

Becoming a “Sense-and-Respond” Academic and Government Organisation

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Abstract: The Information Resources Management College is the largest of four colleges of National Defence University, the pre-eminent U.S. graduate-level institution responsible for educating military and civilian senior leaders across government for national security. The college, dedicated to developing information leaders who can leverage information and information technology for strategic advantage, is rapidly becoming an adaptive enterprise. The college is transforming into a “sense-and-respond” organisation (Haeckel, 1999), that is increasingly netcentric and agile, an essential quality for survival in a dynamic Information Age environment. By engaging more directly with stakeholders, the college is sensing the learning needs of government organisations. In response it is re-designing current, and designing new, educational programs, re-framing its courses into professional development seminars, and designing tailored educational services to meet the learning needs of government organisations. Via its large distributed learning program, the college reaches students around the world, and is expanding its current global reach by supporting communities of practice aligned with perceived stakeholder interests. It is also encouraging faculty participation with networks of government, academic, and private sector colleagues to enrich learning. Cross-boundary communication, collaboration, and leadership are valued as essential to better government and the agility of the college, and are infused as curricular and organisational goals. As part of its transformation, college leaders streamlined the organisational design to create teams of faculty to develop and deliver programs. Replacing command-and-control systems, the leaders are adapting the organisational context by re-framing the organisation’s reason for being, governing principles, and high-level business process design. While continuing to offer credit-bearing courses and programs consistent with the academic traditions of a graduate school, the college is transforming from a “make-and-sell” organisation to a “sense-and-respond” organisation that models agility in today’s information-driven federal government environment.

Keywords: Agility, sense-and-respond, transformation, netcentricity

1. Introduction

Ubiquitous information and communication technologies are defining the Information Age. Our personal, professional, and organisational lives are radically changed by 24/7 communication and information on demand at our fingertips. Resulting freedoms from the constraints of real time and space are leading to the globalisation of the economy, culture, and values. Decision cycles are compressed because of nearly synchronous communication and accelerating expectations for engagement. The behaviour of customers and competitors is no longer predictable. Annual strategic planning cycles are being overtaken by demands for greater responsiveness that can only be achieved through increased organisational ability to gather information from the environment and to respond effectively and quickly. Rapid prototyping and speed to market are essential. Successful organisations need to leverage information and information technology for strategic advantage to survive, be sustainable in, and help influence the unpredictable world. They need to develop new capabilities for global connectivity, real-time collaboration, rapid and continuous information-sharing that facilitate shared situational awareness, boundary-less interaction and

leadership opportunities, ubiquitous access and transformation of organisations to the Information age. In the defence arena this set of capabilities is called net-centricity, defined as people, processes, and technology working together to enable timely access to information, sharing of information, and collaboration among those who need it the most (Grimes 2004). Netcentric communication and collaboration will allow large, complex organisations to survive by adapting systematically, with flexibility, agility, and responsiveness (Haeckel 1999). They must go beyond the traditional model of “make-and-sell” to develop their information-gathering, decision-making capabilities, and internal operations to “sense-and-response” to meet evolving customer needs.

While all organisations will need to operate to some degree as “make-and-sell” organisations, they will need to grow their capacities to sense and respond if they are to compete in the 21st Century marketplace. By gathering and leveraging information, these organisations will be able to customise products and services to meet the needs of their current and new customers. The more customer-focused, net-centric, and agile they become, the more real-time information they seek, receive, process, and use to make

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decisions in response to the unknown and unexpected.

But how can government, the quintessential hierarchy, transform its bureaucratic systems and organisations for the 21st Century? The specialised and rule-based processes of the Industrial Age federal bureaucracy grew in response to the size, complexity, and demands of government of an earlier time. Today, however, the inefficiency, opacity, cost, and unresponsive nature of government are out of line with Information Age opportunities and expectations, demands for efficiency, and impatience of citizens, suppliers, and employees. While there are some innovative efforts for e-government underway, the fundamental culture, nature, and core processes of government have changed little so far in the Information Age. Despite its traditional hierarchical structure based on command-and-control systems and culture, the U.S. Department of Defence is committed to transform to netcentricity to make agile and sense-and-respond behaviour and cultures possible. Higher education is another very tradition-bound institution. While it is taking advantage of information and communication technologies for many of its functions, the culture and core functions of teaching and learning at most institutions are still very traditional. A few innovative, responsive, "sense and respond" units of traditional universities or the new entrepreneurial universities are becoming net-centric and agile, but both higher education and government are still primarily "make and sell" institutions, and by their very nature adapt very slowly to environmental changes.

