



The Criticality of Education in Modern Air Forces

by Sanu Kainikara

FOREWORD

Air power is increasingly the military power of first choice of western nations in settling international disputes. Air forces, therefore, must develop their members to the highest order of professional mastery to ensure they can generate the required effects at all levels of conflict. Professional mastery must pervade the individual and the organisation at all levels if an air force is to establish its credibility as a force of strategic relevance.

This monograph argues that the key for air forces to maintain their professional edge is to have an enduring career long education program that will prepare their members for the challenges that they will face in a rapidly changing world. This is a long term investment and commitment which requires leaders to focus their attention on the professional development of their people, including grooming the future leaders of the organisation. Training regimes which are designed to provide technical mastery can only go so far in preparing people for the future. It is only through robust education programs, established and driven by visionary leadership, that the organisation can create an agile, fully professional force capable of decision superiority at the strategic, operational and tactical levels.

Education is a cornerstone to professional mastery. The professional mastery of an air force forms an integral part of nation-building by assuring air power's ability to secure the national interest in concert with other parts of national power. An air force that has achieved the highest level of professional mastery can offer greater fidelity to the options presented to government in times of crisis.

I commend Dr Sanu Kainikara for informing the debate about the criticality of education within air forces. I encourage air force members at all levels to read this monograph as it outlines the educational requirements for an air force of influence.

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The primary purpose of Professional Military Education is to develop military officers, throughout their careers, for the rigorous intellectual demands of complex contingencies and major conflicts. The United States cannot afford to be complacent when it comes to producing leaders capable of meeting significant challenges, whether at the tactical, operational, or strategic levels of warfare. Military officers must think critically, communicate well, conduct themselves with integrity and lead others to perform strenuous tasks in difficult and often dangerous situations. As a matter of national security, the country's continuing investment in the PME system must be wisely made.¹

INTRODUCTION

The world is passing through a phase of convoluted relationships between nations, and also witnessing overt and covert acts of aggression on the part of recognised States as well as non-state entities. This requires more stable nations to assist the more volatile ones to improve their security environment, which is often achieved through the deployment of military forces into areas of instability. Such deployments can happen unexpectedly and rapidly, increasing the challenges that come with expeditionary operations. However, a military force is expected by a government to be able to meet these requirements in a timely fashion, and at a required level of competency.

Air power is an essential and critical element within Australia's national security structure. Fully understanding all the nuances in the application of air power is perhaps more complex than doing so for other military capabilities. It was Winston Churchill who said, 'Air power is the most difficult of all forms of military force to measure, or even express in precise terms'. This saying holds true even today when technology has enabled air power to become ever more complex and sophisticated. A competent air force must be able to generate, sustain, and employ a balanced, credible and sophisticated range of air power capabilities across a broad spectrum of operational contexts. Creating such an air force is a dynamic process and prone to challenges in myriad areas.

A competent air force is built on a number of fundamental pillars that are critical to its well-being. A critical pillar, one that cannot be substituted with anything else, is a skilled workforce able to operate and function at the leading edge of technology.² Air power today, more than ever before, is based on the ability to create an air force that can employ and sustain modern air systems. This is a major undertaking requiring a number of disparate elements and components within the national power equation working in close conjunction with each other, and requires coordination at the highest levels of national security decision-making. Only a professional and effective air force stemming from a substantial technology base can achieve this sophisticated outcome.

There is an indelible connection between the competency of an air force and its workforce—the more skilled the workforce, the higher the competency that the force will be able to bring to bear. Obviously this holds true when all other factors such as a competent national security strategy, adequacy of resources, assured technology

1 *Another Crossroads? Professional Military Education Two Decades After the Goldwater-Nichols Act and the Skelton Panel*, U.S. Congress, House of Representatives, Committee on Armed Services, Subcommittee on Oversight and Investigations, Washington D.C., U.S. Government Printing Office, April 2010. p. vii.

2 Here the distinction between 'leading edge' and 'cutting edge' of technology needs elaboration. Cutting edge is when the individual or organisation is functioning in the space where the technology has not yet been proven and therefore could possibly fail, whereas leading edge is when the functioning space in terms of technology encompasses the latest and most advanced innovations that have already been proven and has been put into operations. The difference is subtle but of great importance to generation and sustainment of air power, especially for small and medium air forces since they generally operate at the critical mass and therefore will not have the spare capacity to absorb the negative impact of a failure.

availability etc. are taken as being in-place. A skilled workforce is therefore a vital foundational requirement to create and employ a competent modern air force, although it is only one of the many factors that come together in the process. There are other equally important and critical elements that must be carefully and proportionately moulded to create a cohesive and successful air force.

The challenges to achieving the necessary level of cohesiveness is far greater today than it was even a few decades ago, primarily because of quantum leaps in technological innovations. These innovations have catapulted air power, its generation and employment into hitherto unknown levels of efficiency and effectiveness. Generating air power today is an exacting and extremely technology-intensive enterprise. The individual and collective human element at the core of an air force requires a very high level of proficiency, knowledge and expertise in areas that are unique to the generation of air power. Such a workforce—that draws upon the collective expertise of all members—can only be created through rigorous training and education.

