Creativity Greenhouse: At-a-distance collaboration and competition over research funding ☆

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ABSTRACT

This paper describes the design and evaluation of a novel mechanism to develop research proposals and distribute funding: Creativity Greenhouse (CG). Building on an established funding sandpit mechanism for co-located participants, communication technologies and structures were designed to support similar activities at-a-distance. Given a particular topic, selected academic participants collaborate during an ideation phase, then form sub-groups around selected ideas to develop research proposals and compete for the available research funding. This paper details the motivations for developing a distributed approach, before describing our iterative design process and trials. We describe an iterative design and evaluation process to support at-a-distance ideation, group formation, and then competitive development of proposals in a shared virtual space, leading to the detailed evaluation of a full-scale CG event that resulted in the distribution of £1.85 million of funding. This work contributes a novel, fully-developed mechanism to produce research projects, evaluated 'In the Wild'. Our findings are explored with regards to distinctions and similarities between co-located and distributed events, participant well-being and pastoral care, and the capacity of technologies to mediate complex combinations of cooperative and competitive group work. Through this, we contribute knowledge of how to effectively support research funding events, and also to wider understanding of high-stakes, computer-mediated processes, that involve complex creative and social processes.

1. Introduction

Research funding is a relatively scarce resource, and funding bodies employ a variety of mechanisms to distribute funds effectively. While the goals of funders may vary, a common aim is to increase the proportion of ambitious, high-risk projects involving innovative collaborations. Prendergast et al. found that around 60% of the funding bodies responding to their survey stated that they funded 'high-risk' research, with around 80% stating that originality in proposals was indispensable (Prendergast et al., 2008). In the same context, Heinze identifies that the advent of a highly competitive funding landscape is relatively recent, and that this was thought to support the best ideas and collaborations to succeed (Heinze, 2008).

Competition for limited resources necessitates a selection process in some form. Such a process is generally employed to validate proposed ideas against the prevailing view of the research community, with peer review being most commonly used. However, it has also been argued that such approaches stand in the way of potential paradigm shifts, and that "… funding structures with a strong peer-review component tend to overfund mainstream research that follows established research lines, particularly in traditional disciplines" (Heinze, 2008). In a recent poll of UK academics, 71% were in favour of changing the peer review process, as it is seen to form a barrier to new academics and to truly novel projects (Caines, 2011).

In this paper we focus on the adaptation of a mechanism developed and regularly used by our funder – the Engineering and Physical Sciences Research Council (EPSRC) – which has also found

popularity in adaptations elsewhere: The Ideas Factory Sandpit. This is a multi-day event during which selected participants collaborate to explore new ideas and rapidly develop research proposals. Groups form around ideas in a facilitated process and then compete for substantial funding resources, with decisions being made at the close of the event. To address reported drawbacks of this approach with regards to inclusiveness and costs, we collaborated with the EPSRC to develop 'Creativity Greenhouse' (CG), a mechanism for conducting similar sandpits at-a-distance. Through this research, we contribute specific understanding of the design and evaluation of a novel computer-mediated mechanism for proposing and funding research - an essential process within the research landscape, and one that is underexplored in terms of existing literature. Beyond this, we highlight broader issues with the computer-mediation of group activities that involve both collaboration and competition, and have significant consequences for those involved. This is again an area that has lacked research to date, yet it is becoming ever more common that such socially complex, high-stakes activities are conducted through computer mediation.

In the following two sections, we explain the sandpit concept and review relevant research around computer-mediated group creativity, collaboration and competition. Section 4 then outlines the 'Research in the Wild' approach taken to design and evaluate the Creativity Greenhouse. Section 5 describes early trials and findings, then Section 6 provides a detailed analysis of a full-scale CG event. Using this, Section 7 explores distinctions and similarities of conducting such events while co-located or distanced, and provides socio-technical recommendations for implementing such an approach, with Section 8 providing summary conclusions.

