'Improvisational creativity' involves simultaneously identifying new challenges and generating responses with little or no time to prepare.

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CREATIVITY, IMPROVISATION AND ORGANIZATIONS

As the 21st Century Unfolds, lone creators of new ideas are increasingly rare, as teams and larger groups within organizations become the dominant mode through which progress is made in much of the world. Appropriately, management scholars have been turning their attention to organizational creativity in recent years.

Research on creativity began in the psychological domain, with the traditional view of the creative process stemming from Graham Wallas’s seminal work The Art of Thought. In it, he proposed four distinct stages of creativity:

1. Preparation, in which the problem to be solved is detected, and relevant data are identified;
2. Incubation, in which the problem is ‘left alone’ for a time while the unconscious mind works on it;
3. Illumination, in which the idea or solution suddenly appears; and
4. Verification, in which the idea or solution is tested against criteria of acceptability.

Subsequent theories have presented variations on these ideas. In some, incubation plays a prominent role; in others, it is combined with illumination in an idea-generation step. Generally, however, theories addressing the creative process include distinct stages, in sequence, moving from understanding the problem, to developing creative solutions, to selecting among the alternative solutions.

We refer to this standard approach as ‘compositional creativity’, and it seems to adequately capture many instances of creativity in organizations, such as the creation of new products through carefully-planned and rigorously followed stage-gate processes. However, there is another form of creative process, in which there is little evidence of distinct stages across time. We refer to it as ‘improvisational creativity’.

Improvisational Creativity

Improvisation condenses many of the traditional model’s stages. To improvise, actors must simultaneously identify new challenges and generate responses, with little or no time to prepare. In fact, the process of improvising is one single step: a response is generated and executed as the task is presented. Preparation must happen previously, outside of the frame of action.

Although it is clear that there are significant differences between compositional and improvisational processes, we must clearly delineate the two processes to illuminate these differences. In the literature on musical creativity, there is an accepted distinction between composing and improvising music. Jazz saxophonist Steve Lacy succinctly explains the difference between improvisation and composition:
‘The difference between composition and improvisation is that in composition, you have all the time you want to decide what to say in 15 seconds, while in improvisation you have 15 seconds.’ As he points out, the main difference between the two is the time available for response generation and the simultaneity of response generation and execution in improvisation.

Organizational theorists have recently begun to consider the role of improvisation within organizations, sometimes drawing on improvisational performing arts such as jazz for conceptual inspiration. However, few have made explicit links to the more established literature on organizational creativity.

**What is improvisation?**

Improvisation has been defined as “the degree to which the composition and execution of an action converge in time”; “the creative and spontaneous process of trying to achieve an objective in a new way”; and “the conception of action as it unfolds, by an organization and/or its members, drawing on available cognitive, affective and social resources.”

In each definition, we see the central role of two concepts: novelty and time. Improvisation must involve novelty and diverge in some way from prior plans or designs. In fact, ‘conception of action as it unfolds’ can only be claimed if response execution diverges in some way from prior plans and habits; if one is using a plan or a habit, then the action was conceived of before it unfolded, and the process is not improvisational.

Improvisation is ‘creative’ in the sense of a process that is intended to generate novelty, but may succeed or fail. Equally central to definitions of improvisation is the role of time – all of these definitions propose that conceiving of what to do (response generation) and doing it (response execution) must be simultaneous or convergent in time.

If we array organizational action on these two dimensions, we can summarize organizational action using the four categories depicted in **Figure One**.

Highly-novel actions are arrayed in the top two quadrants and are often referred to as ‘creative processes’. Indeed, both improvisation and composition can generate novel products or outcomes; what differentiates the two is the time between the moment when the action is conceived and the moment when that action is executed. In composition, there is clear temporal separation between when a response is generated and when it is executed. In improvisation, there is little such separation – responses are generated and executed simultaneously.