Wars have never been, and even today cannot be, won solely through the optimised employment of technology and training. To a certain extent, technology-facilitated massive firepower, as can be produced by air power when necessary, can become an advantage in the battlespace. However, training only caters for the basic viciousness of battle at the tactical level of its conduct—essentially in a context wherein the majority of possible options, of both the adversary and own forces, are known. Education caters for understanding and critically analysing the developments that the commander does not initially foresee. Comprehensive education makes sure that commanders, and through them the force, is not surprised and immediately overwhelmed by anything that the enemy does. Battle-winning capability may be inculcated through training, but only education provides the holistic capability to enact a war-winning strategy.

The importance of education to the long term success of an air force can never be over emphasised.

AIR FORCES AND THE WORLD TODAY

The world today is heading into an era of increasingly complex security challenges made more complicated by the fluid state of global power arrangements. This brings with it the certainty of strategic ambiguities at the global geo-political level and leads to unwarranted and unwelcome volatilities in the basic security environment. The assurance of steady international relations and the global peace that they brought are things of the past. From a global security perspective, perhaps the most noticeable change to have occurred in the past two decades is that the world can now be characterised by zones of peace and zones of conflict. Further, violent extremist groups and non-traditional threats may disrupt the peace and security of a region, and at times even globally, rapidly and without warning. Stated bluntly, the international security equation is now full of uncertainties and not under the control of any one or a group of nations.

In such times of insecurity and strategic vagueness air power provides sophisticated and nuanced strategic options to Government to ensure national security and the achievement of national objectives. From the late-1980s, air power has become the first-choice option as a decisive tool of national power in conflict. The demand in these contexts is not solely for the application of lethal force but also to provide support and contribute to non-warlike activities such as the provision of humanitarian aid and disaster relief (HADR). The final result has been the broadening of the relevance of air power across the spectrum of conflict from HADR to the conduct of a war of national survival.

In the current climate of declining defence budgets it is not possible for small or medium air forces to maintain a force large enough to cater for all contingencies across the spectrum of conflict. In addition, the unpredictability of emerging crises and often the rapidity of their onset add to the challenge of applying air power judiciously in a timely manner. This poses a significant challenge for air power professionals to generate and apply air power of the necessary calibre, rapidly and with sufficient flexibility. Only focused and optimised training processes and foundational education of the workforce will be able to successfully address this litany of challenges. The need to optimise training and provide holistic education for the workforce to overcome these challenges has never been more acute.

Air force personnel today need to expand their professional competency beyond the operation of technologically superior systems and become professional masters of air power with a very broad understanding of the

intricacies of applying air power to achieve the required joint effects. They also need to be able to understand and appreciate the continuum that leads from tactical actions through to the strategic level of national security. The ultimate achievement of a professional master is the capacity to nurture and retain the ability to conceptualise and institute strategic options aimed at securing national interests.

EDUCATION AND MODERN COMBAT – THE INDELIBLE CONNECTION

At the fundamental level, education creates the ability to construct an in-depth understanding of a particular subject. In this context, the subject could be minutely focused or very broad in its scope. This basic understanding is necessary to create a free-ranging opportunity to further develop the knowledge gained without any constraints, while also providing the wherewithal to overcome any serious limitations that arise in this pursuit. In a military context, the ability to apply knowledge that has been gained through a number of different means is at the core of professionalism.

The fundamentals of education have undergone a generational change over the years, from a ‘telling’ culture to an ‘asking’ culture. The methodology adopted to deliver education has gone from knowledge being pushed to the recipient, normally in the form of a traditional classroom and lecturer process, to one where the information is made available from multiple sources, synthesised by the recipients themselves. Further, information may indeed be forthcoming from the recipient body, independently or collectively.

The Demands of Modern Combat

Modern combat is complex and conducted with the use of state-of-the-art technology as well as sophisticated concepts of operation. As such, it demands four core personal abilities from practitioners. Each of them have their own sub-spectrums. First, the tempo and intensity of modern combat varies without warning and this requires intellectual agility of a very high order to understand and function competently within the overall context of the conflict. Second, the risks, challenges, and threats that emerge in modern conflict scenarios are much broader than they have ever been in the past. The situation demands a wide-ranging understanding of these factors from military personnel not only in relation to the battlefield but to the national security equation at the strategic level.

Third, there must be a clear and critical understanding of the motivation of the adversary and their immediate and long term objectives. This aspect assumes greater importance in contemporary conflicts where, more often than not, the opposing force is non-conventional in nature. Information regarding the possible actions at the tactical and operational levels will provide an insight into the functioning of the adversary’s system. However, knowledge regarding the motivation, which in turn gave rise to the conflict itself, is necessary and critical to initiating the right actions to arrive at a long term solution to the issues that have created the conflict. Appropriate strategic effects can only be created with an in-depth understanding of the various facets that motivate the adversary to fight. This factor emphasises the need for adequate awareness across all levels of the force.

Fourth, decision-makers at all levels of command need to have the knowledge of relative capabilities of the adversary and own forces. Only a correct assessment of this relativity will provide the background necessary to leverage one’s own strengths, establish the centres of gravity of the adversary, and ensure the optimised employment of available military resources.

