

*Don't forget about Boxer: Teaching Systems Thinking,  
Complexity and Design to NCMs*

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This essay will discuss the relevance of educating Canadian Non-commissioned Members (NCMs) about Systems Theory, Design and Complexity to Chief Petty Officer First Class, (CPO1) and Chief Warrant Officers (CWO). It reflects upon my personal experience as an educator at the CWO Osside Institute within the Department of National Defence.<sup>1</sup> The formal rationale for teaching the concepts is that 'Systems Thinking' appears within the Training Plans for Non-Commissioned Member Development Periods 4 and 5, in professional development courses: the Senior Appointment Programme (SAP), the Senior Leadership Programme (SLP) and the Advanced Leadership Programme (ALP).<sup>2</sup> In the first section I will make the case as to why these concepts should be taught to NCMs, arguing that the complexity of the environment in which militaries will be deployed calls for additional cognitive training. Additionally, it calls to recognize the great cognitive potential that exists within this demographic. Subsequently, two specific teaching experience will be discussed autobiographically. The first experience occurred in 2011 on the SAP course. The second experience began in 2013 for the SLP and is ongoing. Challenges experienced during the

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<sup>1</sup> The Chief Warrant Officer Robert Osside Institute for the Profession of Arms is mandated to deliver career courses for senior non-commissioned members of the CAF.

<sup>2</sup> Training Plans are mandated to the Osside Institute by a higher organizational authority although there is leeway for interpretation.

first experience, were formative to the development of a more effective product in the second.

### **Why NCMs should learn about Systems Theory, Design and Complexity**

Boxer was the relentlessly faithful horse from Orwell's *Animal Farm*, always willing to endure hardship and to redouble his effort for the collective goal. Without Boxer, the revolutionary work accomplished by the animals would not have been possible. These attributes embody the NCM demographic, identity and ethos. Like Boxer, the NCM Corps accomplishes the heavy work on the ground and like Boxer, they are always willing to do more. Boxer's strength owing to his size can parallel the numerical supremacy of NCMs within military organizations. There is another parallel with respect to the nature and function of the NCM corps in that Boxer was not a thinker himself. Traditionally, this has been true of NCM corps the NCM corps function as the executors of strategy and not the creators. However, this closed binary organizational division of cognitive labor is no longer sufficient to deal with realities of the contemporary security environment. Thus, NCMs should be educated and empowered to 'think.'

The value of teaching systems thinking and design in this context is that it introduces important cognitive concepts for CPO1/CWO who occupy significant institutional leadership and managerial positions with influence up and down the chain of command. These concepts provide for NCMs an appreciation of the complexity of the issues that militaries are faced with operationally and in terms of institutional management. This builds capacity of NCMs as leaders to act as agents within the 'learning organization' ideal, addressing complex institutional and operational issues.<sup>3</sup>

The Canadian Armed Forces can be interpreted as a Complex Adaptive System (CAS) with individual service members as its 'agents' who adapt and evolve through experience simultaneously as the CAF as a whole.<sup>4</sup> Contemporary NCMs are not robots; as, 'agents,' they have the ability to think and act for themselves. With the ubiquity of

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<sup>3</sup> For a description of a learning organization, see: Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York, NY: Double Day Currency, 1990).

<sup>4</sup> John Holland, *Complexity: A Very Short Introduction* (Oxford: Oxford University Press, 2014).

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information and its instant transmission, NCMs will be aware of hypocrisies and inconsistencies and may not buy-in should they no longer trust their leadership or institutional processes.<sup>5</sup> We also know that ‘agent’ actions at the lowest level (NCM actions at the tactical level), intentional or not can have non-proportional effects upon a CAS or its environment, possibly with “strategic consequences.”<sup>6</sup>

Of course, professional armies are highly disciplined and trained and thus behavior of individual members can be predicted to a certain degree based upon knowledge of tactical training responses to pre-determined situations. The ‘agent’ knows how to respond when situation x, y or z is encountered. This is most correct in ensuring that actions remain legal in terms of domestic and international law and national codes of conduct, useful within the complex ethical grey areas of the contemporary security environment. Here the illegal or unethical behavior is identified and the member avoids this course of action.

However, perhaps there are many legal ways upon which a task might be carried out to achieve success which all may carry different consequences; all are permissible but some perhaps are more effective than others. Knowledge of these concepts can help in decision making when encountering previously unknown emergent properties of an evolving situation, responding to situation p, q, r. Of course, in situations where time is a critical factor, individual decisions will need to be taken in very short order, with little time for full reflection. More awareness of systemic concepts and complexity could increase the probability that a decision is more informed.

Conditions within any complex operational situation are constantly shifting. We can think of a military as a hierarchical system entering into a complex environmental space faced with a problem with structural and interactive complexity. From Rittel and Webber’s “Wicked Problem” definition, the problem itself is continually evolving and any action to remedy it will again change the problem.<sup>7</sup> Yaneer Bar Yam explains how war can be understood as “a complex encounter between complex systems in complex

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<sup>5</sup> See: R.Lummack, “Ethics is not just about the little guy and other observations,” *Cavalier Bleu* (2016) <http://www.cmrsj-rmcsj.ca/cb-bk/art-art/2016/art-art-2016-4-eng.asp>

<sup>6</sup> Charles Krulak, “The Strategic Corporal: Leadership in the Three Block War,” *Marine Corps Gazette* 83, issue 1 (January 1999): pp. 18-23.

