

## RESEARCH ARTICLE

# Course of Action Development – Brainstorm or Brickstorm?

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The article presents findings from a research study which examined organisational barriers to innovation and co-creation experienced during course of action formation processes in military operational planning. We investigated both classroom and practical experiences of courses of action brainstorm development when conducted as outlined in the NATO Comprehensive Operations Planning Directive. In-depth interviews were conducted and combined with one observational case study that involved continual dialogue with central actors involved. The findings indicate that there can be substantial differences between ideal types of brainstorming and the actual brainstorm processes that unfold during course of action development in teaching as well as in real planning situations. The article coins the term brickstorm to capture elements of this process.

**Keywords:** Course of action; brainstorm; military operations planning; innovation; knowledge

## Introduction

Most militaries today harbour an inherent tension. In part, they strive to be innovative and technological first-movers in an effort to confront radical new challenges. Yet, these energies are equally challenged by the highly codified hierarchical structures which most military organisations retain. Conservative organisational cultures persist that are chiefly reliant on linear-thinking doctrines;<sup>1</sup> manuals tend to lean on a factual notion of knowledge; and military conceptual toolboxes are often comprised of strategies, methods, and procedures which privilege previous experience. However, as noted by Williams and Shaffer (2015: 36), “doctrine based on past wars is not usually valuable when preparing for future conflicts.” Relying too exclusively on lessons from past experience will not adequately meet the operational and tactical challenges of today.<sup>2</sup> The complex characteristics framing current operational environments include: the increasing challenge of non-state/lone actors; persistent rapid technological development along with its broad availability via the internet; and the advent and expansion of new domains of possible threat such as information systems, space, cyberspace, electronic warfare, and autonomous weapons (cf. Gerry et al. 2017; Williams & Shaffer 2015; Coker 2015; Hammes 2016a and 2016b; Davis & Wilson 2011: 13).

Recent decades have brought significant changes to US and NATO military organisations and doctrines as part of meeting these new challenges (cf. Hagel 2014a and 2014b; TRADOC 2008; Joint Chief of Staff 2017; NATO 2013. See also Townsend 2017; Louth et al. 2017; Sadler 2016; McGrath 2016). Yet, altering organisational structures, doctrines, and artefacts is one issue; changing culture and mindsets is another. This article describes the findings of a research study which examined various ways in which organisational barriers can frustrate the intent of doctrinal innovation. The focus of our study was the development of military *courses of action* (COAs) as described in the NATO directive for operations planning: the Comprehensive Operations

<sup>1</sup> Military doctrines and directives aimed at planning and execution are generally moving linearly through the phases of situational awareness and problem identification (knowledge development), analysis, solution development (planning), execution, transition, and assessment.

<sup>2</sup> DeFilippi, Nowak and Baylor (2018) note the importance of also being able to identify that which needs to be preserved and/or further developed.

Planning Directive (COPD). We explored practical experiences with the brainstorming phase of the COA planning and development process. The analysis draws on empirical data from classroom settings as well as from narrated experience with teaching and conducting the brainstorm. The findings indicate that there can be substantial differences between ideal types of brainstorming and the actual brainstorm processes that unfold during COA development in classroom settings as well as in real planning situations. Whereas brainstorming is often viewed in idealised terms as an interactive process of concept-formation that blends multiple perspectives, we see in reality that the process often leads to the aggregation of ideas that never quite blend together. The article coins the term *brickstorm* to capture elements of this process. This term is intended to evoke an image of a process in which concepts and knowledge are perceived as solid – as “items” that may be stacked and combined, but are not opened or melted into one another. In a brainstorm ideation phase, many such ‘bricks’ of knowledge may be suggested, but each brick remains itself. No brick ever undergoes a transformation during the process as a result of reflections and exchange between participants. Our observations on this issue will be further developed and refined later in the body of the article. We begin by providing a brief outline of the COPD and its context as well as an overview of our empirical data. We then address central findings of the research project revolving around the difference between brainstorm and brickstorm. This difference is outlined and scrutinised through three themes that incorporate perspectives from complexity theory, design theories, innovation studies, and the sociology of knowledge. The three themes encompass: perceptions of knowledge, communication of knowledge, and the processing and selection of knowledge in relation to the differentiation between convergent and divergent thinking. Lastly, we posit some conclusions.

The research project underpinning this article was inspired and informed by constructivist perspectives. In principle, this theoretical paradigm and the perspectives proposed by the applied theories might point to a fundamental problematisation or even dismissal of the overall planning process as described in the COPD (refuting the core assumption of the operations planning directive about the capacity to define and solve problems through planning). Yet, the article does not discount COPD claims in this manner. Rather, it maintains the COPD as a possible framework for planning, suggesting that the application of alternative perspectives in relation to the planning process and in relation to roles and actions of participants in this process may provide new recommendations for action. In this sense, the article can be viewed as maintaining a functionalist stance.