Satisfying the Demands

Satisfying these four core demands compels military personnel to be multi-faceted. Only a balanced combination of technical and operational expertise and an adequate level of strategic awareness will provide the required input into making superior decisions. Therefore, creating a ‘balanced’ air force requires the spread of systems to generate air power and the depth of expertise resident in its personnel. Technical and operational expertise is built predominantly through training that is oriented towards facing ‘known’ situations and slight variations to them. In terms of air power it deals with the lower levels of application of air power, the actual physical act of employing a system in the most effective manner.

On the other hand, strategic awareness can be considered to be only 10 per cent training and is almost entirely built on education. Strategic awareness is dependent on the ability of a person to critically examine the

current and emerging situation. Correctly identifying the emerging situation in turn is underpinned by the ability to understand the ‘unknown’, which then provides the person with a greater ability to make calculated judgements. Normally there exists a visible gap between technical expertise and strategic awareness, especially in the middle-level command positions. However, a competent military force will create a system by which this gap can be bridged—through building professional mastery across all levels of command.

Modern combat demands professional mastery of the appropriate depth from all practitioners of the art—soldiers, sailors and airmen, as well as cyber and space specialists alike. Military commanders must have the ability to identify the core issues from the mass of information that is provided to them in a conflict situation. At critical junctures, with too many unknowns in the equation, training can prepare a commander only so far—individual and organisational education fills the gap and is the key to success.

PROFESSIONAL MASTERY AND EDUCATION

Professional mastery in simple terms can be described as mastery of a chosen profession. This requires a demonstrated understanding of the body of theoretical work that underpins the profession as whole.³ The concept of being a profession has long been associated with military forces and in recent years has been further entrenched in a nuanced manner because of the sophistication in conceptual thinking and operational art required to employ modern military forces effectively. In military terms, professional mastery is defined as the sum of an individual’s depth and breadth of knowledge and understanding of a profession combined judiciously with the ability to apply it through the lens of personal experience and intellect.⁴ Similar to its application, the end-state to be achieved by a military force has also increased in complexity over the years. At the same time, achieving the desired level of professional mastery as a military professional has become increasingly difficult and arduous for two reasons.

First, the body of theoretical work that underpins the efficient and effective functioning of modern military forces is equal to, if not more than any other profession. An individual must master the theory to become a professional in the art and science of applying military forces to achieve broad national security objectives. Becoming proficient in the desired areas is an onerous, and at times daunting, task. By failing to do so a military force could be gambling with national sovereignty. Unlike in other professions, the military does not have the luxury of being given a second chance to secure the nation in the face of direct threats.

Second, the set of competencies that have to be mastered are more sophisticated and nuanced than in most other professions. In modern conflicts, even at the lowest levels of task-completion, the competencies required to ensure success and achieve excellence are of a high order. Therefore, professional mastery has to be made part and parcel of the entire force and the necessary competencies cultivated in command levels across the entire force. Strategic awareness can only be created through the highest level of competency that in turn leads to professional mastery. Understanding and interpreting the theory necessary to achieve professional mastery requires concerted education.

Education

Education is the activity of learning, clarifying and understanding the guiding principles of the theory and concept of a particular subject. The process of education could also reinforce the knowledge that a person already possesses regarding a profession, gained through training and experience. Education provides the principles and detailed knowledge required to practice a profession, being the foundation upon which professional mastery is built. It aims to develop people’s thinking and thereby influence their behaviour, focusing primarily

3 A profession is defined by its distinctive and unique set of competencies to perform the tasks necessary of the profession, and is underpinned by an acknowledge body of theoretical work. Further, an individual needs to possess and demonstrate a minimum laid down level of competency to be considered a professional. For a detailed analysis and explanation of the concept of professional mastery see Sanu Kainikara, *Professional Mastery and Air Power Education*, Working Paper No 33, Air Power Development Centre, Canberra, October 2011.

4 *The Air Power Manual*, Australian Air Publication 1000-D, Sixth Edition, Air Power Development Centre, Canberra, p. 231.

on the cognitive domain through improving the ability to analyse, comprehend, synthesise, communicate and evaluate. In other words it is the primary tool for the development of professional mastery, which is the critical ingredient to transform a force from operational excellence to strategic proficiency and influence.⁵ Education creates the requisite intellectual rigour within an organisation to encourage innovative thinking that in turn creates superior solutions to known and emerging challenges.

Military education, while similar to general education within any profession, must aim to achieve three objectives. First, it must be oriented towards mastering the theory of military operations; second, it must create a continuum that takes the student from entry into service all the way to the highest levels of strategy and doctrine; and third, it must be complementary to the training being imparted at all levels. Within the national security calculus it must be the connection between the tactical and operational excellence of the force in the field and the strategic relevance of the force at the highest levels of decision-making.