<sup>7</sup> Horst Rittel and Max Webber, “Dilemmas in a general theory of planning,” *Policy Sciences* 2 (1973): pp. 155-169. doi:10.1007/bf01405730

environments.”<sup>8</sup> Operationally, in recent military activities, there has been a prevalence of terrorist tactics, and asymmetric strategy which involve countering small groups of organizationally flat, independent and committed teams who behave unpredictably.

NCMs may lack formal academic experience but possess wisdom borne from deep experience, allowing intuition, ingenuity and creativity to thrive. The learning of such concepts encourages creativity, active learning and stimulates academic curiosity in this traditionally non-academic population. In learning about these concepts, it is premised that CPO1/CWO can be more effective by being aware of strategic issues such as Design within the Officer/NCM relationship and institutional methodologies. Awareness brings the ability to converse and thus be relevant within this construct; NCM knowledge and unique perspective can be included into planning and design processes where relevant. The form that this takes will vary probably vary by military context as well as personality type and the state of the personal relationships involved. Without being aware of design, its language or objectives, important information that NCMs possess might not be included into important planning processes.

Design is the most prominent application of Systems Thinking in the military realm. The intent of the teaching is not to teach design to CPO1/CWO as if it was to be taught to officers who possess the responsibility and authority to command military operations and translate strategic intent. It is meant to pragmatically introduce Systems Thinking, Complexity and design in a way that is useful for the institution and applicable to the reality of the senior-NCM demographic. It is important to note that in being useful to the institution, the intention is not to empower NCMs to inappropriately question decisions of their officers, especially in urgent tactical situations, rather to contribute wisdom responsibly within appropriate channels.

Thus, design’s function as a way for generals to interact, challenge and disrupt with the political level is not applicable to NCMs. Nor is the function related to command responsibilities within operational art; NCMs are not commanders and will not be commanding in operational settings. However, they will be overwhelmingly

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8 Y. Bar-Yam, “Complexity of Military Conflict: Multiscale Complex Systems Analysis of Littoral Warfare,” *New England Complex Systems Institute* (2003). Retrieved from [http://www.necsi.edu/projects/yaneer/ssg\\_necsi\\_3\\_litt.pdf](http://www.necsi.edu/projects/yaneer/ssg_necsi_3_litt.pdf)

present in operational environments, many as leaders who play important roles within Command Team or Leadership Team structures and can have significant informal influence. In this respect, CPO1/CWO can play a critical role in offering a unique type of advice to the commanding officer. Based upon successive conversations with the SLP audience and Directing Staff (DS) and Senior Directing Staff (SDS) a list was compiled as to where and how a CPO1/CWO participates in decision making processes: providing: technical expertise inputs to inform processes; representing Commander's intent and speaking truth to power, based upon a unique perspective and freedom of movement. Further that, CPO1/CWO may have an important role to play in design processes that value creative/novel thought and inclusion of wisdom above rank considerations<sup>9</sup>.

The proposed definition of a Strategic Chief, emerging in 2017 from the multi-year research project CPO1/CWO Strategic Employment Model is the following: "CPO1/CWO provide knowledgeable advice, grounded in critical thinking, supported by ethical reasoning, cultured in practical experience"<sup>10</sup>. In defining the important space CPO1/CWO occupy in the CAF, the authors, CWO Neil and CWO Gillis, explain "it is essential that CPO1/CWOs be capable of understanding, adapting and prevailing despite operational complexity and the challenges of balancing institutional imperatives for professional effectiveness and organizational efficiency."<sup>11</sup> The aforementioned concepts will be of great use in understanding and adapting to changing conditions.

Israeli Brigadier General Hirsch discusses an important aspect of how militaries adapt to changing environmental conditions and absorb new information:

If a commander in the field knows something and feels that he has an important insight to convey and clarify, will his unit encourage him to do so even if it goes against the flow? Will the organization understand that such inputs reflect a fundamental change in the enemy organization and the whole reality may have changed? Does the unit have the strength and

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<sup>9</sup> SLP presentation, "Military Applications of Systems Thinking" January 2015 iteration.

<sup>10</sup> Draft definition of the Strategic CPO1/CWO, Strategic Employment Model.

