# Catalyzing Collective Creativity

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## Introduction

Creativity is social: we learn from others, motivate each other, co-create, teach. Collective creativity is social creativity at scale, encompassing crowd work, citizen science, and peer production – situations in which the end product is the result of many diverse contributions. For example, the polymath project produced proofs created by professionals and amateurs all participating through online forums (Cranshaw and Kittur 2011).

Information systems researchers have an interest in collective creativity because it depends on information technology. The technology is making possible the constitution of new kinds of organization, rapidly assembled, parallel, unpredictable. These organizations manifest a critical aspect of information systems research – the emergence of novelty from the confluence of the social and the technological (Lee 2001). Studying these organizations and what they produce may lead to a better understanding of the mechanisms that trigger emergence.

Researchers may want to use this understanding to create the next generation of such systems. This acquisition of knowledge through construction is design science, consistent with the ideas of Simon that have been echoed in the information systems literature (Gregor 2006; Gregor and Jones 2007; Hevner et al. 2004; March and Smith 1995; Simon 1996).

Interest in observation versus interest in design may lead to a focus on different types of transparent and open systems. Observation works on systems with enough transparency to allow tracing all substantial activity. SourceForge and other open source platforms record virtually all interactions between participants (Feller and Fitzgerald 2002; West and O'Mahony 2008); Wikipedia provides an even greater level of traceability (Halfaker et al. 2011). Because histories can be traced, the transformations in content, in content networks, and in social networks can be analyzed longitudinally.

By contrast, interest in designing new systems may lead to crowd work (Kittur et al. 2013). Crowds can be assembled to try out information systems. Importantly, crowd work can be engineered as an experiment – as participants join, they can be randomly placed into one of several conditions.

What theories are applicable to both forms of research? One promising approach uses variants of the theory of evolution. There is a long tradition of applying evolutionary theory to issues of management and information systems. Companies are foragers for new products, and they choose to exploit a current ecological niche or take the risk of exploring new territory (March 1991). This theory extends to open innovation – crowds provide diversity that can speed search (Afuah and Tucci 2012). In information systems, evolutionary theories have been applied generally (King and Kraemer 1984), as well as specifically to open standards (Nickerson and zur Muehlen 2006).

Crowd-based product design has been modeled as a form of evolution (Nickerson 2014). Crowds have been organized to design chairs (Yu and Nickerson 2011), clocks (Yu and Nickerson 2013), and advertisements (Ren et al. 2014). The central method of this work is experiment: different kinds of information systems, including human based evolutionary systems, are tested against each other. Such work can be informed by observational studies of open communities in which product evolution occurs naturally. For example, designs evolve in the 3d printing community through a process of modification and combination (Kyriakou et al. 2012). Programs evolve in Scratch, a community of youth programmers who provide incentives to each other to increase their own levels of participation (Nickerson and Monroy-Hernández 2011; Yue and Nickerson 2013).

Collective creativity is a domain that can be studied by observing existing systems and constructing new ones. Emergent designs and design networks are made possible by information technology, intertwined with organization structures, motivations, and incentives. These can be studied through the observation of Wiki-based communities in which most every interaction is recorded. Crowd work provides another constructive avenue of research. Crowd work is not inherently transparent, but its restricted visibility provides a useful affordance for large-scale experiments. The design of such experiments can be informed by variants of evolutionary theory. In sum, information systems researchers can contribute to both the understanding and design of these systems. Such systems can be applied to address both local and global challenges, making it possible for many to combine and create.

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