century profession) within the system. However, in line with progress made in the field of computation and artificial intelligence, and moving beyond the subordination of the human as a lesser component in the transcendent digital mythos, the role of the postdigital human 'computer' (or participant in interactive systems) should not be conceptualised according to their ability to conform to exactitude and generalisable standards, but in terms of their agency. In its inception, the automated computer was intended to relieve human operators of relatively menial tasks that demanded monotonous and exact replication; postdigital interaction design needs to define a trajectory that deviates from this intellectual heritage, and not seek to impose fixity when defining human participants in interactive systems through the way that they are modelled: it should facilitate emergent behaviours.

A postdigital efficiency, based on persistent and voluntary emergent participant engagement, needs to incorporate the participant computation that is otherwise outsourced as an externality, at best conceived of as optimal when minimal (as per the traditional usability or user experience paradigms), and at worst disregarded. The idiosyncratic social and cultural narratives that bear upon the cognitive operations of participants can be regarded as valuable to the cognitive labour of participant computation, by virtue of contributing to the extension of experience potential. Here, the immanent, close-range and emergent design perspective ("method designing") is essential, and the preservation of situational specificity, including designing for the impossibility of exhausting all possibilities. An alternative, then, to an inherently totalising perspective on the participant in interactive systems is the turning away from their definition based on fixities, including identity, and reductive definitions of efficiency that are formed with a view of agency as problematic, and instead designing interactions that are openly inclusive of differential participant agency, regarded as essential to the extension of experience potential.

Additional Information

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