SIGCHI Extended Abstract
File: <u>Hacking Creativity</u>

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Abstract

This abstract introduces my academic and personal background and briefly describes my sociological PhD project on technical creativity and inventiveness, featuring ethnographical field studies of hackathons. Although primarily an empirical research project, I try to conceptualize my findings with abstract theoretical framework concerning the (social production of) technical creativity and inventiveness. I present my preliminary findings on how hackathons, conceived as particular social situations, constitute a fruitful environment for creative, inventive (social) practices. Namely by the openness of communication, the diversity of participants, and their specific, short-period temporality.

Author Keywords

Hackathons; Sociology; Creativity; Collaboration

ACM Classification Keywords

• **Human-centered computing~Collaborative and social computing theory, concepts and paradigms** • **Human-centered computing~Social engineering (social sciences)** • *Human-centered computing~Collaborative and social computing* • Human-centered computing

Introduction – Personal and Project Background

After finishing my M.A. in sociology, I have joined the Munich Center for Technology in Society (MCTS), the first German "Science & Technology Studies" (STS) institute, as a graduate student. As a technology enthusiast, I am intrigued by phenomena of technical invention. Hence, I combined this personal interest with my academic profession and am investigating how invention happens and is done, from a sociological perspective. This is a complex question, taking into account the phenomena of inventing and thinking 'new' ideas in the absence of a concrete, plainly given problem. For the contrary scenario is rather a commonplace: people who think of solutions when facing a particular problem, defined by a present problem situation. My empirical access to the social dimension of technical creativity lies in the observation and participation at hackathons and similar events. For they claim to foster creative and inventive ideas.

Hacking Creativity

As indicated, my research project is empirically focused on hackathons concerning the investigation and understanding of meaning and setup of social situations around technical creativity and inventiveness. Thereby, I follow two different research tracks: one that tries to sociologically understand practices and structures within and around events like hackathons, and how creativity is articulated and used as an end, mean or (symbolic) resource. And one that tries to rethink sociology as an 'applied science' that can contribute to a technical understanding of creativity by providing insights in the mechanics and requirements of 'social creativity'. Creativity is, in general, a very fuzzy term. This can be very confusing for one who tries to use creativity as an empirical, scientific concept. For creativity, even defined as technical inventiveness, still cannot be properly operationalized. Nevertheless, 'technical creativity' is, epistemologically, more disposable for it features the differentiation of 'works/works not'. Furthermore, 'creativity' here is identified with all outcomes that, somehow, surprise, i.e. results that had not been expected. This is also a qualitative operationalization that takes into account not only coded results but also new ways of reinterpreting outcomes. Although a tautology, it is a viable sociological approach for, functionally, it does not matter in how far something might 'actually' be creative but how and whether creativity can be successfully attributed as a (socio-economic) quality. This common conceptualization thus also integrates my two research tracks.

However, this abstract highlights the latter, 'applied' track of my research. I ethnographically studied seven hackathons, applying methods of hidden, participating observation (i.e. taking part without revealing my actual research intentions). During those hackathons, I have learned a lot about the explicit and implicit diversities of hackathons, how they integrate different types of participants, e.g. designers, coders, citizens, different experts, professionals, enthusiasts and stakeholders) and topics (open data, AI, IoT, public issues, media and even music); but also how they differ regarding the setup of issues: giving defined tasks and problems to the participants, offering mere thematic frameworks or assigning the invention/discovery of new (possibly) problems and issues. Although hackathons cover all kinds of open/defined problems/solutions and tinkering, my research is focused on the 'creative' aspect of open, non-defined (not ill-defined!) problems.

The more 'present' and (however)-defined problems are, the more they are accessible to systematic, logical structuring. Hence I suggest that the specific, peculiar, and 'abductive' perspective of sociology can shed some light on processes that do not happen on an explicit level and therefore are incommensurable to classical, deductive(-nomological) research approaches.

I have also been able to analyze some of the social mechanics of hackathonian collaboration that render those events 'creative' and to identify first requirements of creative hackathons that produce something 'new'. I have conceptualized three of those hackathonian creativity features (or requirements) that go beyond the ergonomically informed organization of hackathons like starting with knowledge assessment units (e.g. keynotes): Ideational and communicative openness, instant diversity of participants, and short-period temporality.

Ideational and communicative openness refers to the particular capacity of hackathons to set up a realm of low-threshold compatibility of ideas and communication. The presented, communicated and offered ideas by each participant are likely to be accepted as a (proto-)productive contribution. It is yet hard to explain this particular hackathonian feature but the hackathon-typical emphasis on amusement and fun (I call this: 'funnification') is probably one main reason of this open, casual atmosphere. Although it is no imperative, 'funnification' seems to work like an informal hackathon code of conduct. I have, with all studied cases, observed that even virtually rejected ideas were discussed in a friendly and appreciating way. This results, however, in more than mere social convenience; it is often a vital requirement for

unexpected resumptions of ideas, either by trying to somehow integrate such ideas into one's own thinking or by looking for productive aspects of the idea which often differ from the interpretation of the original contributor. Furthermore, original contributors tend to accept and follow those reinterpretations. Those highly irritating and perturbative interaction-structure then leads to project developments and drafts that were not expected by the participating individuals and thus lead them on tracks which each of them alone would not have followed.

