

## **War in the 4<sup>th</sup> Industrial Revolution: Developing Future Military Leaders and an Intellectual Edge**

*In the early twenty-first century, the train of progress is again pulling out of the station – and this will probably be the last train ever to leave the station called Homo Sapiens. Those who miss this train will never get a second chance. In order to get a seat on it you need to understand twenty-first century technology, and in particular the powers of biotechnology and computer algorithms...those left behind will face extinction.*<sup>1</sup>

Yuval Hararis’ warning about the future of human development in *Homo Deus* provides a clarion call for those who lead the intellectual development of future military leaders. Building, maintaining and evolving military forces has absorbed the resources, and the minds, of civilisations from Mesopotamia through to the modern era. The application of this military force has been the subject of countless accounts across the ages. A common theme has been the centrality of effective military leadership.<sup>2</sup> As Van Crevald writes in his 1985 study of military leadership, *Command in War*, “the functions of command are eternal.”<sup>3</sup>

**Foundations, continuity and disruption.** There are three shaping factors in developing a future military leader. The first is the profession of arms and its provenance. Understanding the history of an institution provides steadier foundations for exploring potential future trajectories. As Michael Howard wrote, “warfare is one of the very few human activities that is clearly defined over time with distinct criteria for success and failure. Upon this knowledge has grown the profession of arms, which can and should make judgements about the past to draw conclusions which have an abiding value.”<sup>4</sup>

The second factor is knowledge of continuity in the wider environment. Regardless of changes caused by new technology and geopolitics there will be some enduring characteristics of the future environment is the key strategic trends. A third and final factor is disruption. Geopolitics, technology, work patterns, demography and more integrated approaches to national security are driving adaptation in nations around the world. Knowledge about this disruption provides insights about the types of functions that might be required of future military leaders and indications about the degree of change that might be required in PME systems.

Factor	Implications for Future Military Leader
<b>The Profession of Arms: The foundation for future adaption</b>	<ul style="list-style-type: none"> <li>▪ The military remains a profession, necessitating its members to possess deep expertise across a range of endeavours.</li> <li>▪ The members of the profession must be motivated primarily by values in the execution of their duties.</li> <li>▪ Loyalty to the state will remain a key driver for future military institutions.</li> <li>▪ Elements of the enduring nature of the profession: expertise, institutional cohesion, stewardship, adaptation, exceptionalism, and loyalty to the state.</li> </ul>
<b>Continuity: Enduring challenges</b>	<ul style="list-style-type: none"> <li>▪ Humans will continue to go to war.</li> <li>▪ States will continue to use force (or threaten it) to achieve national objectives.</li> <li>▪ Military institutions must possess mechanisms for innovation and adaptation.</li> <li>▪ Military organisations will need to educate their personnel to build an intellectual edge.</li> </ul>
<b>Disruption: Change in the Strategic Environment</b>	<ul style="list-style-type: none"> <li>▪ Military education must be undertaken within the context of evolving geopolitics and a return to strategic competition.</li> <li>▪ Bio-info tech revolution will fundamentally alter what we do, how we do it and how we develop our people. Human-machine teams and AI-supported decision making will be ubiquitous and we must educate and train our leaders for this.</li> <li>▪ Military officers must possess good technological literacy, and constantly update it.</li> <li>▪ Education of future joint officers must reinforce skills in the intrapersonal, interpersonal, and cognitive domains.</li> <li>▪ Future military officers must continuously educate themselves to remain contemporary.</li> <li>▪ Military leaders need to build their skills in collaborating with other services, agencies and nations throughout their careers: <i>joint by design</i>, not <i>joint qualified</i>.</li> </ul>

## Dealing with Disruption: A New Value Proposition for the Intellectual Edge

Over the next two decades, most Western militaries will be smaller than their adversaries, with a declining technological advantage. Compounding this challenge, they will fight in a new, highly technical and increasingly disaggregated physical-cyber operating environment. This is not an environment that can be shaped by mid-size and small military organisations. With the decline of one the technological edge that has been the preserve of Western military institutions for several centuries, and a potential lack of mass, they must evolve another. This must be an *intellectual edge*.