### The Comprehensive Operations Planning Directive Context

The COPD was introduced in December 2010 after NATO member states recognised that increasingly complex strategic and operational environments require altered operational conceptualising and planning.<sup>3</sup> According to the COPD, an overarching challenge of the operating environments of modern crises is that these environments are “complex and continually changing. Adversaries possess a ‘will’ and are thus unpredictable, complex, and adaptive. Thus, no planning process can guarantee prediction.” (NATO 2013: 1–6). Military troops and planners are increasingly confronted with what Rittel and Webber (1973) termed *wicked problems*. Contrary to *tame problems* that are characterised by knowledgeability, i.e. by conceivable parameters, wicked problems have floating boundaries. There may be many explanations for the same problem, and every problem situation is essentially unique (Rittel & Webber 1973: 160). Tame and wicked problems are not governed by the same logic. As noted by Nelson and Stolterman, “strategies developed to deal with tame problems are not only different in degree, but also different in kind from those required for dealing with the complexity, ambiguity, and epistemological uniqueness of wicked problems.” (Nelson & Stolterman 2012: 17). Since it is possible to get a consensus on the nature of tame problems – to diagnose them – it is also possible to assign the task of solving them to skilled routine experts. Many existing standard operating procedures (SOPs) or lessons learned can usefully be applied to this type of problem. In contrast, it is not possible to rely solely on SOPs when dealing with wicked problems. Instead, military planners must come up with specific, novel, comprehensive, and adaptive responses to every single situation. Experience of such wicked problems has led military researchers to suggest the application of design thinking (cf. TRADOC 2008; Banach 2009; Banach & Ryan 2009; Zweibelson 2016; Zweibelson 2015). Design thinking is usually described as a conglomerate of theories comprised of numerous key concepts, methodologies, and reflec-

<sup>3</sup> The second Interim Version 2.0 (V 2.0) of the Comprehensive Operations Planning Directive (COPD) was issued in 2013 and is currently in effect. In this article, all COPD references are to the COPD V 2.0., available at: <https://www.cmdrcoe.org/download.cgf.php?id=9>. Cf. Barfoed 2014.

tion points (cf. Bason 2017; Nelson & Stolterman 2012; Boland & Collopy 2004; Brown 2008; Dorst 2015; Dorst 2011; von Thienen et al. 2016). In relation to the military design approach, Banach and Ryan (2009: 105–115) highlight the terms *problem situation*, *frame*, *reframing*, and *reflective thinking*. In this article, we view overall course of action development as an intended design process for investigating, developing, and crystallising new ideas and innovative ways to meet (radically) new situations and potentially wicked problems in their unique context. This perspective is developed in the section below, where we describe how the course of action development is embedded in the NATO COPD.

### The Comprehensive Operations Planning Directive

The COPD describes NATO operations planning procedures at the strategic level (chapter 3) and the operational level (chapter 4). The focus of this article is the operational level because our study was specifically interested in looking at the creative brainstorm which is only mentioned in chapter 4. Chapter 4 covers military operational planning procedures through six phases which start with the acquisition of a broader understanding of the situation and the strategic environment and conclude with considerations for termination of a military engagement and the return of military forces to a national command. A pivotal moment in the operational planning process is the development of *courses of action* (COA). A COA is a plan describing the selected strategies and operational actions designed to accomplish the mission according to the commander's intent (NATO 2013: 4–66). Each COA that is developed must be significantly different from any other.<sup>4</sup> The COPD notes that: “the process of developing COAs is designed to encourage creative thinking and the application of operational art to open up the range of possibilities that could be considered. Every attempt should be made at this stage to consider as many COAs as possible.” (NATO 2013: 4–66). The COPD adds that a joint operations planning group (JOPG) “will form teams to *brainstorm* possible COAs and to develop a range of tentative COAs.” (NATO 2013: 4–67). No further guidance is given as to what the gist or the mindset of a brainstorm might be; nor is there practical guidance as to how this brainstorm should be carried out. The suggested COAs are subsequently analysed, compared, and evaluated by the staff using the method of *war-gaming*. After war-gaming, the staff uses a *decision matrix* to determine which COA to recommend to the commander who makes the final decision.