<sup>11</sup> Sherman Neil and Richard Gillis, "Pinnacle of the NCM Corps – The Role of the Chief Petty Officer 1<sup>st</sup> Class / Chief Warrant Officer," *Draft Publication*.

the methodologies to identify this change, name it, and develop an appropriate response, even if nonprocedural? Will this happen in time?<sup>12</sup>

Regardless of the source of the information, if the insight is valid, then it should be incorporated into evolving understandings. Empowering the NCM Corps cognitively would go a long way to do this by generating more data and perhaps data of a higher quality. In any operational environment, there will likely be more NCMs operating than officers by nature of military organizational structures. This means NCMs will have a huge tactical presence in the field, observing local conditions and interacting with people from different host nation and/or enemy systems. This fact is likely not about to change within traditional military structures, so this feature should be leveraged. Having first-hand knowledge of a situation is critical and those in the field who are mostly NCMs play a critical role in being able to accumulate information and re-incorporate it into feedback loops. This is particularly important because modern warfare is much more complex owing to technological progress, expansion of information quantity and evolving interconnectedness of globalization. Additionally, Major General Robert Scales describes how combat arms, particularly infantry tasks are much more complex, requiring new tasks such as: interacting with and assessing host populations, intelligence gathering, small unit requirements to learn multiple skillsets and possibly requiring host society language acquisition.<sup>13</sup> Understanding the environment in which one is operating is crucial to understanding the possible impacts of one's actions and thus making more effective decisions.

Here, Hirsch's "sensorial attitude" is important, whereby all levels pay attention to environmental changes and report them up to be evaluated for significance.<sup>14</sup> We can think of mobile tentacles or an octopus which provide a simultaneous awareness of the creature's environment. In this way, mission command can receive information from its 'sensors' or tentacles - field locations, patrols and actions within the environment.

NCMs who are aware of such concepts could be more effective 'sensors,' capable of transmitting higher quality information. This perhaps would include information

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<sup>12</sup> Gal Hirsch, *Defensive Shield: An Israeli Special Forces Commander on the Frontline of Counterterrorism* (Jerusalem: Gefen Publishing House LTD, 2016), p. 2539.

<sup>13</sup> Robert Scales, "Achieving Tactical Overmatch" podcast, Nov 17, 2016.

<http://modernwarinstitute.libsyn.com/ep-16-achieving-tactical-overmatch-with-mg-r-robert-scales>

<sup>14</sup> Hirsch, *Defensive Shield*, p. 2484.

that is not visible, or not deemed to be important with an awareness of systemic structures and interconnections. If the NCM as a 'sensor' can learn what is important through experience and adapt within the situation independently rather than simply relying upon receiving further training, then the speed of the responsiveness of the institution could be increased. This would be particularly important in terms of understanding host country cultural dimensions, where experience brings greater understanding. Most NCMs do this instinctively. However, formal understanding of systems thinking and complexity might empower NCMs to become more aware of the environment and more formally embrace this important 'sensor' function and produce more productive information.

If we limit cognitive tasks, to officers, we lose out on a huge potential amount of aggregate data, experience and lessons learned that can be used as feedback to be fed back into the command and control processes. This information of course is collected currently; however, having NCMs who can think systemically and are aware of factors of complexity may be able to provide more nuanced and perhaps more valuable information. This higher quality information simply allows the institution to learn more quickly. Osinga summarizes some of John Boyd's thinking about the OODA loop: "put simply Boyd advances the idea that success in war, conflict, competition even survival hinges upon the quality and tempo of the cognitive processes of leaders and their organizations."<sup>15</sup>

Conditions within any complex operational situation are constantly shifting. We can think of a military as a hierarchical system entering into a complex environmental space faced with a problem with structural and interactive complexity. From Rittel and Webber's "Wicked Problem" definition, the problem itself is continually evolving and any action to remedy it will again change the problem.<sup>16</sup> Yaneer Bar Yam explains how war can be understood as "a complex encounter between complex systems in complex environments."<sup>17</sup>

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<sup>15</sup> Frans, Osinga. *Science, Strategy and War: The Strategic Theory of John Boyd* (Delft, ND: Eburon Academic Publishers, 2005), p.3.

<sup>16</sup> Horst Rittel and Max Webber, "Dilemmas in a general theory of planning," *Policy Sciences* 2 (1973): pp. 155-169. doi:10.1007/bf01405730

<sup>17</sup> Y. Bar-Yam, "Complexity of Military Conflict."

Military culture inherently may resist new educational opportunities for NCMs and an expanded 'sensor' role or participation within design processes. Some might question the rationale for doing this, as 'thinking' elements already do this task. It could appear to be a duplication which will only complicate the actual execution of important work by blurring the lines of responsibility. Some military traditionalists may be concerned about over-empowered NCMs. Some see the longstanding demarcation of responsibilities and roles between NCMs and officers as under threat, a sense that NCMs are trying to carve away some command responsibilities. Thus, the status quo of an uneducated NCM corps that simply follows orders is desired by some segments of the military. However, this seems to be a mostly among older generations of officers and NCMs. Many Officers embrace the potential of the command team relationship but this is very much dependent upon personalities.