In the mid-1990 the Information Resources Management College, National Defence University, began to embrace the concept of net-centricity. While maintaining and enhancing its academic rigor as a college in a regionally accredited graduate institution the college began transforming from a traditional Industrial Age to a net-centric college. Currently, the college leverages the power of the underlying concepts of the network and is now reaping its benefits including: 1) a global student body who demands continuous life-long professional learning; 2) a 24/7 virtual learning environment that allows students, faculty, and staff to meet their needs from any location when they are ready to learn or do business; 3) faculty who are globally networked with their scholarly and professional colleagues in order to develop and deliver dynamic leading-edge curriculum; and 4) a network of partners who collaborate to advance the institutional mission of preparing national security leaders to leverage information for strategic advantage. Being net-centric allows the

college to sense and respond to today's dynamic unpredictable environment. The college pulses current student, stakeholder and organisational needs and business environments worldwide, and anticipates the future. It fosters an agile culture in which innovation and initiative, self-organisation and governance drive its operations and policies. The college is actively engaged in its network of respected partners. Its business processes meet the dynamic information demands and expectations of its students, faculty, and staff. The appropriate hardware, software, courseware and databases enable information gathering and sharing, and support of an engaged academic community. This paper describes the essential elements and stages of transformation to a net-centric agile - sense-and-respond - organisation and how one college strategically transformed. The final section of the paper proposes the college as a model for a net-centric agile government and academic organisation that might serve as a model for other organisations.

2. Sense-and-respond organisations explored

Net-centricity, as defined for business in the 21st Century or the future military force, has five capabilities: global connectivity; real-time collaboration; rapid and continuous information sharing that leads to shared situational awareness, boundary-less interaction and leadership opportunities; and ubiquitous access (Lentz 2002; Office of Force Transformation 2005; R. H. Smith School of Business 2004; Peat 2003; Zavin 2004). "Net-centricity creates an information-rich environment populated by vastly increased number of valuable information sources that can be effectively discovered and utilised by those who need and can benefit from it" (Fritzon 2005, p. 2). It is a "transformation enabler that empowers all users with the ability to easily discover, access, integrate, correlate and fuse data/information that supports their mission objectives" (Zavin 2004, p. 4). The desired outcomes of net-centric communication are decision-making that is timely, informed, more robust and dispersed, and authority and responsibility dispersed across a flatter organisation (Lentz 2002; Myers 2004). Initiative, adaptability, and innovation are encouraged because members of the net-centric network are engaged, informed, and empowered (Peat 2003).

Effective real-time information allows an organisation to develop its capacity to sense and respond. According to Haeckel (1999), in sense-and-respond organisations adaptiveness takes precedence over efficiency because change is continuous. In contrast with make-and-sell

organisations in which change was predictable, efficiency was the priority, and planning could take place on long-term cycles, sense-and-respond organisations are designed to gather and act upon their dynamic and unpredictable environment. The needs of customers become the engine driving a company's operation. In response, the organisation changes, and context and coordination replace command and control. Employees are empowered to respond to customer needs within the well-understood mission and parameters. The organisation is engaged in anticipating and pre-empting the actions of customers and competitors.

If growth is finding and developing new ways to establish sustainable competitive advantage, operational effectiveness, productivity, and efficiency though necessary, are not enough. According to research conducted by Gartner, today's companies must innovate and create new market segments, distribution channels, product categories, service offerings, and production processes (Austin, 2006). Companies must be agile in order to deal with, explore and analyse the unknown or unexpected, and collaborate with others. "Agility is the ability of an organisation to sense environmental change and respond efficiently and effectively to that change" (Plummer and McCoy 2006, p. 1). Four fundamental capacities enable organisations to increase their agile performance: awareness, flexibility, adaptability, and productivity. Awareness is proactive sensing and data gathering. Flexibility is the ability to respond appropriately to expected changes, while adaptability is the ability of the organisation to respond to unexpected changes by adding options. Productivity is the capacity to respond effectively and efficiently with substantial internal changes that require innovation, involve risk, and are potentially disruptive (Plummer and McCoy 2006).