Training. There is a prevailing misunderstanding regarding the relationship between education and training with the terms being often used interchangeably. Some even go as far as to advocate the misconception that education is a sub-set of training. Nothing could be further from the truth. If anything, the relationship is the other way round—training being a subsidiary contributor to the broader education of an individual. In fact, the differences between training and education are neither negligible nor irrelevant. Training is skill-oriented and based on the practical application of a particular skill set, whereas education provides the background knowledge for the individual to understand the why and wherefore of a particular action. It also provides a very broad ability to extrapolate past and contemporary events towards obtaining a rough picture of the future. Jay Cross, an educator who is credited with inventing the term ‘e-learning’, explained the difference between education and training very pithily when he made the statement, ‘If your sixteen year-old daughter told you that she was going to take a sex education course at high school, you might be pleased. What if she announced she was going to take part in some sex training at school?’⁶

Professional mastery of air power is a foundational element of an air force of high calibre and strategic relevance. There is a direct link between the professional mastery of individuals and education and it is the combined professional mastery of all personnel which makes an air force achieve holistic professional mastery. Air power education should focus on the three facets—history, theory, and practice—that contribute to a force being able to develop, sustain and optimally apply air power. In this context professional mastery should be understood in its broadest definition, although it means different states of individual development dependent on the level at which an individual functions.

At the tactical level, professional mastery is superimposed by the technical mastery necessary to operate an air power system optimally while also instinctively understanding the connection between the functioning of that individual system and how it forms part of an integrated system that generates, sustains and applies air power optimally. This integrated system needs to be dynamic, sophisticated, contextually flexible and agile. At the operational level, which can be equated to the middle and lower levels of command, it involves a deeper knowledge of how the desired effects are created by the integrated air power system. More importantly it requires the individual to have a more than cursory understanding of how the effects that have been created fit into the broader effects being created to achieve strategic military objectives.

The zenith of professional mastery is achieved at the strategic level of command and decision-making. It involves having a broad appreciation of long-term national objectives, national security requirements to facilitate their achievement, and a clear understanding of the contribution of air power and broader military power, across the spectrum of conflict, to achieving these objectives. This seems a deceptively simple state to achieve. However, professional mastery at this level is very sophisticated and is rarely achievable without adequate, appropriate, concerted and continual education. Strategic professional mastery is the pinnacle of the military profession,

5 Field, Brigadier Chris, ‘Reinvigorating the Australian Army’, Review Essay in *Australian Army Journal*, Volume XI, No 1, Winter 2014, p. 78.

6 Quoted in Barnes, Chris, *Education and Training – What’s the Difference?* 13 June 2014, <<http://elearningindustry.com/education-and-training-what-is-the-difference>>, accessed on 2 June 2015.

achieved not only through promotion to the higher levels of command, but also accrued through a combination of command experience, personal intelligence, and institutional and individual education.

EDUCATING AN AIR FORCE

Air forces are uniformly technology-enabled and dependent and therefore a great deal of importance is laid in achieving the technical mastery required to operate air power systems effectively. This tends to shift the focus towards creating a proficient force at the operational level. Creating the necessary level of operational proficiency can be a time consuming process that requires dedication from all personnel. Even after achieving the desired level of operational proficiency, an air force has to continue to make long term investments in order to ensure that it is maintained at the required level at all times. In this respect falling short is not an option.

While operational proficiency is both a desirable and necessary objective, the strategic relevance of an air force cannot be assured by operational successes alone. Educating personnel to the degree required for each individual to become professional masters is therefore essential, if the force is to become and remain one of strategic relevance. In fact, paced education—provided at the appropriate level to all personnel—is the cornerstone for an air force to become a competent element in the strategic levels of national security and a relevant element of national power.

The combination of the requirement to be operationally proficient and have educated airmen to ensure strategic relevance may cause some challenges to surface, predominantly at the operational level. Further, most of these challenges are intensified for middle power and small air forces that are constrained to operate at or just above critical mass in terms of personnel. This is also true of capability and systems, but their criticality is not directly relevant to this paper and is not further explored. Only by overcoming these varied challenges can an air force be certain that it is truly on the road to professional mastery and strategic relevance.

The Major Challenges

Most air forces across the world are described as either medium or small in terms of size and numerical capability. On the other hand, the spectrum of conflict in which these air forces are expected to operate has expanded in the past few decades to include a very large swath of contingencies. The end result is that these numerically constrained air forces may well be forced to operate at their critical mass on occasions and potentially for extended periods. The impact on the education process of its personnel when functioning at critical mass is that air forces become reluctant to release the necessary numbers for educational courses. A force at critical mass will not have the luxury of having a contingency staffing establishment that permits the backfilling of a position when the incumbent is away on a course.

While operating under at a high tempo, this reluctance is understandable and if the tempo increases, then releasing personnel might even become an operational impossibility. This applies particularly to the core of personnel considered to be the ‘best and the brightest’. Paradoxically, these are the same personnel who the Service would want to educate in a focused manner as future leaders and commanders.⁷ In these circumstances a tendency to ‘select’ personnel of a lesser calibre for educational courses could set in at the command level. The challenge of this situation is that incrementally it would bring in the acceptance of mediocrity as being normal, which will lead to the long term deterioration of the professional capacity of the force. The professional mastery continuum of the force as a whole could become warped, if this challenge is not effectively mitigated before damaging effects become apparent.

The second challenge for numerically small forces is making time available for an individual to pursue educational qualifications while being engaged in operational duties. The focus in operations is on technical mastery of individuals to ensure that the integrated system that generates, sustains and applies air power is

⁷ In terms of releasing the best and the brightest, senior officers must understand the benefits of creating educational opportunities for the ‘rising stars’ in the organisation and be committed to providing it. They must accept that such education, which may have been denied to them for the very same reasons, is a necessary overhead to be absorbed that in turn will result in creating a professional master of high calibre.

functioning optimally when and where required. This is appropriate, since the ultimate demonstration of the efficacy of an air force is its performance in operations. For an air force functioning at its critical mass, the requirement to have proven superior technical mastery in individuals leaves limited time available to be devoted to individual educational development aimed at fostering professional mastery. Individual education is one of the first casualties of an increased operational tempo.

