

1 Creativity

What is creativity? Creativity – the potential for making something new – is framed by the old, is contingent upon history. As what was once new becomes old and as new challenges, new skills, new technologies, and new possibilities emerge the potential for making something new evolves. Creativity is situated in time, in cultural and social context. It is perceived at temporal scales from the instantaneous to the evolutionary, at scales ranging from the personal – the interior – to the global. Creativity depends upon the perception or experience of newness, a concept that is transient, dependent upon the past, and culturally defined and yet personally determined. Thus creativity is unstable, continually shifting, continually evolving, its possibility, its value, and its definition in constant flux yet constrained by history and context. Creativity allow us to adapt cognitively and culturally as our world changes.

Art – as creative expression – is the evocation of cognitive change (Donald, 2006). Art as an inherently creative endeavor highlights the inchoate nature of creativity. ‘The concept of art is located in a historically changing constellation of elements; it refuses definition’ (Adorno, 1997). Art’s definitions and values shift over time and across cultures – ‘much that was not art – cultic works, for instance – has over the course of history metamorphosed into art; and much that was once art is that no longer’ (Adorno, 1997). Because art is creative, ‘art can be understood only by its laws of movement.... It is defined by its relation to what it is not.’ (Adorno, 1997).

Charismatic creativity Creativity does not seem so mysterious. Psychologists have classified types of creativity, modeled the creative process, and developed metrics for measuring creativity. Creativity has been classified in terms of implementation, novelty, and value, and intentionality. Creativity can be personal, novel and significant for the individual, or it can be novel and valued in a wider context, potentially at a global and historical scale (Drago and Finney, 2014). Wallas modeled the creative process as a sequence of stages – a process of preparation, incubation, illumination, and verification (1926). In this widely accepted model of creativity one first prepares – one begins to think about a problem or endeavor, researching it and developing the skills needed to address it. Eventually one lets their ideas incubate in their subconscious, letting their imagination make novel connections. When a creative idea emerges from the subconscious there is a moment of illumination. Finally the creative idea should be expressed, tested, and verified. Does it solve the problem? Is it valuable? Is it truly novel? (Wallas, 1926; Drago and Finney, 2014).

These models of charismatic creativity are based on a modern conception of self and Romantic ideologies of natural genius, originality, and individualism. In Romanticism originality is unlearned and inspired from within. Since originality is unlearned, the individual – not their society – is paramount; this spirit of individualism fueled a culture of innovation focused on genius. Romantic ideas of self expression stressed contingency, spontaneity, and unpredictability in creative work (Wilf, 2013a,b).

Wilf argues that with the rise of a ‘creative class’ in contemporary society there has been a move to professionalize charismatic creativity by streamlining the muse. That the Romantic vision of creativity as an unpredictable, unteachable process that springs from within has become ingrained in global culture today, but is now being transformed. That our culture seeks to harness contingency and spontaneity as cultural resources in order to make creativity more efficient (2013b).

Flow There are other important psychological and cognitive models of creativity. Csikszentmihalyi proposed that 'flow,' a state of 'intense experiential involvement in moment-to-moment activity' in which action and awareness merge (2014b) was the primary motivating force, the driver of creativity (Csikszentmihalyi, 2014a). While still based on the romantic vision of charismatic creativity flow highlights the importance of action, experience, and emotion. By grounding creativity in the body flow suggests the potential role of embodied cognition in creativity. And if embodied cognition plays a role in creativity then surely situated and distributed cognition must as well?

Conceptual blending Conceptual blending – another model for creativity – describes the sub-conscious cognitive process by which meaning evolves. This model explores creativity at a fine temporal scale – the instantaneous – and how it unfolds iteratively. In a rapid, subconscious process, two ideas are blended together against a background of shared knowledge so that a novel idea emerges. The two ideas may be mismatched and even contradictory so long as they share something in common. The relationship drawn between these two potentially incongruous ideas creates new meaning. Types of meaning such as a “categorizations, analogies, counterfactuals, metaphors, rituals, logical framing, and grammatical constructions” are formed by blending (Fauconnier, 2000). The process can unfold rapidly, sequentially, and in parallel as blends are blended. In blends of blends concepts can become more complex and nested. Greater novelty and richer meaning can arise as more blends are blended. This is a very different conception of creativity. It is a rapid process. It is situated and potentially distributed and embodied. In conceptual blending cognition is situated in a background of shared knowledge and experience. It may be embodied, drawn from kinaesthetic and emotion experience and expressed in action. It is distributed across existing ideas, shared meanings. It may be distributed between multiple actors sharing creative agency, relying on tools and technology.

Embodied creativity Art and thus creativity evolved with cognition. As early human's prefrontal and premotor cortex grew in size and connectivity their metacognitive abilities expanded so that they could reflect on, develop, and eventually share their actions. Roughly 2 million years ago the first mode of artistic expression, the mimetic arts – 'gesturing, pantomime, dance, visual analogy, and ritual' – emerged marking a significant advance in cognition, culture, and creativity (Donald, 2006). Mimesis enabled people to share ideas, technologies, and practices through imitation, rehearsal, and play and set the stage for the emergence of language (Donald, 2006). Mimesis enabled people to embody cognitive processes through action – abstracting ideas through play (Deacon, 2006) and physically simulation (Kirsh, 2013) in order to learn them and adapt them. Adaptation is always creative because every body is unique, mimesis is exploratory, and abstraction introduces novelty. With mimesis humans had the creative ability to abstractly explore and develop ideas with the body. Later when linguistic and then theoretical expression evolved, new modes of creativity and art emerged (Donald, 2006).

