

CHAPTER 22

Solving Complex Problems with Creativity

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ABSTRACT

Difficulties faced by organisations and individuals have become more complex, and the use of traditional analytical and linear methods is less appropriate to the difficulties. The need is to deliberately work on imagination and logic. Creative problem-solving is just that—using imaginative and analytical thinking in a structured way such that it can come up with solutions that sequential thinking would not produce. This article discusses what creative problem-solving is, offers a perspective on what is the difference between complex and complicated problems that can be addressed, and explores the major approaches that come from creative problem-solving: the alternation of divergent and convergent thinking and design thinking as a way of human-centred innovation. It outlines the fundamental steps creative problem solving takes – clarifying the problem, generating ideas, creating solutions, developing solutions, implementing solutions and it sees these steps as not necessarily a linear sequence as insight gained at one step often leads to a redefinition of the problem itself. The article also examines the use of these techniques in practice in managerial decision making, customer experience, and team working and contends that creativity does not come naturally to anyone and that it is a capability that can be learned and developed by anyone and any organisation.

Keywords: Creative problem-solving; Design thinking; Complex problems; Innovation; Critical thinking.

1.0 Introduction

Modern life offers challenges and problems which require no simple answers. The problems of climate change, public health, and digital technology, as well as the constantly evolving expectations of consumers, are all examples of problems that involve more than one party, lack full information, and have variables that change over time. These problems are not solved by a formula or by a fixed procedure as they are with other problems.

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Under such conditions creative problem solving has become one of the more desired human skills, especially among organisations that need to be innovative and different in a competitive environment. Given that these competencies are needed to understand uncertainty, see patterns and come up with new possibilities instead of following a plan, they have been consistently identified as important skills for the workplace in successive skill assessments (World economic forum 2023).

2.0 Concept Explanation

2.1 Creative problem-solving

Creative problem-solving denotes the practice of arriving at solutions that are both original and useful. The approach was formalised by Alex Osborn and subsequently developed by Sidney Parnes as a means of enabling people to move beyond habitual patterns of thought through a deliberate sequence of steps (Osborn, 1953; Parnes, 1967). The framework has been refined considerably since, and contemporary formulations organise the process around four principal components rather than the longer sequences of the original models (Isaksen et al., 2011).

Creative problem-solving depends upon two distinct modes of thinking. Divergent thinking generates possibilities: it explores concepts freely and defers judgement so that unexpected connections have the opportunity to form. Convergent thinking examines, selects and refines those possibilities against criteria such as feasibility, likely impact and consistency with wider objectives (Guilford, 1967). Alternating deliberately between the two guards against the two characteristic failures of problem-solving: discarding promising ideas prematurely, and generating so many options that no decision about implementation can be reached.

2.2 Complex problems

Complex problems are characterised by multiple interacting variables, by uncertainty and frequently by conflicting perspectives, in circumstances where the relation between cause and effect is not evident. Unlike simple problems, they cannot be fully understood or resolved by decomposition into independent parts addressed separately, since the parts affect one another and the context continues to evolve while the problem is being addressed. Problems of this kind have been described as wicked, in the sense that their formulation and their solution are inseparable (Rittel & Webber, 1973). Designing a service that meets the needs of diverse customers, managing organisational change and framing policy that balances economic, social and environmental considerations are all instances.

Addressing a complex problem at work requires logic and imagination in combination. Analytical skill is still required to interpret the data, and to understand the

limitations under which a solution is going to function but it is not enough when the problem is ill-defined, or when the stakeholder's perception of what success would look like is different. When confronted in these situations, creativity provides other means of defining and searching the problem, and structured process provides the discipline needed to turn ideas into action (Snowden & Boone, 2007).

3.0 The core stages of creative problem-solving

Contemporary accounts of creative problem-solving identify a series of stages extending from the recognition of a problem to the implementation of a solution. The various models give these stages different names, but the substance is broadly consistent: clarification, idea generation, development and implementation. The progression is iterative rather than strictly linear, since experience acquired at a later stage frequently prompts a redefinition of the problem itself.

3.1 Clarifying the problem

This stage is concerned with gathering evidence, identifying the principal stakeholders and establishing the objective of the work. Its purpose is emphatically not to generate solutions quickly. It is rather to examine the different ways in which the challenge might be framed, since a problem framed in several distinct ways will generate a considerably wider range of ideas than one accepted in the form in which it first presented itself.

3.2 Generating ideas

At this stage the aim is to produce as many possible responses as can be assembled, without evaluating or judging them prematurely. Techniques such as brainstorming, mind mapping and deliberate provocation help to push thinking beyond the obvious towards genuine alternatives.

3.3 Developing solutions

The third stage combines, evaluates and refines the ideas generated into a coherent proposal, assessed against criteria such as feasibility, originality and relevance to the people who will use it. Promising proposals may be prototyped or tested through a pilot before wider commitment is made.

3.4 Implementation

The final stage translates the chosen solution into action, which in practice requires attention to resourcing, sequencing and the management of those affected by the change as much as to the merits of the solution itself.