The third challenge is the perception that individual education is not important to the operational functioning of the force. The connection between education and individual performance may not be directly visible when operational effectiveness is measured, and therefore may be considered unimportant to the direct completion of the task at hand. This perception is pronounced when an air force is operating at a high tempo at its critical mass with no spare capacity to draw upon. The force may not be able to 'spare' anyone to undertake personal educational development courses. Short term operational imperatives almost always trump long term educational needs, once again leading to the long term detriment of the professional capacity of the force.

The fourth challenge is another misperception—that experience will cater for the lack of education and that professional capacity of the force will be ensured through the senior people of the force. This belief is based on the assumption that the more senior a person is in the Service, the more wisdom he or she will possess. In a simplistic manner this could be considered an acceptable axiom. However, the caveat to this is that the more senior persons should have spent sufficient time and energy in educating themselves and only then will the axiom hold true. This belief is also based on a slightly anachronistic view of the profession-of-arms where experience was highly regarded and rewarded. However, in the high-technology world of modern air power there is no sacrosanct rule that connects wisdom, knowledge and proficiency to experience other than to signify that all of them are intricately interconnected.

In combination, these challenges coalesce into a large challenge for medium and small air forces—the absolute necessity to create an educational process that provides appropriate and adequate inputs at the pivotal points in the career of each chosen airman. This process must be held to be inviolable irrespective of the operational tempo, numerical and resource constraints, and any other short term impediment to educational excellence. Only through individual educational excellence can an air force hope to achieve collective professional mastery.

The Opportunities

Addressing the aforementioned challenges will generate opportunities to improve individual professional mastery and thus enhancing the overall professional capacity of the force. At the functional level the challenges can be directly met by giving demonstrated credence to education from an organisational perspective. This can be partly achieved by creating an institutional expectation, which should be set at a very high level, to instil a culture of self-learning. In order to develop this culture it may be necessary to inject a moral imperative for the individual, already on tight schedules, to find the required time to engage in education.

While encouraging self-education the force should also at all times, irrespective of the operational tempo, appoint, reward and encourage a small number of selected personnel who have achieved the highest standards of technical mastery to further their educational requirements. This will be a clear message to the force that the organisation as an entity values education and puts a premium priority on achieving educational excellence. By doing so, even a small force operating at its critical mass will be able to create a dedicated cadre of qualified personnel, a core group, starting on their path to professional mastery. In the long term this will create depth in the strategic thinking of even a small air force and be a catalyst for its transformation into a force of strategic influence in the national security arena.

Personnel selected to further their education need to be self-motivated and of a high calibre and should be provided targeted educational opportunities. If this process fails—by the selection of inappropriate personnel or not providing the opportunity for education at all—the force will inevitably follow a downhill path in professional development and gradually decline into one of limited stature and consequence as an element of national power. However, the identification and targeted professional development of high calibre personnel will only be relevant when they can be employed to leverage this education. For air forces functioning at their critical mass this may be difficult since they have very limited spare capacity for growth after their operational requirements are met. This will be a fine balancing act that if not achieved could lead to diminishing returns

for the professional growth of the force. Strategic leadership will have to carefully make these decisions and monitor the professional progress of the force, providing nuanced and hands-on leadership when required.

Further, air power education is not a subject that is readily found on the curriculum of most universities. Therefore it is incumbent on air forces to provide the necessary air power educational courses, and the opportunity to attend them to its personnel. Such an approach will also provide an impetus for future individual educational enterprises.

The fundamental intent in implementing any mitigating strategy to neutralise the challenges that arise out of personnel and resource constraints should be to create and sustain the organisational intellect across the entire force.

ORGANISATIONAL INTELLECT

All successful organisations have a consolidated repository of ‘corporate’ knowledge that can be used when the organisation is faced with new and emerging challenges. This is organisational intellect—a repository of the holistic knowledge of an organisation. It needs to be realised at a high level through a concerted effort to continually add to it, as well as to modify existing information to suit changes that take place in the operating environment. In the case of an air force, organisational intellect plays a fundamental role in aligning it with the dynamic security environment, national security objectives and providing the guidance for it to function within the national security strategy. Therefore, organisational intellect constitutes a combination of the institutional memory of an air force that encompasses the lessons from history, at the strategic level of decision-making and derived from operations; doctrine, theory and concepts of air power viewed dispassionately as an element of national power; and an understanding of the factors that impact, directly and indirectly, the operational efficiency of the force.

These three broad inputs to organisational intellect are brought together through the human element within the force. Only a well-educated work force will be able to create the core mass necessary for organisational intellect to become a true capability that can be tapped at any time and act as a force multiplier. There are two distinct functions that organisational intellect delivers.