Clausewitz emphasised that surprising the enemy should be one of the general, foundational endeavours in all operations (Clausewitz 1976: chapter 9). The COA development brainstorm can be viewed as a pivotal moment where the JOPG gathers all its professional resources and expertise to come up with unique and creative plans characterised by surprise and resourcefulness. The COA development process is also delimited in numerous ways: by restraints and constraints,<sup>5</sup> by limitations set previously in the planning process, and by competence or capacity limitations stemming from the composition of the JOPG. The guidance delivered by the commander and Chief of Staff will also add limitations to the working process.<sup>6</sup> Moreover, the COA development process is largely affected by tacit organisational expectations and routine ways-of-working related to themes such as communication, mindset, and perceptions of knowledge. This last set of factors is rarely addressed in the doctrines, but it was very visible during our research process.

### Methods and Material

We employed a qualitative approach where two separate studies were combined in the analysis. Five semi-structured, in-depth interviews were conducted and combined with one observational study that included continual dialogue, involving central actors. Informants were selected on the basis of their international experience as instructors and/or facilitators of military planning processes and COA development in the context of joint, army, and/or air force component command. They were asked about their experiences with teaching and conducting the COA brainstorm. The observational study followed Danish officer training in the three-month graduate-level course Joint Campaign Planning conducted at the Royal Danish Defence College in 2016. The analysis also included a literature study of tactical and operations planning directives and guidelines. The method of combining an observational classroom study with experiential

<sup>4</sup> Differences may e.g. relate to task organization, use of reserves, location of Main Effort, scheme of maneuver, or defeat mechanisms (Kem 2012).

<sup>5</sup> Restraints are the requirements placed on a commander that prohibit action. Constraints are requirements that dictate action (Santacroce 2013).

<sup>6</sup> These limitations may e.g. relate to working methods, interpretations of key concepts, working group formation and assignment of tasks, and the time allowed in each planning step.

interviews allowed the research findings to simultaneously address how COA development is taught and how it is conducted in real planning situations. Yet, it is important to note that the most substantial part of the observations and narrated experiences concern classroom settings.

### Brainstorm or Brickstorm?

In 1953, Alex Osborn's book *Applied Imagination: Principles and Procedures of Creative Thinking* prompted the use of brainstorming as a tool for organisational ideation and product generation.<sup>7</sup> Osborn proposed applying the following four rules to brainstorm sessions:<sup>8</sup>

- Come up with as many ideas as possible
- Welcome and verbalise all ideas that come to mind, no matter how wild or crazy they may seem
- Do not criticise an idea. All judgment should be deferred until the brainstorm process is over
- Seek to combine and develop on previous ideas; build on and improve the ideas of others

In our research, JOPG leads and COA brainstorm facilitators were generally reflective of the methods and structures that they use during the COA brainstorm. Informants largely use methods they have learned during their general education, military training, or training at the NATO school in Oberammergau. With individual variations, facilitators apply prevalent brainstorming methods and framing such as instructing participants in 'no criticism allowed', being attentive towards 'introvert' participants, and using yellow stickers on a display board to bring forth ideas indiscriminately. As described by one of our informants:

Everybody came up with suggestions. And nobody – and such were the rules – shut anything down initially. So, everything was put on the board and then we took the discussion afterwards. And the discussion was not about dismissing things as I recall; it was primarily intended to understand, 'What did you mean by that?'<sup>9</sup>

Our research observed, however, that rather than a brainstorm process, as proposed by Osborn, where participants are open to developing and enriching each other's ideas through a mindset of co-creation, the COA brainstorm sometimes seems more like a process of assembly, of bricolage, where "fixed" conceptual and knowledge-loaded elements are combined. We propose the term brickstorm to describe this process. To outline the difference between a brainstorm and a brickstorm as we define it, we suggest contrasting two conceptions of teamwork. One is the concept of *cooperation* as defined by Hackman, where participants essentially work independently of one another on their part of the whole project (Hackman 2002). The second is the concept of *collaboration* as described by O'Donnell and Devin (2012). O'Donnell and Devin observe the creativity of special teams "working iteratively to create a product that emerges from the activity of producing it" (2012: 280). They note that such teams work as ensembles where the final outcomes "exceed the sum of their parts" (2012: 280). It is characteristic of these group work processes that the participants open themselves to the contribution of others and use those contributions as material for their own work towards the generation of emergent and unanticipated outcomes (O'Donnell & Devin 2012: 288). A central difference between these conceptions relates to whether participants open themselves (their mental concepts and frameworks) to the ideas and concepts of others, or whether participants are unwilling to let their own ideas undergo a transformation as part of a collective explorative process. Another central difference relates to the anticipated result – whether it is the sum of the single contributions of participants or whether it is something more: a "common third".