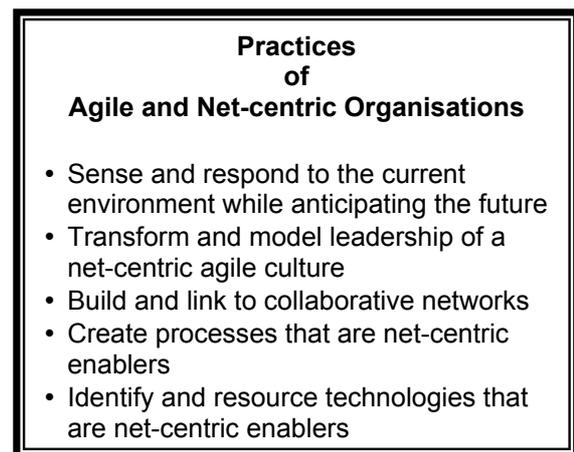
In order to sense and respond effectively and efficiently the leadership of adaptive and agile organisations must be more distributed than in command-and-control hierarchical organisations. Decision-making must be more decentralised in a culture in which the purpose and scope of the business are clear to everyone (Haeckel 1999, p. 93). Governing adaptive organisations requires a context for behaviour, not a means for dictating it. The context consists of three elements: a reason for being that articulates the organisation's essential purpose, governing principles that set boundaries on allowable behaviour, and a high-level business design for how critical elements interact to fulfil the reason for being (p. 103-4). Transforming to a sense-and-respond

organisation requires leadership commitment to create a new culture, capacities, systems, rewards, and behaviour.

3. One college's transformation to net-centricity and agility

During its mid-1990s environmental scan, the Information Resources Management College assessed and anticipated the changing needs of its students and stakeholders. Its prospective student population (mid to senior level government leaders) would soon realise its need for continuous life-long learning, flexible, reliable, and robust information, and on-demand communication systems driven by the global nature and information intensity of their jobs. The operational tempos of their organisations would likely continue to increase, keeping these professionals chained to their offices or in the field, and out of traditional classrooms. Budgets were almost guaranteed to be tightened with support for traditional in resident learning at risk. In response, the leadership deliberately set a course toward agility and net-centricity. To achieve this vision they evolved five enterprise practices (Figure 1: Practices of Agile and Net-centric Organisations): sense and respond to the current environment while anticipating the future, transform and model leadership of a net-centric agile culture, build and link to collaborative networks, create processes that are net-centric enablers, and identify and resource technologies that are net-centric enablers.

Figure 1: Practices of Agile and Net-centric Organisations



3.1 Sense and respond to current environment while anticipating the future

Only by scanning the environment and anticipating its direction, characteristics, and potential opportunities can a net-centric

organisation remain relevant and agile (Alberts and Hayes 2003). In higher education the landscape is continually changing in accordance with the needs and expectations of the students, stakeholders, and faculty and the creation of new knowledge and technologies. The college's federal agency and defence civilian and active duty military students are life-long learners who work in organisations where the operational tempos and declining budgets continue to limit their attendance in traditional residential courses. With downsizing, government organisations must achieve their missions with fewer staff; this places a premium on the knowledge and skills of the remaining workforce. Education becomes even more critical.

In response, the college now offers courses in at least four formats that vary in length and delivery mode. The longest program of eight courses leading to the Chief Information Officer Certificate is fourteen weeks in residence, but the same certificate can be earned by taking eight separate courses over four years in three delivery modes. Most students still come to campus for courses. Approximately 20 percent of all course enrolments are in interactive seminar distributed learning offerings that have no residential component. For about 5 percent of enrolments, the college conducts residential course offerings at the students' location to accommodate their particular constituencies' needs. The college has expanded the array of programs into specialised areas (e.g., enterprise architecture and information technology project management) in response to requests by students, alumni, and stakeholder organisations. Listening to stakeholders who report that a segment of their workforce needs learning delivered in individual courses but are not interested in credit for certificates or graduate degrees, the college is now actively recruiting students for professional development as well as certificate and graduate credit. The college is also offering workshops on requested topics of varying depth, for various audiences and purposes. This responsiveness to expressed stakeholder needs and interests has led to exciting engagements for many faculty members and increased the college's reputation. Being responsive requires adjusting the workload metrics and rewards for faculty, as well as curriculum development and contracting for new products. The college is also expanding its global reach to offer courses and to share curriculum with faculty in collaborating international institutions.