Yet, from my years of interacting with them, NCMs themselves continually indicate that they are not trying to become officers. Further, that they fully respect the chain of command and have no desire to overturn it. In fact, the chain of command concept becomes so engrained that reverence to it is almost Biblical. In discussions about the command team concept, an oft repeated phrase among senior NCMs is 'staying in your lane' referring to not infringing upon the officer's responsibilities and recalling that 'officers always maintain command.' They wholeheartedly embrace concept of 'speaking honestly to the officer and objecting in private, but always supporting the Officer in public.' My experience indicates that NCMs wholeheartedly desire to assist where they can and within the appropriate capacity, seeing their role as complimentary to and not in competition with the officer corps.

However, what needs to be understood by all is that the complexity of the security environment makes it imperative that NCMs receive additional education. The opportunity cost is too high not to. Weak link theory demonstrates that there is value in focusing on strengthening the weakest links of a system.<sup>18</sup> Here, empowering NCM as 'thinkers' can pay dividends for the entire organization in terms of having 'agents' who

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<sup>18</sup> See: Malcolm Gladwell, "My Little Hundred Million," Podcast, July 21, 2106. [revisionisthistory.com/episodes/06-my-little-hundred-million](http://revisionisthistory.com/episodes/06-my-little-hundred-million). In this podcast, Gladwell discusses investment in higher education applying the logic of weak link vs. strong link theory as described by Chris Anderson and David Sally, *The Numbers Game: Why Everything you Know About Soccer is Wrong* (New York, NY: Penguin Books, 2013) and applies.



are more capable and effective acting within complex operational situations and in terms of managing complex institutional problems. Additionally, effects of any action are not certain – effects could produce the expected result but could also produce counter-intuitive and unexpected effects. This means that there is limited predictability within the operating space; degrading long term planning capabilities, as there are no constants upon which to anchor future action. If we do not leverage the immense cognitive potential of the NCM mass, then the military itself will not be as agile and responsive and thus effective as it could be in responding to accelerating complexity.

#### *Teaching Experience 1: 2011*

I was selected to develop and provide an *Introduction to Systems Thinking* to the SAP in a 45 minute period followed by a two hour candidate exercise. Civilian teaching opportunities on the residential portions of our courses were limited and the being the most senior course, meant that the presentation was a big deal. It was also the first time the civilian instructor corps had contact with the subject, so I did not have any previous knowledge to tap. Nevertheless, I was naturally attuned to these concepts, already a holistic thinker. I was very excited to have discovered a theoretical framework with a vast research field to discover.

I described the essence of systems thinking as a multi-disciplinary research framework, distinguishing it from traditional approaches. I provided basic elements of systems and simple examples of types of systems: ecological, biological, mechanical, etc... to arrive at human systems, using the CAF as a system within the broader government system. In addition to the lecture, I used a short video to reiterate key concepts.

I explained that systems thinking offers an alternative cognitive framework that can be used to understand and deal with complex problems (forecasting, military planning, dealing with constant change, dealing with root causes, etc...) There was also a significant thrust about developing a “learning organization/culture” within the CAF

having been very influenced by Senge.<sup>19</sup> At the time other foundational sources included Bentley;<sup>20</sup> Baker;<sup>21</sup> Von Bertalanffy;<sup>22</sup> Steward and Ayres;<sup>23</sup> Lauder.<sup>24</sup> The activity was a small group analysis of a created fictional scenario called *Nazagan* which combined complexities of failed and failing states.

The essential elements of the presentation were communicated clearly. However, in terms of outcome, the overall experience was received with mixed reviews. A retired general officer claimed that the exercise was too strategic for CPO1/CWO, commenting they would never be involved with strategic campaigning or operational planning. Some DS (Directing Staff) felt that it was too theoretical or academic for the audience and that I needed to focus on the military context more directly. Students complained that the scenario did not have all required information and that it was too complex, although this was designed intentionally. I was frustrated with negative comments from people who until then had not even heard of the concept. I maintained that, yes, the concepts were abstract and difficult to grasp, but that oversimplification was not doing justice to the concepts themselves.

Despite reservations, I accepted that the experience was not successful and recognized that I needed to learn from it. I needed to connect directly with the audience but I needed to know where and how systems thinking was being used in the CAF. I also realized a real life example would be better to avoid creating a fictional scenario and then having to convince of its validity.

To learn more about the Canadian context, I asked in an ad-hoc fashion many CAF personnel who I met very simply, *where and how is systems thinking applied in the*

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<sup>19</sup> Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York, NY: Double Day Currency, 1990).

<sup>20</sup> Bill Bentley, "Systems Theory, Systems Thinking and Culture" in *Cultural Intelligence and Leadership: An Introduction for Canadian Forces Leaders*, ed. Karen Davis (Kingston, ON: Canadian Defence Academy Press, 2009), pp. 1-8.

<sup>21</sup> Jim Baker, "Systems Thinking and Counterinsurgencies" *Parameters*, Winter (2006): pp. 26-43.  
<http://www.carlisle.army.mil/usawc/parameters/Articles/06winter/baker.pdf>

<sup>22</sup> Ludwig Von Bertalanffy, *A Systems View of Man* (Boulder, CO: Westview, 1981).

<sup>23</sup> J. Stewart and R. Ayres, "Systems Theory and Policy Practices: An Exploration," *Policy Sciences* 34, no.1 (2001): pp. 79-94.