4.0 Divergent and Convergent Thinking in Practice

The distinction between divergent and convergent thinking is not merely definitional; it bears directly on what occurs when groups work together. Where a brainstorming session mixes the generation of ideas with their criticism, participants begin to censor themselves and offer only safe or conventional suggestions.

Where a phase is deliberately established in which quantity and unconventionality are valued, participants prove considerably more willing to propose unusual possibilities, and it is from these that genuine breakthroughs tend to emerge (Amabile, 1996).

Once a large number of ideas exists, convergent thinking supplies the focus required to select the most promising among them. Selection criteria, impact-and-effort matrices and rapid experiments are all useful at this point, and each has the additional merit of making the basis of a decision visible and open to collective scrutiny. The alternation between the two modes matters most where a context is complex and where exploratory and decision-making tasks must both be accomplished, as in innovation projects, service redesign and strategic planning.

5.0 Design Thinking as a Creative Process

Design thinking is a widely adopted method that applies creativity to the development of human-centred solutions across products, services and experiences (Brown, 2008). It ordinarily proceeds through five activities — empathising, defining, ideating, prototyping and testing — repeated in cycles so that understanding of users and of possible solutions deepens with each iteration. Rather than beginning from technological possibility or from the preferences of the organisation itself, design thinking begins by developing an understanding of people's actual experience and then reframes the problem so that new opportunities become apparent (Dorst, 2011).

In practice, teams observe how users interact with their environment, conduct interviews and construct empathy maps in order to capture emotional as well as functional needs. The defining stage synthesises these observations into a clear problem statement, frequently expressed as a question about how a particular difficulty might be addressed, which then frames the ideation that follows. Ideation employs divergent techniques to produce a wide range of candidate solutions, which are subsequently narrowed through the construction of rough prototypes and rapid testing with the intended users.

Design thinking has been applied in healthcare, education and commerce. An example of the redesign of a patient flow in a hospital ED is a “characteristic example”: the approach focuses on what is happening to patients and staff and rarely uncovers improvements that could not be revealed through process analysis alone (Liedtka, 2015).

6.0 Creativity as a Workplace Skill

Creativity has become a significant workplace capability precisely because conventional solutions fail when circumstances are unfamiliar. Those who solve problems creatively reframe customer complaints, find new ways of interpreting data and address difficulties from perspectives that others in an industry have not adopted. Effective creativity does not consist in generating abstract or impractical proposals; it consists in producing original ideas that can operate within an organisation's real constraints.

A wide range of roles — in marketing, product development, operations and leadership — now requires people to decide amid ambiguity, to approach problems from several perspectives and to devise new methods rather than await instruction. Practices that strengthen this capacity include taking a familiar problem and reframing it deliberately as a design challenge, considering what solutions would follow from radically different levels of available resource, and consistently involving people of varied background to test one's own assumptions.

Individual capability is not the whole of the matter, since organisational culture bears heavily on whether creativity is exercised at all. Organisations that permit experimentation, accept a measure of considered risk and treat failure as an occasion for learning develop markedly greater collective capacity for innovation than those that do not (Amabile & Pratt, 2016).

7.0 Everyday Techniques for Solving Complex Problems Creatively

Creative problem-solving need not be confined to formal innovation projects and facilitated workshops. Several practical methods make it available in ordinary work. Reframing is among the most useful: restating a problem frequently exposes assumptions that had gone unnoticed and opens possibilities that the original formulation excluded. Changing a question from how the number of customer complaints might be reduced to what experience would prompt a customer to recommend the organisation to others generates an entirely different set of options.

A second family of techniques involves adopting another perspective. Considering how someone from a different industry or discipline might approach a difficulty often produces unfamiliar solutions. Related practices include observing the work of other departments, seeking comment from non-specialists and examining a process from the user's point of view rather than the provider's.

Structured techniques for generating ideas also have their place: time-limited sprints, the deliberate articulation of the worst possible idea as a means of loosening conventional thinking, and the introduction of random stimuli to be combined with the

problem in hand. Finally, experimentation is essential wherever systems are complex and prediction correspondingly unreliable. Since waiting for a complete plan is not a practicable option, small and inexpensive experiments should be constructed to test ideas, so that learning occurs early and strategy can be adjusted while adjustment remains cheap.

8.0 Conclusion

Complexity is an increasing feature of both working and personal life, and few of the challenges it produces yield to the application of a formula alone. Creative methods offer a structured approach that remains flexible in the face of such challenges, combining divergent generation, convergent evaluation and iterative experimentation within a human-centred frame. The key here is that creativity is not about talent. It is a practice that is learned, and it grows from specific attitudes, actions and conditions. When individuals and teams resolve uncertainty and transform constraints into opportunities for innovation as they explore the problem, develop potential solutions, and assess the potential solutions as they go, they process the information in the right manner. It is the ability to solve complex problems in an innovative and creative way that is highly desired by the individual and essential to those who are required to collaborate.

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