For example, in musical composition, composers often outline every detail of a symphony – not only the notes and rhythms, but the dynamics (loudness), the tempo, and many expressive considerations – long before a symphony orchestra ever plays any of it. In contrast, a jazz musician chooses notes, rhythms, dynamics, and all expressive considerations at the same time the music is being performed.

The bottom two quadrants represent actions low in novelty. When one is forced to act in the moment, with little time for planning, but responds in planned or habitual ways, we see quadrant III – algorithmic execution. The term ‘algorithmic’ has been used to describe those instructions that specify each step of an action and are learned by rote. Similarly, actions low in novelty that are configured on the spur of the moment must rely on elements that are commonly used or were learned by rote at an earlier time.

In contrast to improvisation, algorithmic execution is either the execution of a composed plan, like a computer running code, or a habitual response. For example, operators in a nuclear power plant follow detailed written procedures in almost every aspect of their work, specifying which buttons to push, where each button is located, how to assess if pushing the button generated the
desired outcome, what page to proceed to if pushing the button does not result in that outcome, and so on. Habitual responses, which must compete with novel responses, are also examples of algorithmic execution.

When novelty is low and temporal separation is high, we see algorithmic planning (quadrant IV). Algorithmic planning is like creating the list of procedures for the nuclear power plant operators to follow – the procedures to be written down are known (and often legislated) and the job of the actor is to record them as accurately as possible so that others may execute those instructions; their only concern is to express the plan so that it is executed without errors or violations.

Clearly, these four types of action rarely occur in their pure forms; in practice, improvisation generally involves the execution of parts of previously composed material, and many compositions come about partially through moments of improvisation. Further, both improvisation and composition often rely on a ‘vocabulary’ of pre-existing small chunks of action – called ‘ready-mades’ in improvisational theater or ‘licks’ in jazz – which introduce many elements that are not, by themselves, novel. However, despite these grey areas, thinking about improvisation and composition as relatively distinct processes has interesting implications for research on creativity.

If we situate improvisation within the stages outlined in the componential theory of creativity, we find that improvisation is characterized by the way it combines some aspects of the compositional process. Improvisation describes actions in which there is a high divergence from prior actions or plans, combined with a low temporal separation of problem identification, idea generation and idea execution. Thus, we define improvisation as ‘actions with high novelty (divergence from prior actions) and low temporal separation of conception and execution.’ Improvisational actions are arrayed on a continuum, depending on the degree of novelty and the degree of temporal separation. When such actions occur in an organizational context, they are considered to be instances of organizational improvisation.

A Synthesis and Proposed Model
The relationship between improvisation and creativity is unclear in the existing literature. Some theorize that the two are overlapping but distinct concepts because many creative products are not improvised; others argue that improvisation is a creative process that is intended to generate creative products, but may or may not succeed in generating a novel and appropriate outcome. We propose that improvisation is one process by which creative products or actions can be generated, but that not all improvisation results in true creativity (i.e. ‘appropriate novelty’).

We believe that three primary situations are likely to evoke improvisational creativity:

1. Emergent Crises
In the Mann Gulch fire of 1949, some firefighters were able to go beyond the scope of their training and survive by lying in the ashes of a small fire that they created themselves as the larger fire passed around them. Serious crises arise suddenly within businesses, as well. In 1982, three people died after taking the over-the-counter medication Tylenol with traces of poison in it. James Burke, CEO of Johnson & Johnson, which manufactured and sold Tylenol, had to react quickly and decisively, with incomplete knowledge about the source of the poison (possibly introduced during the manufacturing process) and with considerable conflicting advice.

Burke’s decision, made under extreme time pressure and with national attention, was to recall all Tylenol products from all stores immediately. At the time, many analysts predicted that this decision would mean the demise of the product. Nonetheless, Burke’s decision and subsequent immediate actions (after the discovery that the products had been tampered with in stores by a private citizen) are now credited with restoring the public’s trust in the brand and saving the company.