Within the field of knowledge creation in organisations, researchers note the importance of dialogical social interactions between participants in order to generate new organisational knowledge (Tsoukas 2005 and 2009; Orlikowski 2002; Nonaka & Takeuchi 1995; Andersen & Chen 2002; Argyris 1991). Nonaka and Takeuchi (1995: 86) point to the important role of dialogue, highlighting the collective use of figurative

<sup>7</sup> Osborn was an advertising executive whose business declined in the late 1930s, prompting him to think about ways in which he could encourage his employees to "think up" new ideas. Using his suggested tools for creativity, his company became one of the most prosperous advertising companies in the US in the post-war era (Besant 2016).

<sup>8</sup> Besides these four rules, Osborn suggested a number of additional guidelines, including some that related to the preparation of a brainstorming session and its duration; the number of participants and their selection criteria; and the facilitation and communication of a brainstorm (Osborn 1953; Isaksen 1998).

<sup>9</sup> Some of the interviews were conducted in Danish and have subsequently been translated.

language, the combination of concepts, and the creation of new concepts as central to knowledge creation processes. Orlikowski (2002) underlines the social aspects of knowledge creation, while Tsoukas (2009) argues that since practitioners are always embedded in specific, local discursive practices that involve implicit distinctions, there is a need for productive, dialogical exchange between participants in knowledge development processes in order to articulate existing distinctions and develop new ones. Drawing *inter alia* upon Sawyer (1999) and Argyris (1991), Tsoukas also notes that dialogue becomes productive “when the modality of interaction between participants is that of relational engagement” (Tsoukas 2009: 942). Relational engagement is characterised by participants being attentive not only towards the joint task in which they are involved, but also towards the relationships and emotional conditions of the setting. As a result, participants are more likely to “make themselves more open to one another” (Tsoukas 2009: 945).<sup>10</sup>

We noted several constituent factors in what we call a brickstorm process. Below, we outline what characterises a brickstorm (and what makes it different from a brainstorm) through three themes selected on the basis of our research material. These themes concern: i) perceptions of knowledge, ii) communication, and iii) divergent vs. convergent thinking. The themes are interwoven and interrelated. Each contains elements of the others. We divide and label them only in the attempt to present them as clearly as possible.

## Knowledge Perception

American educational philosopher John Dewey noted in his work *How We Think* that:

the most important factor in the training of good mental habits consists in acquiring the attitude of **suspended conclusion**, and in mastering the various methods of searching for new materials to corroborate or to refute the first suggestions that occur. To **maintain the state of doubt** and to carry on **systematic and protracted inquiry** – these are the essentials of thinking.

(Dewey 1910: 12 and 33, emphasis added)

Dewey emphasised the individual ability to remain in the domain of *not knowing*, and he valorised inquiry and suspended judgment. We noted in our research that despite newer trends in doctrine, for the most part military learning and expertise lean on a factual, positivist perception of the world. Most military tools of analysis are deductive in their intent: they aim at reducing complexity to enable decision-making, and they rely on a perception of knowledge as definite. This is underpinned by an organisational culture which largely supposes that there is right and there is wrong, and that commanders are supposed to possess superior or more extensive knowledge than their subordinates.

The sociology of knowledge is concerned with those processes whereby social perceptions of reality and knowledge are constructed. Such sociology explores relations between social and contextual factors and the social construction, representation, and communication of knowledge. The perception and presentation of knowledge as discernible, possessable, and definite is the primary focus of this section of the article. This relates to the issue of how subjective knowledge is generated as *objective* or *institutionalised* knowledge (cf. Berger & Luckmann 1966; Nonaka et al. 2006; Tsoukas 2005 and 2009). Berger and Luckmann (1966: 85–86) describe how individual knowledge is filtered through individual and social processing and sediments as collective, often taken-for-granted, knowledge. They use the term “objectivation” to describe the processes of transformation whereby subjective perceptions of reality become objective and institutionalised knowledge. Although the institutional world appears to be objective, its apparent objectivity is socially constructed; it is constructed objectivity (Berger & Luckmann 1966: 78). In this constructivist perspective, the notion of “science” – or of any *factual* knowledge claim – can be seen as initially experienced or assumed knowledge that has subsequently been objectified (and possibly systematically organised) and passed on as an objective truth (cf. Berger & Luckmann 1966: 84). It is inherent to objectification processes that “[...] man is capable of forgetting his own authorship of the human world” (Berger & Luckmann 1966: 106). When objectified, the social world and the (assumed) knowledge that it builds on and organises its activities around, confront individuals as something *outside* of themselves. Berger and Luckmann use the term “reification” to denote the extreme step in the process of objectivation “whereby the objectivated world loses its comprehensibility as a human enterprise and becomes fixated” (Berger & Luckmann 1966: 106).