2. Funding Sandpits: an innovative mechanism to encourage ambition in funding applications

Although many funding bodies aim to fund high-risk research, there remains a perception that potentially valuable speculative work struggles to secure funding, and that decisions are overly reliant on the applicants' track record (Prendergast et al.). In this context, three phases of the funding process are typically distinguished (Susan, Guerin et al.). The *development* phase includes the funder defining the scope, researchers identifying questions, the funder collecting proposals and any iterative refinement. In the *selection* phase, funders choose projects to fund. Within this it must be considered who selects, the process, and the criteria. The final phase is concerned with *supporting the research*. Stimulating transformative research, which is multi-disciplinary, adventurous and high-risk-high-return, is a stated aim of the EPSRC, a major government-sponsored research funding body in the UK. EPSRC has trialled various approaches to stimulate such transformative research. However, those mechanisms were not seen to achieve the desired culture change. In response, and over the last 10 years, EPSRC have developed the Ideas Factory programme, which amongst other approaches includes the sandpit concept described below (EPSRC).

2.1. The Sandpit concept

Sandpits are seen as an alternative to the standard approach of academics proposing and peer-reviewing proposals over extended periods amongst their own circles. A sandpit is an explicit attempt to nurture group creativity and perturb the existing landscape of research ideas by bringing together a diverse group of individuals to an intense, well-supported event, usually focused on a particular topic (e.g. 'Transport Grand Challenges' or 'IT as a Utility'). They draw inspiration from Creative Problem Solving (CPS) approaches to structure group creativity (Osborn, 1953) (Creative Education Foundation, 2013). Facilitators will prompt groups to explore a given challenge through defining aims and objectives, considering the background and clarifying the problem. The focus then switches to generating ideas, and then to the refinement and selection of solutions and plans based on these. All phases have divergent and convergent elements. Brainstorming plays a vital part in CPS, and the production of many ideas, and importantly, the re-use of others' ideas, is actively encouraged.

Context and interaction with others are key factors in shaping how creativity manifests itself (Fischer, 2005). In this regard, EPSRC carefully design the context, processes and resources for sandpits. The standard form is a five-day residential event, with participants brought together in a venue to first collaborate to develop themes and ideas in connection with a given challenge, and then to compete for funding resources in self-selecting groups. The key mission is the creation of multi-disciplinary teams around ideas that will not be funded through other routes. This is both evident in the selection process at the individual level (e.g. willingness to engage, lack of preconceptions) and for the whole group (e.g. a balance of seniority, disciplines and institutions) (Maldé, 2010). EPSRC invites people from a wide range of backgrounds perceived as relevant, and challenges participants to work with those who have a different view of the world (Giles, 2004). This multi-disciplinary nature increases the likelihood that participants do not know each other beforehand. It is therefore essential that participants have time and space to assess who they would like to work with, and form a suitable team to address a shared problem (EPSRC, 2013).

Participants are asked to remain at the venue for the duration, and avoid other appointments or work. The process is guided by a director and a team of mentors who advise on the topic and provide feedback, and a team of external or in-house facilitators who lead group interactions and keep the process flowing through the key CPS stages. Representatives of the funding body are also available to advise on funding details (see Table 1) (EPSRC, 2010).

Although featuring a range of activities and iterations, each sandpit can be broken down into two main stages: whole-group collaboration and divergence in stage 1 and sub-group competition and convergence towards proposals in stage 2. During stage 1, roughly the first 2 days of a 5-day event, participants will collectively explore the topic from multiple perspectives. Participants are actively discouraged by facilitators to discuss solutions at this stage and instead to fully explore the space of relevant ideas. At the same time, participants will get to know other's personalities and skills. Different group configurations are actively encouraged at this stage. As the event progresses into stage 2, participants are expected to commit to a combination of proposal idea and associated sub-group, and the event becomes convergent and competitive. Groups work intensely on their proposal, including multiple rounds of presenting to peers, facilitators and funders to gain feedback. Through this, participants act as formative peer reviewers for the competing proposals. On the last day, groups make a final pitch, and funding decisions are made by the director, mentors and funders (EPSRC, 2008).

Table 1
The roles in an Ideas Factory Sandpit.

Director	Overall topic responsibility
Mentor	Topic specialist, mentoring on research methodology and project management
Facilitator	Expert in CPS process, resources, external, internal
Research Council Staff	Process facilitation and funding advice
Speaker	Invited as specialist or to perturb existing views
Participant	Carefully selected academic participants