However, the utility or integration of such results is another issue. Often (external) hackathonian projects fail to transfer their results into established organization contexts of e.g. greater companies. Vice versa, hackathonian projects work well and even long-term in private or start-up contexts. Hence, this is less a genuine difficulty of scaling time from the event to a continual elaboration but an issue of discrepancies between instant conceptions and established organizations which operate under certain standards.. E.g. one hackathon was won by my team and it was part of our prize that we were given the opportunity to present our project idea to the sponsoring company. However, there was no proper format to integrate our project and work into the static structures of that organization. Although there was interest in our ideas and suggestions, they were almost complete incompatible to this company's technical and organizational infrastructures. In another case, a winning team was invited to cooperate with the hackathon's hosting company. But that cooperation failed as well; this time because the participants could not be motivated to engage themselves in a long-term project that suddenly appeared to be plain work. The

company's mostly monetary incentives just did not apply to the interests and expectations of the hackathon team which was rather looking for technical challenges. However, those problems might rather concern 'external' hackathons; unfortunately, I have almost no experience with internal ones.

On an abstract conceptual level, this disadvantage derives systematically from the very creative features of such hackathons: to think off the beaten track. In order to explain this feature of social creativity at hackathons, neuro- or cognition science theories can be used. Those disciplines identify technical creativity with the ability to solve inherently difficult problems (e.g. nine dots problem) which, from their point of view, actually requires to omit certain heuristics or pattern recognition[1]. Heuristics can force individuals to interpret situations in a specific manner that renders a needed solution inconceivable (like drawings lines beyond the assumed bounds of a dot square). While individuals often struggle to omit their common, internalized heuristics, the perturbations produced by the communicative irritations described above resemble the absence of heuristics on a social, inter-individual level, breaching with common plausibilities not within but between the participants by means of openness. However, cognition science conceptualizes creativity contrary to disciplines like management studies or ergonomics which identify creativity with holistic capabilities of overviewing the whole situation, having in mind both the little, subtle details and the larger frameworks[2]. Contrary to the concept of technical creativity I have introduced, ergonomic creativity is focused on large-scale innovation projects instead of micro-events of invention. While innovation projects rather require tact and foresight for enterprise and thus have to understand the social meaning of situations in order to respond appropriately, invention seems to need quite the opposite. With hackathons fostering and focusing on this latter type of creativity, the former, project-management orientated perspective rather falls aside and can thus be missing in greater innovation scenarios. Thus, hackathons underlie an inherent trade-off between inventive, technical and innovative entrepreneurial creativity. However, this effect might be regulated, to some extent, by providing participants with concrete, given assignments so that given frameworks can be defined and taken into account. There is a continuum between open hackathons without defined problems and those that feature specific technical challenges. However, finding the right equilibrium of inventiveness and integratability can be tough. The instant diversity of participants also amplifies the perturbative quality of interactions. Diversity not in terms of social inclusion; actually, especially for civic hackathons, like open data day events, inclusion and (self-)selectivity is a notable issue. Here diversity means a micro-level heterogeneity in terms of experiences, backgrounds, skills, mindsets and things taken for granted. Intriguingly, this feature corresponds also with ergonomic concepts of technical creativity [3]. The plain diversity of participants increases the likelihood of irritations, of facing unexpected and (personally) unstandardized styles, contents and logics. In sociological terms, stressing Luhmannian system theory [4], they lack of 'moral', i.e. binding precedencies and established interaction orders. The thus constituted heterogeneity within interactions, again, resembles the demanded heuristic breach. It furthermore contributes to the aforesaid qualities of openness: Participants often do not know each other. Hence, they are also unable to assess each

other's capacities. As a result, hackathons provide a practical application of the philosophical 'principle of charity' [5]: Every statement is interpreted in the most useful and reasonable way. However, since there is no common interaction routine, discrepancies of communication are often reproduced by attempts of benevolent interpretation. This continual bridging of communicative differences results in unexpected, thus creative, interactions. The diversity and initial anonymity of participants also amplifies the funnification since the success of hackathon events, not in terms of productivity but in terms of an 'awesome happening', cannot be realized by mere means of organization but highly depends on the participants themselves, who thus tend to comply in the performance of casual unconventionality. Also, the said 'lack of moral' renders explicit declarations in terms of 'funnification' more influential concerning the actual conduct of hackathons.

The short-period temporality of hackathons means more than general time-boundedness, but their very own rhythm. All observed hackathons that featured schedules with multiple intermissions like keynotes, presentations, lunch, joint events, etc., produced many 'creative' outcomes, and vice versa. Those event schedules function as 'tacit project schedules': hackathon teams tend to use these schedules to temporally structure their own project work. They apply them as binding deadlines for work steps, e.g. having a concrete idea at lunchtime, finding a technical solution until the afternoon presentation, etc. This is not only crucial for a proper project execution but often forces hackathon teams to deliver premature results which impels them to deal with unforeseen situations . Eventually, this can result in serendipity, when the

actual significant project outcome is the solution of such a sudden problem instead of the initially appointed objective – e.g. my team wanted to create a passenger counting system for streetcars but suddenly had to find a way of determining directions of movements using only one ultra sound sensor (because more would have interfered with each other) which happened to be our main achievement. To understand this social creativity feature, imagine a person who is assigned to do a radical new art work within infinite time. This person will most certainly end up with a product that is exactly like one's imagination of 'radical new art' (and probably never finish). Give that person temporal bounds and the result might inevitably appear as 'radically new' because there was no time to adapt it to given concepts of novelty. [6] This virtual reproduction of creative cognition is a particular important feature because it even works for rather homogenous and routinized groups.

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