2. Unexpected Opportunities
In 1970, PhD engineer and entrepreneur George Hatsopoulos was trying to start an instrument business within his modestly-successful young company. He had some ideas for industrial measurement instruments he might design, but no such products. At a lunch meeting, a Ford Motor Company executive complained that the U.S. Congress had just passed the Clean Air Act, requiring all new vehicles to monitor and control oxides of nitrogen to an accuracy of one-part-per-million, but there were currently no instruments available to fulfill this requirement. On the spot, Hatsopoulos promised that if Ford placed an order with him, he would deliver an instrument in three months that would fulfill these requirements.

Hatsopoulos had no product (nor even a prototype) but, after this fateful lunch meeting, he received orders not only from Ford, but from Toyota and Mercedes as well. He found that price was no object to them, because each knew that his was the only instrument that would soon be available. Hatsopoulos’s improvised response to this unexpected opportunity was the beginning of a great corporate success story: Thermo-Electron Corporation went on to become an industrial powerhouse for several decades.

3. Compositional Creativity
Improvisational creativity can be embedded within a larger process of compositional creativity. Some scholars have found that improvisation helped accelerate innovation processes in computer product development. At the celebrated design firm IDEO, researchers have described the central importance of highly-improvisational, time-constrained brainstorming practices within the entire process of designing new products – a process that can take several weeks or months.

Figure One specifies the elements that are necessary for improvisation: high novelty (divergence from prior actions) and low temporal separation of conception and execution. But improvisation requires one additional element to achieve the status of creativity: the action must not only be spontaneous and novel, it must also be appropriate, in order to meet the definition of creativity.

A key difference between the two types of creativity is that in improvisation, process and product cannot be separated. In
compositional creativity, the process of composing results in some sort of product, service, or design, and this resultant product is then assessed for creativity. For example, a *Picasso* painting that hangs in a gallery is creative to the extent that viewers find it novel and appropriate – expressive or aesthetically appealing – regardless of the process behind it. In contrast, in improvisation, the unit of assessment is the act of creating itself: the improvisation is both the process of action and the product that is judged as creative or uncreative.

For instance, when we call Hatsopoulos’s behavior at that fateful lunch ‘creative’, we are characterizing what he did as both novel (because it was far from the typical or expected response) and appropriate (because it responded perfectly to the demands of the situation in which he found himself). Because his improvised actions responded to situational demands appropriately, they can be considered creative. Thus, we propose that all improvisational creativity includes one key element that has not been specified by improvisation theorists: responsiveness to temporally-proximate stimuli.

Temporally-proximate stimuli consist of whatever relevant situational factors are observable at or immediately before the moment of action. In a jazz band, those stimuli are usually what other group members are playing and what the individual himself just played. Jazz bands are creative as a group to the extent that they are responsive to and adjust to what the other members of the group play. Even if the individual contributions of group members were novel and appropriate when heard individually, the group would not be considered a creative improvising unit unless group members were responsive to each other.

Drawing on prior conceptions of organizational creativity (especially the componential theory of creativity), conceptions of improvisation in organizations, and the new idea of responsiveness to temporally proxi-mate stimuli, we propose a preliminary model of creative improvisation in organizations (see Figure Two).

In this model, we define creative improvisation as “actions responsive to temporally-proximate stimuli, where the actions contain both a high degree of novelty and a low temporal separation of problem presentation, idea generation and idea execution.” Such actions are arrayed on a continuum, depending on the degree of novelty, the degree of temporal separation, and the degree of responsiveness to temporally-proximate stimuli. When such actions occur in an organizational context, they are considered to be instances of organizational improvisational creativity.

In contrast to traditional models of creativity, ours contains two distinguishing features:

- preparation precedes the improvisational process; and
- the stages are ‘fluid’, with problem presentation, response generation, and response execution happening virtually simultaneously.