<sup>10</sup> The importance of relations and relational awareness in relation to creativity and innovation is also noted in innovation studies and design research (cf. Bason 2017; Friis 2014; Darso 2011; Dorst 2011).

During our observations of the COA brainstorm processes as well as during our interviews, it was noticeable that mindsets and communication were often markedly shaped by such immediate notions of knowledge as fixed, and hence as ‘either-or’. The COA brainstorm process was largely permeated by a positivist ontology. Initial analytical estimates were often quite promptly denoted as objective, factual knowledge claims. Ideas brought up during brainstorm sessions were often more or less instantly and continually evaluated by reference to “factual knowledge” or by use of calculative military tools of analysis. One of our informants noted that:

we have to be careful sometimes not to be completely drawn out by the scientific approach to it. It is all green, it is all yellow, and the 9.2 wins. I think there is a lot more than that to military operations, feeling, and art that helps you make up your mind. Make sure that you considered everything, but at the end of the day you have to think – the commander has to be able to look at this and say, I don’t have a good feeling about this. Yeah, the NAC<sup>11</sup> tells me this, but that is where this went. That’s what he is paid for, otherwise we wouldn’t need a commander, otherwise it would only be a staff decision, and he needs to be able to have that flexibility.

While we might easily appreciate the *instrumental* function of these military decision-making tools and tools of analysis and planning – to ensure and qualify specific analytical processes – there is also a *performative* side to them. By performative we mean that these technologies tacitly assume a specific world view. They constitute a selective lens through which they enable us to see and enact the world, but they rarely explicate their fundamental assumptions, and they rarely specify what their outline is *excluding* (cf. Luhmann 1990: 228; Rennison 2010: 130; Heltberg & Jellesmark 2017). To use the term of Berger and Luckman, we may say that the military tools of analysis and planning objectivise a specific knowledge perception. In the case of COA development, the military tools of analysis become performative in that they are permeated by – and thereby install – a specific perception of knowledge as definite and stable, as “brick knowledge.”

In our studies, we observed that the prevailing perceptions of *what knowledge is*<sup>12</sup> and the prevailing perceptions of *what kind of knowledge is valuable* are decisive for how the COA brainstorm is performed. We saw that when knowledge is viewed within a positivist ontology as something solid, when knowledge is regarded as an asset that someone can *have*, and when having the ‘right’ knowledge supposedly makes this person more competent than others, this challenges the suspension of conclusions. We also noted that the specific military knowledge perception seems to stimulate response rather than inquiry. It appears to stimulate an underlying assumption that the alternative COA are readily available or obtainable, and that we need only identify them, list them, and then contrast them in order to enable the commander to choose the best one. We observed that the valorisation of “knowing right” hampers curiosity and openness towards expanding and scrutinising those suggestions which at first glance are considered out of order. Instead, such ideas are rejected as being wrong. Furthermore, we saw that in many instances, the military institutional perception of knowledge as “solid” hampers the practice of *collaboration* as suggested by O’Donnell and Devin (embedded in the rule proposed by Osborn about building on the ideas of others). Instead of a process where participants open their mental conceptions and framework to the ideas and conceptions of others, the brainstorm sessions are inclined to become antagonistic debates where ideas are argued as if they were facts. Instead of engaging within a space of protracted inquiry, at times, participants tend to enter a realm of competing over – and possibly arguing over – knowledge. One of our informants made the following observation of the COA brainstorm sessions that he had directed:

they are normally very heated because [...] I see, at least in this building, people get too emotionally attached to their ideas, so they get very: “This I my idea and it must be right.” So they get very heated, especially when it’s a group of peers, you have a group of majors, lieutenant colonels, so rank does not really apply and they are all basically equal [...] they think that their idea is as good as anyone else’s and a lot of people won’t let go of their idea. We see it over and over again, even when we are just doing slide presentations. “Well, this slide is important! No, it adds nothing to the brief, but I spent two hours working on it and you must show it.” So [...] people get very emotional about their ideas.

<sup>11</sup> North Atlantic Council.

<sup>12</sup> Namely the ontological question of whether the social world and its factual claims, however objectivated, are all constructed by humans and can therefore always be questioned and remade (cf. Berger & Luckmann 1966: 106).