In embodied cognition thinking is embedded in the body. Meaning is grounded in emotion, perception, and experience. Higher thought is built upon perception, sensation, and action. Thinking can happen through action (Hardy-Vallée and Payette, 2008). Creativity, when embodied, should be conceived differently. Embodied cognition relies upon sensory and motor schemas, on parallel subconscious processing. Complex thought processes can be offloaded and physically simulated with the body, processed subconsciously. Because so much cognitive work can be performed

subconsciously through action, subconscious creative processes need not be separated into Wallas's incubation stage – the creative process may unfold in rapid, generative iterations in which conscious thought is built upon subconscious thinking-in-action.

Creativity in action While psychological research has been focused on charismatic creativity there are other cultures with very different, more embodied conceptions of creativity. In the Zen Arts, for example, 'creativity is represented as a state of 'nothingness' (mûshin) that is beyond matter and form' (Cox, 2011), a state of purely embodied, subconscious thinking-in-action. When creativity is embodied there may be no time for incubation, no discrete moment of inspiration or illumination, no linear step-by-step process. While creative performances may (or may not) be choreographed and practiced, the performers make creative decisions while in action. Dancers may interpret their emotions through dance, actors interpret their roles while acting them, and martial artists creatively act and react. Open work – art in which the author, the performer, and potentially even the audience collaborate and develop meaning together – is a radical example of creative agency in performance. In Stockhausen's *Klavierstück XI* for example the performers decide how to navigate through a sequence of fragments, charting their own course across the sheet of music in a highly creative performance that unfolds in action (Eco, 1989).

Deconstructing creativity The role of the individual creative – the author, the artist, the genius – as the sole creative agent, as the fount of meaning has been deconstructed by Barthes (1977) and Foucault (1998). Every creative work is situated in an intertextual network; it was inspired by other works, references others, communicates through them. A work's meaning is not transmitted directly from the creative to their audience; it is filtered by the audience's awareness of other texts, other works, other experiences that informed it. Creative agency unravels, distributed. The reader interprets the work, creating their own meaning. The network of texts mediates, contributes possible meanings, other readings.

Creativity in design The creative process in design disciplines is often described as an iterative process in contrast to the linear model espoused by Wallas. Schön proposed that professionals like designers develop creative ideas through 'reflection-in-action,' an iterative, exploratory process of framing the problem, ideation or making, and critical reflection (1983). This exploratory process may unfold in an instant in action, repeated continually through acts like drawing or model making. Frank Gehry for example develops his designs through exploratory form finding with massing models and by thinking through the movement of gestural drawing Gehry (2004); Pollack (2006).

The iterative nature of 'reflection-in-action' may suggest incremental creative advances, but novelty and efficacy may emerge suddenly as the sophistication and complexity of the idea develops. The choice of (or process of choosing) the frame – a generative metaphor perhaps – is an important creative decision. The frame, however, is not static – it is developed, refined, adapted, and perhaps even discarded and replaced through the creative process. Since conceptual blending describes how frames such as metaphors and analogies are developed, adapted, and built upon, it may be the cognitive process underlying 'reflection-in-action.'

Yaneva's ethnography of the Office of Metropolitan Architecture showed that architects in the firm used practices like reuse, adaption, and exploratory modeling to develop a design through an iter-

ative process lacking Wallas's sudden moment of illumination (2009). The architects, for example, explored form by carving foam massing models with hot-wire cutters, reflecting on each model as they carved, while building up a library of forms. Ideas and forms set aside and unused in one project might show up in other projects, recycled and adapted (Yaneva, 2009). In design there is a tension between charismatic creativity and collaborative studio work. While the charismatic 'star-architect' Rem Koolhaas dominates the public's perception of the Office of Metropolitan Architecture, Yaneva's ethnography revealed a collaborative studio environment with distributed creative agency (2009).

Assessing creativity Just as there are many models of creativity there are many different methods for assessing creativity. There are methods for assessing an individual's creativity such as psychometric tests (Drago and Finney, 2014), self assessments, peer assessment, and creative output Csikszentmihalyi (2014a). There are qualitative methods for assessing the results of the creative process such as expert judgment and evaluation. And there are quantitative experiments for assessing the cognitive response of subjects to a creative product (for example a painting or sculpture) using technologies like eye tracking, electroencephalograms, and functional magnetic resonance imaging Chatterjee (2014). There are qualitative methods for assessing the performance of creativity like the experience sampling method – randomized self reporting – used to assess flow Csikszentmihalyi (2014b). Since there are many modes of creativity, I argue that ethnographic methods such first be used to frame the creative practice in its cultural context. The way in which creativity is conceived in a given context must be established before it can be assessed. Once we have described and framed creative practice in context we may be able to experimentally study the creative process and its results.

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