<sup>24</sup> Matthew Lauder, "Systemic Operational Design: Freeing Operational Planning From the Shackles of Linearity," *Canadian Military Journal* 9, no. 4 (2011): pp. 41-49.

*Canadian military?* Generally, most officers and NCMs who I came across had not heard of the concept. I called the Canadian Forces College in 2012 and had a conference call with three officers who informed of specialized projects and units which were using it, but that it would be hard for me have access without a 'need to know.' To their knowledge, 'systemic operational design' or related concepts were not being taught on OPP courses at CFC and that nothing was in development to replace the OPP. I eventually wrote a lesson for the Advanced Leadership Programme (ALP) which was great to capture and preserve learning.

#### *Experience Two:*

In 2013, I started to research a more precise Educational Objective (EO), *Explain Military Applications of Systems Thinking*, within a redevelopment project of the SLP residential. This redesign of the SLP was significant as an entire day was devoted to the topic within a fifteen day course. I became more aware of the vast literature on where Systems Theory has most affected the military, namely, on planning processes and the evolving history of systemic operational design and derivatives. A few important sources were: Bentley;<sup>25</sup> Schmitt;<sup>26</sup> Gharajedaghi;<sup>27</sup> Yaneer Bar Yam;<sup>28</sup> Conklin<sup>29</sup> and School of Advanced Military Studies.<sup>30</sup>

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<sup>25</sup> Bill Bentley, *We Murder to Dissect: A Primer on Systems Thinking and War* (Kingston, ON: Canadian Defence Academy Press, 2012).

<sup>26</sup> John Schmitt, "A Systemic Concept for Operational Design," 2004. Accessed September 17, 2016. [http://www.au.af.mil/au/awc/awcgate/usmc/mcwl\\_schmitt\\_op\\_design.pdf](http://www.au.af.mil/au/awc/awcgate/usmc/mcwl_schmitt_op_design.pdf)

<sup>27</sup> Jamshid Gharajedaghi, *Systems Thinking Managing Chaos and Complexity: A platform for designing business architecture* (Boston, Mass.: Butterworth-Heinemann, 1999).

<sup>28</sup> Yaneer Bar-Yam, "Complexity of Military Conflict: Multiscale Complex Systems Analysis of Littoral Warfare," New England Complex Systems Institute, 2003. Accessed September 16, 2016. [http://www.necsi.edu/projects/yaneer/ssg\\_necsi\\_3\\_litt.pdf](http://www.necsi.edu/projects/yaneer/ssg_necsi_3_litt.pdf).

<sup>29</sup> Jeff Conklin, "Wicked Problems & Social Complexity," in *Dialogue Mapping: Building Shared Understanding of Wicked Problems* (Chichester, West Sussex: John Wiley and Sons Ltd., 2006).

<sup>30</sup> School of Advanced Military Studies, "Art of Design, Student Text," Version 2.0. School of Advanced Military Studies (SAMS). Accessed September 15, 2016. [http://usacac.army.mil/cac2/CGSC/events/sams/ArtofDesign\\_v2.pdf](http://usacac.army.mil/cac2/CGSC/events/sams/ArtofDesign_v2.pdf)

The design of the product took eight months and included several rounds of feedback, from military and civilian colleagues<sup>31</sup>. I tested at least three versions prior to arriving at a final version, trying to incorporate comments with each version. There was consistent pressure to cut theory, which I did reluctantly. I really felt that a deep emphasis on theory was critically important to provide a strong foundation of understanding. I deliberately invited hard critical feedback, particularly from military members with operational experience, as I wanted the product to be credible. A discussion with Dr. Bill Bentley was beneficial for validating ideas and having context to understand the military design literature (who was writing, for whom, in what context, for what purpose).

In terms of the product, it consists of theoretical lectures and then a small group activity with assigned pre-reading. The logic of the presentations is such; I try to walk the students through a story connecting it to their reality describing how complex the security environment is, that it is multifaceted, including PMESII factors.<sup>32</sup> The idea is to allow candidates to connect their past experience in difficult places and build on prior learning. I explain how global problems are beyond single state control (global terrorism, drug trade, insurgencies, climate change, poverty, etc...) and can be conceived of as 'Wicked Problems.' The features of Wicked Problems, Systems Principles and Complex Adaptive Systems are described. Images are used to communicate complexity and systemic organization; many from the series *Postcards from Hell*<sup>33</sup> as well as short videos and anecdotes. The Syrian crisis, Libya and Crimea have remained prime examples through the years. Other examples of non-linearity, surprising events or counterintuitive effects are also discussed; I was heavily influenced by Smith<sup>34</sup> and Nutt.<sup>35</sup>

Key messages are that because of VUCA aspects of the security environment that denies predictability, additivity or linearity, it is urgent that we embrace new cognitive methods in which to confront this complexity (Wicked Problems, Systems Theory,

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<sup>31</sup> Here I am grateful to Serge Beaudoin, Jean-Luc Desaulniers, Laura Herring and Ross Lewis.