Government employees who become students of the college require access to education that offers them opportunities to think strategically about Information Age issues and challenges with their

multi-agency peers. The college's students and faculty are technologically savvy and demand global 24/7 access and efficiency to satisfy their learning and business needs. To stay relevant to students, stakeholders, and faculty the college has become more net-centric and agile in its educational offerings and delivery systems, leadership and culture, networks, learning and business processes, and supporting technologies.

3.2 Transform and model leadership of a net-centric agile culture

The college leadership is transforming the college into a net-centric agile organisation from one that was more traditionally governmental and military in its culture, hierarchy, internal focus, department-centric, residential location, and paper-based curriculum and business processes. To become an agile organisation the college leadership must model and support collaboration, rapid and continuous information access and exchange, and global connectivity. The college leadership is evolving the culture by encouraging, rewarding, and modelling collaboration across diverse functions and departments both internally and externally. By sharing information and pushing responsibility for decision-making downward to department chairs and faculty members means that the leadership is distributing accountability and responsibility for quality. The leadership of the college regularly and deliberately communicates its expectations for curriculum and instruction to become net-centric, i.e., every course is to be enriched by e-learning so that enrolled students, even in resident offerings, can access e-learning lessons in the distributed learning formats in case a natural or man-made emergency prevents delivery of instruction on campus. The leadership expects faculty to foster valuable network partnerships in their academic and professional fields. To set the context, leaders articulated a clear sense of mission and purpose, the governing principles that set boundaries for distributed leadership and responsibility, and a high-level business design (Haeckel 1999). The college leaders set strategic goals that require net-centric operations to provide learning opportunities for students, business processes of the college, and professional and organisational partnering, cross-boundary collaborating, and global connectivity in physical and virtual space. To increase its partnerships the college expanded its engagement with private sector and public institutions, domestic and global, for concept development, academic programs, and timely learning. The college's pioneering efforts in telework policy that led to a national award in 2004 required the integration of new technologies, business process, and policies for communication,

productivity, and trust. Faculty are equipped with the appropriate hardware, software, and communication resources to facilitate learning, advise students, conduct research, and participate in college operations 24/7 remotely, even internationally, as necessary. The college facilitates net-centric teaching via its very successful interactive distributed learning (DL) model by weighting DL teaching as time and a half credit in calculating faculty teaching loads. In every one of its academic programs, the curriculum explicitly addresses the net-centric concepts of cross-boundary leadership, communication, and collaboration.

3.3 Build and link to collaborative networks

Effective networks are composed of partners who participate for mutual benefit (Peat 2003; Zain 2004). The networks of the college are composed of stakeholders, academic and professional colleagues and organisations. Fluid self-organising student- and faculty-accessible ubiquitous communities of interest are forming to share information, knowledge, and businesses processes across these networks. In net-centric organisations networks must be extensive and robust, and connectedness with networks must be ongoing, meaningful, and sensing. The college recognises the value of building and maintaining its reputation as a partner of choice in its niche, information leadership and information resources management. It is committed to engage appropriate stakeholders in the private sector, international, defence and federal government organisations, and other strategic decision makers and communities of interest in knowledge sharing and creation. Students while enrolled in courses over a two- to four-year period are repeatedly and deliberately encouraged to be active members of the learning community in and out of class to meet their professional and organisational needs, and to continue as alumni. Connected and involved alumni provide essential feedback on current and future issues in their organisations, offer students perspectives that enrich theory and research, and contribute as valuable members of the college-supported communities of practice that underpin the college's network. Effective networks engage partners from international, domestic federal, state, and local governments as well as the academic and private sectors with common interests who appreciate the power of, the need for, and benefits of sharing. Network-centric organisations recognise that knowledge shared is stronger and more valuable than knowledge that is held, especially information with a short shelf life, and particularly in situations with increased operational tempo. Through its expanding network

of partners, the college enlarges its knowledge base, satisfies student demand for network growth (McCully and Schulin 2004), connects to key stakeholders and experts in multi-levelled networks, and looks for opportunities to collaborate as a respected global network partner.