Osborn urged managers to make a habit of assuming that there really is no such thing as an outright bad idea. His own business exemplified the importance of continually looking for seeds of creative intention and relevant practical potential even in seemingly obsolete or stubborn suggestions that a team member might contribute with (Osborn 1953; Isaksen 1998). Applying this outlook to the COA development brainstorm, we might suggest that a central difference between a brainstorm and a brickstorm, as we define it, rests in the organisational and individual knowledge perceptions that lie at the foundation of the whole process. To what extent is knowledge objectified (cf. Berger & Luckmann 1966)? As indicators to help show which of the two process types we are engaged in, we suggest considering questions such as:

- To what extent do participants dismiss ideas because they are not aligned with current expertise or prevailing regimes of justification?
- To what extent are ideas that are not immediately considered useful appreciated as a resource for new ideas?
- To what extent are participants oriented towards convincing others about their own ideas?
- To what extent does the organisational setting encourage participants to engage in the kind of reflection identified by Dewey, where they actively, persistently, and carefully consider the grounds that support the ideas that come up?<sup>13</sup>

Ultimately, we might consider the extent to which our prevailing perception of what knowledge is (or is supposed to be) affects whether we are capable of looking at any idea as a creative intention and as a driver for COA innovation? If we fail to recognise the importance of these questions, we may believe that we are getting the most out of COA brainstorms when perhaps we are not.

## Communication

Barnett Pearce and Verner Cronen, American professors in communication studies, pointed out that in any organisation, in any system of thought, there is an inherent “control system” that decides *how we operate here* (Pearce & Cronen 1980, cf. Foucault 1989 and 2002; Schnoor 2015: 100). Both explicitly and tacitly, this control system defines the boundaries for what we are allowed to do, what we are allowed to say, how we are allowed to say it, and even what we are allowed to think within the organisation at large and within the variety of everyday episodes that take place. According to Pearce and Cronen, one of the decisive factors in these system rules is communication (Pearce & Cronen 1980; Pearce 2007). In the following section, we direct our attention towards selected aspects of the communication that takes place within the COA development process and particularly within the COA brainstorm sessions.

As mentioned, the language of command is created to ensure precise and univocal understanding. Its vocabulary is shaped by linear thinking and analytical techniques that ultimately help the commander choose between a set of alternative COA (cf. Heltberg 2016). Using the distinction suggested by Boland and Collopy (2004) between “decision attitude” and “design attitude,” we may say that military command and military operational planning have a vocabulary of decision-making. One central challenge in operations planning, and notably in the COA development process, is how to make this vocabulary enable and drive processes which nurture a joint ability to tailor creative and comprehensive plans capable of surprising the enemy. “*Your job is to make a continuous production of black swans*”, one of the lecturers told the students during a planning sequence prior to the COA brainstorm. We observed, however, that the operational planning communication may at times hamper such collaborative and creative endeavours. Instructors tend to inform participants about their own specific area of expertise. They *present* their knowledge, and only to a lesser extent (if at all) do they instigate an open and reflective dialogue. They do not inquire into the propositions of subject matter experts, nor do they highlight their own doubt as a potential catalyst for inquiry and an important tool for reflection. While notionally endorsing doctrinal ideas of complexity, co-creation, and creativity, this military prototype communication is cast-iron and tight. Assessments are presented as certainties: “this is how [the adversary] thinks.” Instructors do not comment on the meta-perspective which is that *by communicating in this way*, they may implicitly be downplaying the space for common reflection. Applying such a meta-perspective to this planning process, communication might constitute a practical example of what Papparone (2013: 77 and 2017) terms “institutional reflexivity”. Institutional reflexivity

<sup>13</sup> A paraphrase of John Dewey, *How We Think*, D. C. Heath & Company (1910), 6–7, available at <http://www.gutenberg.org/files/37423/37423-h/37423-h.htm>.

denotes the collective consciousness and capability of institution members to observe and exercise practical scepticism towards the knowledge and values that the institution tends to believe in (Paparone 2017).

There is, however, an important point to note here, since the military planning toolbox certainly does contain tools for challenging knowledge and ideas. Examples of this would be concepts and organisational constructs such as Opposing COAs (OCOAs), red teaming, and the J2 section. Yet, in this connection key issues arise from how these concepts and constructs are performed, and how this performance affects the entire process and its outcomes. Our research noted that the communication forms and types prevailing during the COA development process (the tone of voice, the choice of words, the verbal and non-verbal attitudes exhibited) were often permeated by a decision attitude. As an example, we recall below how one of our informants described his role in the COA brainstorm process:

it is always easier to destroy somebody else's plan. So, offer a plan and let people just smash it. If you really challenge every idea that comes in [...] So, if I am the syndicate lead [brainstorm facilitator], and you bring something up, my job is to try and destroy that plan. My job is to really challenge that plan so that you can prove to me that it is a good idea. [...] You have to play the devil's advocate all the way up, and in that way, we should have thought about everything by the time we go to the commander.