This intellectual edge must be constructed around the development of an ultra-professional intellectual military culture – from deployed forces, to education and training institutions through to strategic planning approaches. People in this system must be able to contextualise, plan, decide, act and adapt faster and more successfully relative to adversaries.<sup>5</sup> The best within this evolved culture, the elite military thinkers, must be celebrated and nurtured similar to how we currently celebrate and value elite sportspeople or elite special operations personnel. Institutional incentives to encourage elite thinking must be reinforced, and potentially, promotion pathways adapted.

To achieve an evolved culture, a new ‘value-proposition’ is required for the *intellectual edge* in military institutions. Military institutions must assess and articulate the benefit of the *intellectual edge* to future warfighting, proving that such an investment will lead to a more effective fighting force. Intellectual mastery of the profession of arms and the development of this intellectual edge must be openly viewed by all service personnel as a critical warfighting edge. This *intellectual edge* can only be achieved in military institutions through an increased investment in professional education and more sophisticated, open incentivisation of diversity of thought and widely-distributed learning approaches. And while military educational institutions must advocate for intellectual mastery, this is insufficient.

The most senior leadership of military organisations and the national security community must advocate for continuous intellectual development. This must be founded on an organisational vision<sup>6</sup> that provides a shared sense of purpose for developing an enhanced intellectual edge within the military institution. A clear, consistent and relevant vision for the intellectual edge will assist in coordinating the efforts required to stimulate its development in future military leaders.<sup>7</sup> It should answer the question *what are we about?* This can be answered with a succinct and easily understood response: *building clever, broad and collaborative people who possess an intellectual advantage over potential adversaries across the spectrum of conflict.*

### A Performance Based Approach

The development of the future joint officer is a multi-year odyssey. Noting the requirement for officers able to work in a more integrated national security environment, the performance specification for the future officer may need to be *joint by design* rather than *joint qualified*. Given the length of time over which officers develop, the best approach is to divide it into a series of steps (or stages) that comprise a logical professional progression. The Australian Defence Force recently designed five stages of an individual’s intellectual journey from cadet to General and correlates with key phase changes in one’s career.<sup>8</sup> These five stages, while focussed on contemporary skills, provide a baseline for assessing future needs. Informed by the imperatives of the profession of arms and changes in the strategic environment, a hypothesis around future skill sets and behaviours might be developed to inform what performance is required from future military leaders at different stages of their professional development.

Professional Foundations	Developing Tactical Mastery	Operational Artist	Nascent Strategist	National Security Leader
Training and Years 0-4 in commission	Years 5-10 in commission	Years 10-15 in commission	Years 15-25 in commission	Years 25 onwards in commission

## Developing a Future Intellectual Edge

Building an intellectual edge has both institutional and individual manifestations. But it is, at its heart, about people. As professionals, our personnel must expand not only their skills and physical abilities but enhance their intellectual capacity for a wide array of tasks for which they may not have been specifically prepared. This will require a *whole of enterprise*, unified approach to maturing the future joint officer. It should comprise a systemic approach focused on the outcome of producing people that are ready for contemporary and future challenges. Some key initiatives are below.

**Futures, Education and Adaptation.** The curriculum of military institutions must be informed by an institutional view about the future environments its people will operate within. Military education must form closer and more substantial linkages with organisations – in the military and beyond – that undertake futures work. There should be a transparent and logical pathway from informed views of the future, and type of intellectual development received by the future joint officer. To retain relevance and remain at the forefront of best practice, our PME system must also complement its future work with mechanisms for adaptation. The system requires formal mechanisms to identify the need for change, make informed decisions about change and to make those changes in a timely way.