In compositional creativity, preparation might include learning relevant skills and obtaining information necessary to perform the task. For example, when an advertising-agency team is developing a campaign for a new client, it often researches previous campaigns, learns about the industry, and compares the client to its competitors before beginning to generate responses. In improvisational creativity, however, such preparation cannot occur, because immediate action is needed. Individuals must instead build up a store of knowledge and routines that are both quickly-accessible and flexible to various situational demands. Jazz musicians, for example, learn common patterns and theory before knowing what song they will play at a jam session; the ideas used in a solo are generated and executed as they are performed. Similarly, Hatsopoulos did not prepare a response to his lunch partner’s complaints after contemplating them; he told the Ford executive of his ideas as they came into his head, based on his extensive prior research, training, and experience.

After preparation comes the actual process of improvisation. As we described earlier, improvisation is defined by the temporal convergence of response generation and execution. Response generation and execution are prompted and shaped by the temporally-proximate stimuli which constantly inform and shape the problem at hand – the problem presented by the external environment. Crises, such as Burke’s case at Johnson & Johnson, are instigated by external stimuli which can change over time. As events unfold and data become available, actions are shaped accordingly, and the nature of the problem itself can change. In this way, temporally-proximate stimuli not only present the problem but also shift as responses are generated and executed. The resultant improvised creative outcomes are novel (by being divergent) and appropriate (by responding to temporally proximate stimuli). As we mentioned earlier, these outcomes might be the final result, as in a jazz improvisation, or they might represent possible responses in a compositional process, as in the structured brainstorming used at IDEO.

The components that influence improvisational creativity also differ somewhat from those in the traditional componential model. In improvisational creativity, a large number of well-learned facts and routines that are both readily-accessible and flexibly organized is important prior to action. Unlike in compositional creativity, such expertise cannot be obtained after a problem is presented. Because improvisation often occurs in response to crises or unexpected opportunities, it is likely that a person or group with less expertise would improvise less creatively in such situations.

Further, we propose that the creativity-relevant processes of risk-orientation and responsiveness to temporally proximate stimuli are especially important for improvisational creativity. Risk-orientation is often essential for an individual to engage in improvisation instead of pursuing a more known (if less creative) path during turbulent times.

Similar to its role in compositional creativity, intrinsic motivation is likely important for engaging in and persisting with improvisation. An intrinsically-motivated person who is improvising can focus more on the problem presenting itself, instead of focusing on evaluation and its impact on rewards and punishments. Further, because improvisation is often used instead of algorithmic execution in times of crises, several theorists have proposed that internal motivation will increase not only from the success of the process, but from the increased autonomy that improvisation offers members of an organization.
A Model of Improvisational Creativity

Several aspects of the work environment facilitate improvisational creativity in organizations. Previous research has identified ‘an experimental culture’ and ‘minimal structures’ as important conditions for improvisation. It is likely that a culture that tolerates mistakes and promotes action will facilitate improvisational creativity; and minimal structures mean that there are only loose procedures in place in domains where improvisation is likely. More-detailed policies would make people likely to follow them and execute algorithmically. Access to real-time information and structures that facilitate its communication have also been shown to increase the resources that improvisers have available to them, multiplying the sources of ideas and solutions.

In closing
Overall, our model highlights certain contrasts to traditional models of creativity. Specifically, the role of preparation and the synchronous nature of problem presentation, response generation and response execution are starkly contrasted with linear ideas of the creative process. To facilitate improvisational creativity, one must acquire the expertise to operate fluently in a domain without also acquiring the lack of novelty that often accompanies increased expertise.

Many questions remain to be answered: what tradeoffs and costs might occur through fostering the fluency necessary to improvise? Is there a distinct creativity-relevant skill of being responsive to temporally-proximate stimuli and, if so, is it stable across domains? Some researchers have argued that aspects of creative thinking transcend domain. Could such responsiveness be a similar skill? To what extent, and under what conditions, can it be learned?

In the end, one thing is certain: organizations that do not build a capacity to respond in novel and appropriate ways to emergent crises, unexpected opportunities and dynamic environments are at a competitive disadvantage just as much as organizations that do not produce novel ideas and products. R

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