<sup>32</sup> Political, Military, Economic, Social, Ideology, Infrastructure.

<sup>33</sup> "Postcards from Hell," *Foreign Policy*. Last modified June 24, 2014. Accessed September 30<sup>th</sup>, 2016, <http://foreignpolicy.com/slideshow/postcards-from-hell-2/>

<sup>34</sup> R. Smith, *The Utility of Force: The Art of War in the Modern World* (New York: Penguin Books, 2005).

<sup>35</sup> Samantha Nutt, *Damned Nations: Greed, Guns, Armies, and Aid* (Toronto, ON: Signal, 2011).

specifically Complex Adaptive Systems.<sup>36</sup> It explains that “traditional, linear, reductionist” approaches are insufficient to properly understand or inform action within the wicked problems militaries will be called to act within, with relevant quotes from the literature.

Then, design as a process is introduced as a way for militaries to formulate intelligent and coherent action and coordinate with partners to act within ‘Wicked Problems.’ It communicates what I feel is the spirit of design (iteration, flexibility, humility, team learning, getting inputs from stakeholders, creativity, red-teaming, experimentation etc...) as well as how it is related to planning, the operational planning process. Rich picturing is taught and the ‘Destablia’ example from the annex of Schmitt<sup>37</sup> illustrates the process.

For the rest of the day the candidates undertake a design process in small groups consisting of an environmental frame, a problem frame and a solutions frame based on methodology from the School of Advanced Military Studies. The logic is to allow as much time as possible for candidates to ‘actively learn’ together by ‘doing’ and applying theoretical concepts taught in the lectures.

The case study to date has been on Boko Haram. This has been a good example, because of the inherent complexity, evolving nature and because most candidates do not have prior knowledge of it. As a real life situation, it was deliberately chosen so as to make use of the vast literature that already exists. Additionally, since CAF military deployments generally occur in destabilized areas of the world, the learner can also develop a useful understanding of problems in failed and failing states.

In approximately 6 syndicates of 10-12 individuals, candidates are assigned a persona with corresponding pre-reading.<sup>38</sup> It has been a challenge to find comparable

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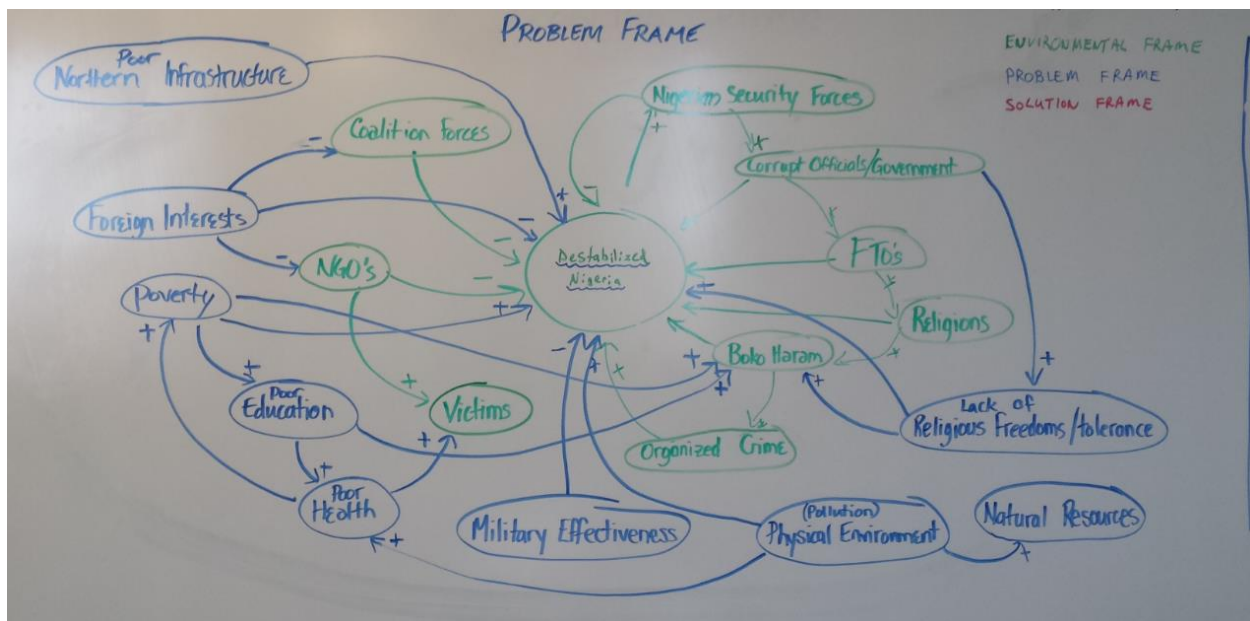
<sup>36</sup> Robert Lummack, “Expecting Uncertainty: Approaching security environment complexity with humility and conceptual flexibility,” *Cavalier Bleu*, 2017. <http://www.cmrsj-rmcsj.forces.gc.ca/cb-bk/art-art/2017/art-art-2017-1-fra.asp>

<sup>37</sup> John Schmitt, “A Systemic Concept for Operational Design.”