First, it is the guiding force in the employment of knowledge, both institutional and individual. This in turn facilitates the ability of the force to alter and optimise the employment of air power in a contextual manner thereby enhancing the inherent flexibility of the air force. Second, it is the catalyst for acquiring and absorbing new knowledge as an organisation. Organisational intellect acts as the system that dove-tails new knowledge with the existing knowledge bank of an air force, altering the final output in a nuanced manner to suit the context in which it is being employed. Only organisational intellect, underpinned by concerted educational processes, will be able to assure the intellectual capacity and subsequent superiority of an air force.

Organisational intellect is difficult to quantify, but when it exists, it creates an organisational value greater than the sum of its tangible assets. In the case of an air force, organisational intellect is the glue that binds individual systems into an integrated system that generates, sustains and applies air power. Such a system with adequate organisational intellectual underpinnings will invariably be dynamic, sophisticated, contextually flexible and agile. Organisational intellect provides a holistic and across-the-board knowledge and understanding of strategic goals and the optimum manner in which they can be achieved. At its highest levels of purity, organisational intellect provides a complete belief in the organisational purpose, and the theories that support it. Education is irreplaceable as the foundation for building and sustaining adequate organisational intellect in an air force, without which the force would gradually lose strategic influence and stop being a relevant element of national power.

EDUCATION AND LEADERSHIP

There is an umbilical connection between good leadership and education, particularly in the case of military leadership. Professional mastery of a high order is a prerequisite for effective leadership, from the tactical to the strategic level. As the uncertainty in the security environment increases into the future, military leaders will need to solve complex challenges with limited outside guidance, reconcile the context of a situation along with the inevitable ‘unknowns’, and adapt the actions that have to be initiated to achieve optimum effects. General Martin Dempsey, Chairman of the USA Joint Chiefs of Staff, argued that developing such leaders is the best hedge against the uncertainties of the future, which are sure to create fog and friction on the battlefield. He stated that ‘Leadership is what will see us through when our organisational structure is not perfect, when technology comes up short, when training misses the mark, and when guidance is late to need.’⁸

Education for military leaders should meet a two-pronged, and at times contradictory, requirement to deliver long term objectives. First, it must serve the near term warfighting needs of the force; and second it must provide, strategic, critical thinking-based education to cater for the long term needs of the force. A military training approach to education will not meet these dual requirements.⁹ Two fundamental issues that challenge the proper resourcing and structuring of military education have been identified. The first is institutional in nature: namely who teaches what, how, to what end, and with what vigour. The second is systemic in nature: the organisational support, both perceived and actual, to furthering education and how leaders manage the education program.¹⁰

Institutional Issues

The faculty of military education institutions are normally a mix of active duty officers, retired military personnel with academic qualifications and civilian academics. Unfortunately a number of surveys and evaluations that have been conducted in Western military forces, particularly in the higher education establishments of the United States military forces, indicate that the curriculum in most institutions lacks focus and relevance, and that there is an imbalance between theory and practice. Further, research and study tend to focus on readily recognisable ‘civilian’ disciplines rather than on the more difficult study of the military art. The reconciliation between generalist and specialist models was noted as being insufficient. The method of delivery was assessed to lack innovative teaching techniques and was more focused on a ‘training’ mode of delivery i.e. information transmittal rather than facilitating critical thinking and invigorating intellectual vibrancy. The pass/fail system in which everyone ‘passes’ does not impart sufficient rigour to the educational course and therefore dilutes the content and take away messages.¹¹

These shortfalls cannot be said to be universal in Western military forces, but are indicative of the institutional issues that face the educator as opposed to the trainer. In addition, the inability of military colleges to attract top civilian academics further diminishes the rigour of the curriculum and forces it to remain static for longer than it should. A dynamic curriculum delivered with rigour and establishing a merit-based assessment, rather than a pass/fail outcome that automatically sets a low bar, would create a better system. However, these remedial measures require organisational support to achieve the desired outcomes.

8 Dempsey, General Martin, ‘From the Chairman: Building Tomorrow’s Leaders’, *Joint Force Quarterly* 67, Fourth Quarter, National Defense University Press, St Louis, Missouri, October 2012, p. 2. <<http://www.dtic.mil/doctrine/jfq/jfq-67.pdf>> accessed on 29 June 2015

9 Johnson-Freese, Joan, ‘Educating the U.S. Military: Is Real Change Possible?’, <<http://warontherocks.com/2015/05/educating-the-u-s-military-is-real-change-possible/?singlepage=1>> accessed on 18 May 2015.

10 *ibid.*

11 Lamb, Christopher J., & Porro, Brittany, ‘Next Steps for Transforming Education at National Defense University’, *Joint Force Quarterly* 76, First Quarter, National Defense University Press, St Louis, Missouri, January 2015, pp. 40-47. <<http://www.dtic.mil/doctrine/jfq/jfq-76.pdf>> accessed on 29 June 2015.

Systemic Issues

Military educational institutions tend to favour the hiring of administrators with military background rather than with academic background, since the normally rigid military culture clashes with the more liberal academic culture in an overarching manner. Further, single Service culture tends to be biased towards operational excellence and overshadows the need for reflective education—training becomes more important than education in most cases. The issues are not insurmountable, although the choice of instructors must be carefully considered. The quality of instructors determines the quality of the education that is delivered.¹² Education must be tailored to ensure that military personnel are cognisant of the fact that professional mastery is rooted in the past, with a clear understanding of the present and a vision for the future.