Certainly, the role described here is challenging knowledge and ideas. However, the way such objections are communicated may signify that they function very differently than Dewey's conception of systematic and protracted inquiry, and that they also diverge substantially from Osborn's rule of welcoming all ideas. Recalling the aforementioned research that underlines the centrality of social relations in relation to knowledge creation in organisations (Darso 2011; Andersen & Chen 2002; Argyris 1991; Tsoukas 2005 and 2009; Sawyer 1999; Nonaka & Takeuchi 1995), we may suggest that perhaps, in the NATO brainstorm version, there should be room for a greater awareness of the importance of emotional and relational tendering during the process if we wish to avoid it turning into a brickstorm.

### Divergent Versus Convergent Thinking

Our third focal point relates to the concepts of divergent and convergent thinking (cf. Guilford 1950). Brainstorm processes are generally supposed to be characterised by *divergent* thinking where participants try to generate numerous ideas and explore original alternatives (seeking to generate quantity, bring up crazy ideas, and defer judgment). Divergent thinking is explorative, curious, open-minded and seeks to unfold ideas and options. Divergent thinking is wild. Its counter-concept, *convergent* thinking, describes a focused approach: a mindset oriented towards narrowing-down, searching for clear answers and univocal results. Convergent thinking values speed, precision, and logic (Guilford 1967). Neurological research indicates that different processes are taking place within the brain when we think in a divergent or convergent mode (Runco & Yoruk 2014; Jauk et al. 2012; Benedek et al. 2011; Razumnikova 2000), while research within design and innovation studies draws attention to the role of social and organisational *context* (i.e. factors such as organisational structures and routines, attitudes towards creativity, communication styles, and the preparation of a brainstorm session) (Osborn 1953; Dorst 2011; Nelson & Stolterman 2012; Cooper et al. 2009).

Our study revealed that there is a challenge involved in switching to a divergent mindset when working within predominantly convergent thinking structures (cf. Kalargiros & Manning 2015). Despite general awareness of brainstorm principles, divergent thinking seemed hampered by the use of a language loaded with precision and certainty; by organisational values built around a pervasive, strong respect for hierarchy and military expert branches; and by certain analytical and decision-making templates that are used both before and after the brainstorm (e.g. actor analysis, war-gaming and decision matrix). These templates prescribe precise categories, measures, numbers, and values. They convert uncertainties and assessments into seemingly precise knowledge. By doing so, they lead us to suppose that objective reality is not constantly moving, changing, and responding. They lead us to suppose that the operational environment is not as reflective and mobile as we are as participants.<sup>14</sup>

<sup>14</sup> If objective reality really was not responsive and reflective – if it did not constantly unfold in ways affected by the complex character that is also described in the doctrines – convergent thinking would perhaps suffice.

The COPD phases which precede the brainstorm provide the brainstorming session with a predominantly goal-oriented and convergent point of departure. On the one hand, some informants found that this enhanced group creativity:

the creative warm-up resides in the fact that you know the scenario very well. You make your mission analysis, so you have been turning every stone, and everyone [participating in the COA development brainstorm] has contributed to the factor-deduction-conclusion, everyone has made risk assessment, everyone has read constraints/restraints, everyone has helped make the OPS design [...] So, the people who stay and work, they are deeply into the matter and they don't need a mental warm-up; they all have ideas as to how we can handle this problem.

On the other hand, from the perspective of design thinking, we might be wary of this (assumed) profound, situational knowledge. It may prompt the working group to start the brainstorm session without thoroughly assessing whether there is a need for further information, a need to further explore possibilities, or a need to suggest an expansion of the solution mandate. One informant said:

We had another working group that also looked at COA development and we sort of looked at each other to make sure that we came up with something different. Because we often saw that with all the restraints and constraints given from the Higher Command, that often there really is just one COA. One COA with a variation of flavours. But otherwise, when we start talking about these military response options that have been generated at the strategic level, it has already been canalised so far down, you are already into the funnel [...] when you get to the COA development. So even though they say you can do anything within the limits that have been set, you often find that there are not really that many substantially different COAs.