<sup>38</sup> Persona roles are: Senior GAC field officer with extensive experience in Africa and over 10 years in Nigeria; A PPCLI major who has experience in Africa with a deployment with MONUSCO; A R22R CWO who implemented counterinsurgency tactics in Afghanistan; A DND intelligence analyst with expertise in Sub-Saharan Africa; A UNOCHA representative; An American officer from AFRICA COMMAND

academic pre-reading in French. As an output, each group must produce a narrative and rich picture of each frame. The day closes with a short debrief where the groups discuss their findings, observations and the group processes and dynamics. The process is challenging but in six iterations the feedback has been positive. Candidates enjoy sharing their work and are proud of what they accomplished and learned as a group, although they are mentally exhausted and fatigued. I try to keep the debrief short so as not to exasperate them and to avoid repetition. It consists of a minimal presentation per group (5 minutes) and with concluding comments/discussion about process, findings, their experience, their challenges, etc...

**Figure 1 Example of a Syndicate Rich Picture**



The product itself in terms of messaging and sequencing has stayed quite constant through its iterations (August 2014, January 2015, September 2015, January 2016, September 2016, and January 2017). A colleague, Mr. Francis Clermont became involved in the project in 2015 and presented on the January 2016 course bringing in a more robust general introduction to Systems Thinking preceding the sequence described above.

A Ghanaian World Bank Manager; African Union Representative; A Leading scholar on Islam in Africa and Boko Haram UNICEF Advisor; Maj Gen – Nigerian Army 3rd Division; DPKO Gender Advisor.

For the September 2016 iteration, theoretical periods were cut from three to two, streamlining and consolidating the material. I was against this change wanting more time to delve into the depth of the concepts. However, the narrowed focus kept the messaging concise and did not overwhelm students for the one-day period and feedback was very positive.

### *Challenges based upon experiences 1 and 2*

#### Challenge 1: Concepts are not widely known or known deeply:

Without a prior knowledge it takes time to explain concepts sufficiently. In some cases, people may think they already know. In this case prior knowledge (accurate or not) has already solidified an opinion which can be difficult to modify. It is important to define terms early for common understanding and avoid what Brigadier General Hirsh calls a “Tower of Babel situation.”<sup>39</sup> With relation to evolving military contexts, Hirsch discusses how new words and metaphors are created to describe experience, but there are potential risks in confusion in their premature use. This confusion as alluded to in the biblical story caused by people each speaking their own language, each not understanding each other. Here, a glossary could be constructed to alleviate this risk.

#### Challenge 2: Overcoming skepticism and building credibility:

A consistent issue is building and maintaining credibility to avoid rejection of the messenger and by extension the message. Early on, I experienced lots of skepticism from Directing Staff (DS) and Senior Directing Staff (SDS) because the subject was not something they were aware of or had experienced.

There was perhaps also resistance to the fact that senior NCMs may not have judged my knowledge as a SME to be authoritative: ‘who is this civilian teaching me *avant-garde* military issues?’ This is a valid question and it is important to prepare for this and be as legitimate as possible.

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<sup>39</sup> Hirsch, *Defensive Shield*, p. 2498.

Making connections with people who have expert knowledge to validate and bring in new ideas has been crucial.

Connections with other experts have been critical to build the legitimacy and relevancy of the product and to share additional context as to where and how systemic concepts were being applied in the CAF. Throughout the years I contacted experts to seek out feedback and validation: (Col. Abboud, B.Gen. Carignan and Col. Bernard).

B.Gen. Carignan was an excellent help, having spent time at the School of Advanced Military Studies. Although surprised that CPO1/CWO were learning about Design, she attended an iteration of the course; her messaging really connected with the audience. I asked her to film a short video to have as a permanent teaching tool. She made the suggestion to focus the exercise on the environmental and problem frames and to avoid the solutions frame. This was due to the idea that CPO1/CWO culture has a mindset of responsive problem solving. The fear was that complexity would be overlooked in the rush to provide a solution for the commander. This allows for a process of inquiry and intense learning without the pressure/temptation to shortcut the process or to think that it is a check in the box process.

In addition, a very experienced exchange US Army SGM Mitchell demonstrated different methods and types of rich picturing and was very successful in bringing credibility for the Canadian audience who most had not heard of Design. Contact with Dr. Mitchell from CFC and Dr. Beaulieu-Brossard from the University of Ottawa have been immensely helpful and informative.

As respected voices have affirmed the project, DS and SDS have become much more enthusiastic and have 'bought in.'<sup>40</sup> What a change! This in turn has a positive effect upon candidate buy-in who look to the DS/SDS for direction. Similarly, credibility is gained when candidates who are held in high esteem by their peers (coming from highly regarded units/commands such as CANSOFCOM) affirm the product.