OPTIMISING AIR POWER EDUCATION

Air power education is a relatively new discipline in the field of military education, which is not surprising considering that air power as we know it today has been part of military capabilities for only a century. Further, in the early days of aviation, the practice of air power came first and the development and understanding of theories—education—was commenced much later. To a certain extent this process is still embedded in the training and education continuum of most air forces. Training to employ the complex systems that produce air power is considered more important in the earlier stages of an airman's career, whereas education is at times even considered to be 'good to have' if the opportunity presents itself. Having an in-depth understanding of air power goes to the heart of every airman and is fundamental to establishing their credentials as a military professional.

Air forces generally tend to focus on action, which translates to technical mastery achieved through training, and only after achieving the desired level of operational excellence do they concern themselves with intellectual development through the discussion and debate of theory. In other words, air forces tend to concentrate on being tactically and operationally effective as a measure of their competence. Complementary to this approach is the fact that air forces tend to attract individuals who are instinctively good at 'doing things' rather than of the contemplative mindset.

In the current environment of austerity and increasing employment of military forces in operations that do not involve the direct application of force, the education continuum must be maintained without a break across an entire career. Immediate and temporary operational imperatives could cloud decision-making regarding the necessity for continuing education, which will be detrimental to the well-being of the force in the long term. In order to ensure that educational development does not suffer during times of heightened operational tempo, an innovative approach to air power education has to be adopted. Innovation circumvents traditional obstacles and also adds value to existing resources and processes. There are three education innovations that should be considered by all air forces, which are particularly relevant to the ones functioning at, or just above, their critical mass.

Innovation One – Distance Education

In just two decades, distance education has moved from correspondence courses based on a 'set of books' to on-line interactive courses that are flexible and adaptable. Taking advantage of the world-wide-web or internet, an increasing number of air forces are offering on-line education to their personnel. While in-residence courses provide the best education, such courses are becoming increasingly constrained in catering to the needs of the air force. The cost of conducting a year-long in-residence educational course is almost prohibitive both in terms of finances as well as the ensuing non-availability of quality personnel in the field. The institutional infrastructure and number of faculty required to cater for the required number of students adds recurrently to this financial burden.¹³ For air forces operating at minimal personnel strength and at a much higher tempo

¹² *ibid.*

¹³ Mahoney, Kathleen A., & Ackerman, John, 'PME and Online Education in the Air Force', *Joint Force Quarterly* 67, Fourth Quarter, National Defense University Press, St Louis, Missouri, October 2012, pp. 20-24.

than two decades ago, while also functioning within an enlarged spectrum of operations, the overheads become unsustainable for any more than essential courses such as Command and Staff Courses and a small number of professional military education courses.

Distance education and the conduct of on-line courses have distinct advantages for an air force functioning at its full capacity. In comparison to an in-residence course, this option is relatively more economical since overhead costs are minimised. Distance courses are also easier to conduct, both for the students and the instructors. Interactive technologies tend to foster critical thinking, which is a fundamental requirement of military education, since all educational courses must stimulate intellectual activity in the participants. These courses can be undertaken as self-paced modules, varying the pace of the course to cater for an individual student's regular workload and inclination towards education. This is an overriding advantage for air forces that are numerically constrained, geographically spread and operating at a high tempo. Distance education also retains the flexibility to include short duration in-residence modules to emphasise the core elements of a program if necessary.

There are two other advantages that can be leveraged in offering distance education. One, the numbers that can undertake the course is restricted only by the availability of moderators with sufficient subject matter expertise. Two, if the program includes a discussion forum, the students can benefit from the expertise and experience of all participants in a generic manner.

The use of the internet as an educational tool to gather and disseminate information is already an established trend. However, this process can develop into a double-edged sword. The obvious advantages are: the high speed with which great volumes of information can be transmitted or transferred; the open access and therefore availability of information that is placed on the internet; and the unlimited number of people who can simultaneously access the necessary information, at will and from far-flung locations. The same advantages can also become disadvantages and restrict the use of the internet medium, especially in the case of the military. The major disadvantages are: the questionable reliability of open-source information that is readily available; the quantum of information that can be converted to useful knowledge; the insecure nature of the information and even in the case where security protection is built-in, susceptibility to breeches; and that fact that information on the internet is more a pull-mechanism than the push-mechanism practised in traditional classrooms. Further, such courses can degenerate into multiple-choice options that add little to the learning process. These disadvantages can be mitigated and the internet optimised for use as an educational tool, although the cost of doing so in a secure manner might be relatively high.

Innovation Two – Shared Educational System

A number of military forces of allied nations share training facilities and carry out combined as well as joint training. There is a case to further investigate the feasibility of creating and sharing educational facilities. There are two major advantages that will accrue from such programs. First, the cost of developing and maintaining state-of-the-art educational facilities is increasing significantly with the greater demand for intellectual development being placed on military personnel. This is a direct result of the growing sophistication of the systems that are being operated to generate air power. A middle-size air force may not be able to sustain specialist educational institutions of the necessary calibre independently. Shared facilities may well be the answer to this vexed question of resources and demand.