Mental or visual sketches of suggested solutions – which may take shape early in the process – may be difficult to forget once they are made. They may easily taint subsequent suggestions and ideas. Our observation, encapsulated in the quotation above, was that an important challenge seems to concern how to “open up” the brainstorm session and bring the process out of “the funnel” in order to support creativity at this point. If a process aspires to be a brainstorm as outlined by Osborn rather than a brickstorm, it is vitally important to nurture awareness in the brainstorm working group that there might be other paths and possibilities than the ones paved from the beginning. Here, we should emphasise the difference that arises depending on whether visual models (such as a sketching of direction or the outlining of a main effort on a map) are considered as a *real representation* of the situation and its solution or whether such models are used as *tools for thinking*, as *tools for exploring ideas* (cf. Boland & Collopy 2004). If we neglect this important difference, the COA brainstorm risks being voided of its intended function as a creativity catalyst.

Notably, the challenge highlighted here – unfolding a divergent thinking process within convergent analytical structures – does not reside in the fact that there *is* a structural framework. Nor does the challenge reside in the fact that the overall COA development is delimited in multiple ways, as noted previously. Innovation studies have demonstrated that frames and limitations are often constitutive for divergent thinking: to think outside the box, you must first see a box (cf. Onarheim 2013). Our concern here relates to the issue of *mindset*: we are concerned with the challenge of leading divergent thinking processes when all participants (including the facilitator) have been thoroughly trained and are skilled experts in dissecting situations, categorising problems, and finding solutions with a view to making a decision. We might say that the convergent “muscle” has been trained very well in military education. Our research indicated that it is now time to equally strengthen the capacity of divergent thinking: not only in officers, but also in educators and instructors, in leaders, and in the broader military organisation.

## Conclusion

This article presented a research study investigating COA development brainstorms as per the NATO COPD. Our research indicates that although military planning doctrines may to some extent notionally address and try to integrate intentions, theories, and ideas that embrace constructivist conceptions of complexity, these doctrines may contain an inherent ambiguity in their planning framework. As a result, dynamics arise which are liable to frustrate doctrinal intent when these working methods are applied in educational settings as well as in actual operational planning. The article outlined some key characteristics of what doctrinal procedures may become in practice and suggested the term “brickstorm” to designate the processes which are

often enacted. Drawing *inter alia* on Tsoukas (2005, 2009) and Berger and Luckmann (1966), we noted that these characteristics relate to how knowledge is perceived by the participants in the brainstorm, how knowledge is communicated, and how knowledge is developed and selected through processes of convergent and divergent thinking. We noted that once participants are in “the funnel” of the linear and predominantly convergent COPD planning process, it seems difficult to make space for divergent thinking.

The article explored constructivist perspectives suggested by design thinking, innovation studies, complexity theories, and the sociology of knowledge. It noted that if these perspectives are applied to the planning process described by the COPD, new opportunities for action can be seen in relation to the way in which the COA brainstorm is managed and performed. The proposed perspectives are not regarded as a “cure” for problems arising from foundational assumptions that underpin the COPD planning process. (They cannot resolve contradictions in the notion that it is indeed possible to analyse, define, plan, and solve wicked problems). Yet, the perspectives and scopes for action that these perspectives suggest may change the way in which the COA brainstorm is perceived and conducted by its participants. With this in mind, we noted that while it draws on constructivist theories, the article and its conclusions retain a functionalist stance concerning the COA brainstorming process.

Why does this matter? The observations and reflections in our research involve thinking about institutional self-awareness and Paparone’s (2013) notion of institutional reflexivity. If we believe that we regularly create real brainstorms, and that we are able to extract maximum benefit from this process – and if we are mistaken – then we need to explore the restraining factors. The propositions in this article should not be viewed as a critique directed at the COPD or at the highly-qualified officers who lead and participate in the operational planning process. We cannot “fix” the issues mentioned in this article simply by elaborating on the COPD or by adding documents. Ultimately, our study and our research questions relate to a larger inquiry about how COA development is affected by the social context of its production: i.e. how military organisation and its inherent norms and values, its methods and tools of analysis, its established world-views and its organisational routines all affect military planning processes. We see this research and its findings as an opportunity for military organisations to develop in relation to important themes such as norms, processes, leadership, and communication. Moreover, we note that since a substantial part of our research data has been concerned with COA development in educational settings, further studies on how the COA development brainstorm is conducted and performed in real planning situations – e.g. in the context of large, international military staff work – would be very beneficial. Excellent COAs may already emerge as outcomes of the current COA brainstorm processes. Yet, if we increase our institutional and relational awareness and thereby manage to instil a cognitive flexibility into our deeply-rooted institutional default modes of thinking, communicating, valorising, and acting, we might broaden our possibilities and increase the likelihood of coming up with alternate plans with an even greater potential to be comprehensive and surprising.

## Competing Interests

The authors have no competing interests to declare.

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