**A Continuum and Continuous Learning.** Future military institutions require a continuum with functional descriptions of what the future military leader must be capable of at various stages of their professional journey. An institutional curriculum must underpin this. It should not however be an industrial age production line. It should form a ‘backbone’ around which individually tailored intellectual development might be constructed. Murray and Millet, in their examination of inter-war military innovation, found the military leaders were better able to lead and invest in innovative new ideas and technologies when they had undertaken continuous learning throughout their careers. They noted that *professional military education must remain a central concern throughout the entire career of an officer*. Military institutions must *foster a military career where those promoted to the highest ranks possess the imagination and intellectual framework to support innovation*.<sup>9</sup> In developing the future joint officer, we must ignite their desire to learn on entry to the military, and avoid long temporal gaps in formal professional development activities. Experience does not adequately fill current gaps, and is less effective without an educational foundation.

**Access.** Much of contemporary Joint education and individual training is delivered in a residential setting. While this provides for good learning outcomes, it results in only a small percentage of military personnel gaining access to Joint learning opportunities. We need to break down geographic, technical and cultural barriers to create a truly connected force where education is continuous and self-sustaining. The system to develop these future joint officers should be accessible to them, all military members and Defence civilians, regardless of role, rank or location. There is much we can learn here from the civilian education sector, while also leveraging efforts such as the US DoD Advanced Distributed Learning Initiative.

**Guided Self-Development in the Global PME Eco-System.** In 1982, Major van Riper wrote on the requirement for self-study to complement formal education for officers. He noted the *responsibility for professional development between periods in formal programs rests with the individual officer*. *This is inherent in the nature of the military officer's calling*<sup>10</sup> Formal education in military institutions cannot cover all the needs in the intellectual development of future officers; it must be supplemented through self-study. Self-study will be most effective if it is complementary to formal educational experiences. The implication is that military organisations should provide curated resources that future joint officers might ‘pull down’ from their institution – using internet or other sources – to supplement their professional development. These curated hubs of professional development material may be changed quickly to adapt to changes in the strategic environment or in technological developments. They are also be a resource that has a shorter adaptation cycle than the curriculum in military, and sustain an individual’s desire to learn between formal education activities.

**Skill, Re-Skill, Repeat.** The future environment is one where the construction and destruction of occupations and industries will occur more quickly than in previous industrial revolutions. As Harari has recently predicted, "...just as in the 20th century governments established massive education systems for young people, in the 21st century they will need to establish massive re-education systems for adults."<sup>11</sup> Therefore, future military institutions will need to possess a system that is built around skilling and rapid re-skilling their officers (and all of their personnel) as technology and strategic circumstances change. We might question whether our current people have the education and training to be relevant in just a decade, given technological developments. We could imagine having to re-educate entire generations of military leaders in the next decade because of the impact of these new technologies, and because of the historically unprecedented acceleration in technological change.

**Innovation and Engagement.** Finally, the pace of change in technology is accelerating. While this has impacted wider society, it is also disrupting long-standing approaches to training and education. Technology has enabled a more 'connected' approach to learning. This is resulting in a gap between older (or heritage) institutional education models and the newer digitally-enabled approaches. New learning approaches are now available for students who may have been excluded from existing models. However, as Cathy Downes describes, by comparison with many other sectors, the higher education sector has evolved extremely slowly and in a very patchy way.<sup>12</sup>

For students, new learning technologies (built around adult learning) present an expanded range of opportunities for students to learn through their own discovery, and by their own collaborations. As the explosion in number of military themed blogs, and self-study sites such as *The Cove*<sup>13</sup> attest, there is a significant appetite in today's junior officers for self-discovery and learning to complement and supplement more formal military educational experiences.

More recent digital age technologies offer even more advanced approaches to learning. The bio-info technology revolution offers the military profession multiple pathways to enhancing the intellectual capacity of individuals and institutions. Artificial intelligence may significantly change the way militaries educate their personnel. In combining knowledge and expertise of teaching, knowledge of subjects being taught and knowledge of learners, AI may underpin an expanded range of potential activities to support the learning of military personnel. Biotechnology, particularly neurotechnology, proffers capabilities such as cognitive enhancement, implanted memory and using expanded knowledge of the brain to inform better artificial intelligence algorithms. The impact of these technologies on learning and developing future military leaders might be an area of collaboration across Western military institutions.