Second, most military campaigns are now being conducted as coalition operations, where interoperability with allies and partners is vital for the success of each mission within the campaign. Interoperability at the tactical level is achieved through dedicated joint and combined training. From an air power perspective, one of the fundamental reasons to opt for coalition operations is the enormous resource requirements to function as a competent independent air force. The other (not really germane to the current argument) is the need for political legitimacy in conducting intervention operations, which is easier to obtain in a coalition than when a nation initiates action unilaterally. Shared education at all levels would greatly increase the understanding between allies and make interoperability at the operational and strategic levels that much easier to achieve. However, it must be noted that shared educational facilities are not in any way intended to subsume the

national ethos of individual military forces. On the contrary they are meant to create awareness within allies and coalition partners of the differences in each other's approach to national security.

Innovation Three – Creating Air-mindedness

Air power is optimally applied only by professional airmen. The debate regarding non-airmen being given command of air power assets has been put to rest conclusively. In order to ensure that air power—a scarce and expensive commodity—is employed in the most effective manner, the airmen maintaining, operating and commanding the 'air power generation system' must be sufficiently air-minded.

Air-mindedness is the ability of an individual to instinctively understand the necessary level of air power that is required to accomplish the task at hand and to have a clear appreciation of the nuances of creating, applying and sustaining available air power. It is the sum of an individual's depth and breadth of knowledge and understanding of the characteristics and employment of air power.¹⁴ The sum total of the air-mindedness of all personnel in an air force will be the 'effectiveness' of an air force. Here the 'necessary level of air power' and the 'task at hand' need to be clarified as varying at different levels of command, from the tactical mission to the operational campaign aimed at achieving national strategic objectives.

Creating air-mindedness in an individual is a lifelong study and requires a nuanced knowledge of the current application of air power along with the technical mastery necessary to generate it, as well as a clear understanding of its history. An understanding of air power history should therefore become a vital element in the education curriculum that aims to produce air-minded professionals. While information regarding technological advances and changes are equally important at the operational level, it is a historical background that brings the possibilities they create into focus, both individually and as an air force. This facet of education is not emphasised sufficiently at the moment and needs to be corrected. Air-mindedness creates a professional air force; holistic air-mindedness is only achieved through broad and comprehensive education; and therefore only an air force that emphasises education as a fundamental focus can hope to be professional.

Summing Up

Education is one of the foundational elements that makes an air force a professional force and therefore it is incumbent on all airmen to attend to their education. The responsibility for becoming an educated air force is equally shared by the individual and the organisation. Education delivered in the classrooms in the traditional manner has its advantages, but may not be the optimum way to deliver all air power education in contemporary air forces. Resource constraints, numerically small forces, and a trend towards increased operational tempo demand that innovative measures be adopted to deliver education of the desired rigour to the rank and file of the force.

If it is accepted that education is a foundational requirement to create and maintain an air force of calibre, and that resource availability in terms of finances and personnel will become increasingly constrained, then adapting innovative ideas to ensure adequacy of education is the only way forward for smaller air forces that strive to remain at the leading edge of capability. It is also necessary to ensure that within this educational continuum, a professional understanding of air power stays as the nucleus. If lack of education permeates an air force, it will be condemned to function at the fringes of professional mastery. The implications of such a situation are dire, for the well-being of the air force and ultimately the security of the nation. Innovative ideas in providing quality education are critical to avoid this state of affairs.

14 *The Air Power Manual*, Australian Air Publication 1000-D, Sixth Edition, Air Power Development Centre, Canberra, p. 214.

CONCLUSION

The ultimate educational aim of an air force should be to achieve the desired level of professional mastery, in a holistic manner, for the entire force. In medium and small air forces this requires organisational awareness and support, especially when the force is functioning at critical mass and under continuous operational tempo and intensity that could have long term implications for sustainability. Operational activities can only be sustained only through technical mastery of a high order. However, such technical mastery will not be able to assure the long term strategic competence of the force as this is almost completely underwritten by professional mastery, which can only be achieved through structured, through-career education. Professional mastery underpins the strategic relevance of an air force.

An air force must at all times endeavour to increase its organisational intellect and create the necessary infrastructure to develop and nurture professional masters of air power through all levels of command and across the entire force. This can only be achieved through developing, implementing and continually improving a dynamic education continuum for all personnel, which is tailored to suit individual and organisational requirements in a contextual manner. This will be a long term process and should contribute to the holistic intellectual development of the force, thus creating relative intellectual superiority.

Contemporary air forces cannot rely solely on numerical or technological superiority as a core element in defeating an adversary. Such victories will be at best transitory in nature. Similarly, conceptual superiority at the operational level will only provide a short term respite and advantage, till such times as the adversary creates a counter-concept that neutralises one's own. Only marked intellectual superiority will provide an assured capability advantage in the long term. This superiority can only be created through developing and diligently nurturing the organisational intellect of the force through concerted and conscious education. Any other process is unlikely to deliver the necessary level of professional air power to the nation when it is required the most.

Every art has its rules and maxims. One must study them: theory facilitates practice. The lifetime of one man is not long enough to enable him to acquire perfect knowledge and experience. Theory helps to supplement it; it provides a youth with premature experience and makes him skilful also through the mistakes of others. In the profession of war the rules of the art are never violated without drawing punishment from the enemy, who is delighted to find us at fault.

-- Fredrick the Great

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