A persistent early question from candidates was 'why are we learning design when officers are not?' Links with CFC have now been created in order to answer this

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<sup>40</sup> There have been many DS and SDS who have been supportive and who have played a direct role in creating positive conditions for the reception of this information, including Maj. Turbide, CPO1 Mondelli, MWO Fuller, MWO Côté, Jean Denis to name a few.



question appropriately to explain where and how it is taught; this has had a positive effect.

There is also candidate defensiveness about critiques against the OPP and ‘traditional, linear’ military culture; essentially, the audience feels that their prior experience, which they feel has been tremendously successful, is being criticized. It is therefore critical to frame that Design is different from planning, that Planning remains important but that Design can help inform it and make it better.

### Challenge 3: Time limitations and over-simplifying complex concepts

There is a consistent desire from other stakeholders, Standards and Development and DS and SDS to get right to the point due to time limitations and their view of the audience. However, it is difficult to do justice to the concepts in such a short window of time without overwhelming students theoretically.

Limited pre-reading, restarted prior to the September 2016 iteration was assigned so as to develop a common prior knowledge and has alleviated this issue to a degree.<sup>41</sup> Nevertheless, it is important to be able to articulate clearly the essence of the concept being discussed in a concise but accurate and meaningful way. Yet to be meaningful, it must be connected to the reality of the learner.

### Challenge 4: Introducing a design cultural philosophy that is different from socialized military experience.

Within the exercise, some of the candidates expect feedback from myself as the instructor as to what the correct answers are. The DS/SDS similarly feel they need to provide an evaluative feedback to the candidates. Instructors and candidates are perhaps uncomfortable in this ‘grey’ domain, expecting the authority figure to provide a definitive right/wrong answer. Additionally, some DS and SDS really want detailed process rules, ‘what are the rules?, what is the right way?, where is the checklist?’ My answer, that experimentation and creativity trump any rules beyond the basic guidelines, that that there is no right or wrong answer is often disappointing. As well,

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<sup>41</sup> I had previously included a chapter from Bentley’s “We Murder to Dissect” publication as pre-reading on the Distance Learning portion of the SLP. However, fellow teachers judged the material too advanced and it was removed.

there are risks as candidates feel dismayed, 'what are we striving for?' Instead, I question them to prompt their own self-reflexivity to ask – 'is your product as complete as it needs to be?' 'Does it account for all factors?' 'What are you missing?' 'Is everyone in agreement?'

Challenge 5: Demographics of the audience:

There is great variation within the CPO1/CWO population in terms of educational backgrounds, but most do not have post-secondary education as a base to which to anchor learning. They are highly intelligent and are capable of receiving complex information but purely academic methods need to be adapted.

Additionally, aside from an overwhelmingly male and generally ethnically homogenous group, candidates arrive for the most part at the end of their careers having been successful in their respective worlds rising to the highest NCM rank. Thus, there can be resistance; this is perhaps similar to other experiences: Dr. Ofra Gracier in this issue characterizes generals as beyond education and Dr. Paul Mitchell noticed a more open reception with Majors than with Colonels.<sup>42</sup> However, largely, their careers have been focused tactically. Generally, they have not had a lot of exposure to the OPP or strategic geo-political issues. Some candidates are perhaps simply not in the position of having an opinion, not having had experience to define it. However, despite challenges, most students are open-minded about learning something new and theoretical, but you have to make it clear why it is important for them to listen. I try to empower them to the fact that they have vast experience and knowledge to contribute within the institution. In fact, that their unique input is critical, as complex Wicked Problems are so urgent. This is appreciated by the candidates.

Challenge 6: Updating the product with multiple stakeholders.

As the product is owned by several stakeholders, there is always some change to make. For example, lessons learned from course critiques are incorporated as are perspectives of new people exposed to the project, such as the rotation of active and retired military members who act as DS and SDS and Standards and Development personnel.

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<sup>42</sup> See – Gracier and Mitchell articles in this volume.

There are always new opinions that feel the need to make some type of change. This is sometimes difficult to swallow when you do not personally agree with the proposed changes; ego of all stakeholders is a constant factor, as everyone is convinced of the correctness of their actions.

After the third iteration, I was resistant to suggestions to further streamline, as feedback had been very positive. I realized that I had fallen into a trap that I constantly criticized, the famous 'if it ain't broke don't fix it.' It is a constant personal reminder to say, that it is not about me but about the candidates learning opportunity and experience. I needed to listen to others in the interest of making the overall product more effective.<sup>43</sup>

This brief essay has discussed personal experiences teaching Systems Theory, Design and Complexity to a very specific audience within the CAF. In the first section, I made the case as to why NCMs should be educated about Systems Thinking, Complexity and Design arguing that environmental complexity requires it. Additionally, it argued that knowledge of these concepts, enables the massive NCM corps to become more self-reflexive and sensitive to nuances and new ideas. Subsequently, I described two teaching experiences summarizing the messaging and discussing teaching challenges that were experienced. Building capacity of NCMs as leaders to deal with complexity at all levels would be a great value for the CAF, so that more effective decisions can be taken.

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<sup>43</sup> Here I must thank Anne-Katell Lombino and Pierre Côté for their respective inputs.