Finally, engagement between like-minded military institutions must improve. There is a wide array of ideas in military education being shared online – but this is not always replicated between institutions. Enhanced sharing – of best-practice curricula, of outstanding academic personnel, new learning approaches, and new military theories – must be one of the cornerstones of our approach to Western military alliances.

## Conclusion

Our security environment has fundamentally changed. We must deal with future threats that the application of technology and mass will not solve. Only through thinking better and building the intellectual edge in our people and institutions, will we have an improved capacity for securing future national interests and retaining a full measure of national sovereignty. While the many of the skills required may change, and the human composition of these forces continues to evolve, the intellectual preparation of military people for the demands of future conflict is an enduring requirement. In his book, *The Big Stick*, Eliot Cohen quotes Abraham Lincoln, stating that "as our case is new, so we must think anew and act anew."<sup>14</sup> In developing an intellectual edge in their future leaders in these new circumstances, military forces must also think anew and act anew.<sup>15</sup>

## End Notes

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- <sup>1</sup> Yuval Noah Harari, *Homo Deus: A Brief History of Tomorrow*, Vintage Books, London, 2015, p. 319.
- <sup>2</sup> Among the best studies of historical military leadership and continuities in military command, are: Van Crevald, M., *Command in War*, Harvard University Press, Cambridge, 1985; Kegan, J., *The Mask of Command*, Penguin Books, New York, 1987; Marshall, S., *Men Against Fire: The Problem of Battle Command*, William Morrow and Company, New York, 1947; Hanson, V., *The Soul of Battle*, Anchor Books, New York, 1999; Slim, W., *Defeat into Victory: Battling Japan in Burma and India 1942-1945*, Cooper Square Press, New York, 1956.
- <sup>3</sup> Van Crevald, M., *Command in War*, Harvard University Press, Cambridge, 1985, p. 9.
- <sup>4</sup> Howard, M., “The Use and Abuse of Military History”, reprinted in *Parameters*, Vol. XI, No. 1, March 1981, p. 12.
- <sup>5</sup> A very similar logic to this was applied in our development of the Australian Army *PME strategy* in 2017. I am indebted to LTCOL Tom McDermott in particular for his contributions.
- <sup>6</sup> An excellent discussion on the use of organisational vision in military institutions is Builder, C., and others, *The Army in a Changing World: The Role of Organizational Vision*, RAND Corporation, Arroyo Center, Santa Monica, 1990.
- <sup>7</sup> Builder, C., and others, *The Army in a Changing World: The Role of Organizational Vision*, RAND Corporation, Arroyo Center, Santa Monica, 1990, p. 68, 78.
- <sup>8</sup> This five stage approach was endorsed in July 2018 as part of the development of a new Joint Professional Military Education continuum in the Australian Defence Force.
- <sup>9</sup> Murray, W. & Millet, A., (eds), *Military Innovation in the Interwar Period*, Cambridge University Press, 1996, p. 327.
- <sup>10</sup> Van Riper, P., *A Self-Directed Officer Study Program*, US Army War College, 1982, p. 1.
- <sup>11</sup> Harari, Y., “Why Technology Favours Tyranny”, *The Atlantic*, October 2018. Source: <https://www.theatlantic.com/magazine/archive/2018/10/yuval-noah-harari-technology-tyranny/568330/>
- <sup>12</sup> Downes, C., “Rapidly Evolving, Digitally-Enabled Learning Environments: Implications for Institutional Leaders, Educators and Students”, in Doughty, Wells and Hailes (Eds.), *Innovative Learning: A Key to National Security*, The Army Press, Kansas, 2015, p. 107-108.
- <sup>13</sup> The Cove is an Australian Army curated hub of PME material that we launched in December 2016.
- <sup>14</sup> Cohen, E., *The Big Stick: The Limits of Soft Power and the Necessity of Military Force*, Basic Books, New York, 2016, p. 226.
- <sup>15</sup> Ryan, M., “Mastering the Profession of Arms, Part III”, *War on the Rocks*, 23 March 2017, source: <https://warontherocks.com/2017/03/mastering-the-profession-of-arms-part-iii-competencies-today-and-into-the-future/>