One year ago the college embarked on a multi-faceted outreach initiative. In focus groups stakeholders were invited to articulate their perspectives about the uniqueness and value of the college. Their perspectives led to key messages and branding of the college and its programs, and new outreach products such as brochures, posters, a website, a student centred command briefing, and conference booth. These products are designed to communicate with stakeholders about the college and its courses, programs, and services to meet their workforce needs and to offer strategic partnership opportunities. The college is keeping track of interfaces, constituencies, and stakeholders with whom faculty and leaders have contact, and the follow up that is necessary and desirable. As a result, the network of partners is expanding exponentially, enabling the college to collect more real-time information, which it is using to adapt its courses, programs, and services to meet stakeholder needs. The college, consistent with its new key message, "a learning community for government's most promising information leaders", launched a web-based system to support communities of practice in the information resources management field. Faculty and other organisations, supported on the system purchased and managed by the college, have launched approximately six communities. The college's community of learners, formal and informal, local and global, as well as U.S. and international, is growing and expanding virtually everyday.

3.4 Create processes that are net-centric enablers

Net-centric organisations create processes that enable global connectivity, real-time collaboration, rapid and continuous information exchange that is boundary-less and ubiquitous, and access to data and information that is secure and reliable. In a net-centric agile higher education organisation, these capabilities require processes very different from those used in the traditional hierarchical academic, government, or military organisation. They involve processes at the learning and business levels that virtually reach and connect beyond the campus to deliver equal or better e-services to faculty, students, and partners. In the mid-1990s, the college began exploring tools and technologies to create media-rich instructional

materials and experimenting with e-learning environments to support the interactive seminar model, first for students in residence and then online. By fostering innovation and developing consensus about the learning principles and models, technology, and tools, the college began creating its highly effective virtual learning environment. In this environment students are active builders of knowledge and faculty are innovators in the teaching and learning process. Another core process, the collaborative development of interdisciplinary curriculum, engages faculty from across the college and relies on net-centric 24/7 access from campus, home, or any global location to each other and to curriculum materials and courseware on shared network drives. Curriculum documents are electronically available and archived, as are instantiations of each distributed learning offering.

The ability of adult students to travel to campus for resident course offerings is often limited by competing job requirements and organisational funding. But students continue to need and want access to high quality professional development, graduate learning and opportunities to network with others engaged with the same professional challenges. In response the college offers all courses in residence on campus as well as in asynchronous distributed learning (DL) format to meet student needs for learning and networking anytime and any place. Both modes create very interactive learning environments and are of equal high quality (McCully and Schulin 2004). Currently over 20 percent of the college's total offerings are in the DL mode for students who live locally, across the country, and around the globe. Enrolment in DL continues to increase. Most of the college's other core processes have become net-centric, enabling all members, on and off campus, to meet their needs effectively when conducting the business of education. Student (and faculty) access to all the library resources is another process that is transformed. All enrolled students have 24/7 password-controlled web access to library resources. The college's processes for application and registration for courses and programs are now web-based for global student access and action. Faculty, staff, and students are able to access course content, schedules, and password-controlled student records that reflect real-time reliable data information. The faculty and staff can order course materials; schedule classes and rooms; arrange, approve, and request reimbursements for travel using the web-based 24/7 systems.

3.5 Identify and resource technology that are netcentric enablers

Netcentric capabilities allow the college to sense and respond to student, stakeholder, and practitioner interests and needs, share information, and facilitate learning. A networked college community is enabled by information and communication technologies that are based on an architecture that considers security, reliability, affordability, expandability, interoperability, and is deemed user-friendly by faculty, staff, and students on site and in remote locations. Net-centric technologies enable global connectivity, real-time collaboration, continuous information sharing, boundary-less interaction and leadership, and ubiquitous access. The software that supports the college business processes is web-based, user hardware-independent, and accessible remotely. Courseware, all of which satisfies federal legislative mandates to meet the access needs of students and faculty with disabilities, is supported on the Blackboard course management system. It allows faculty to conduct interactive courses that are globally accessible via dial up or digital high-speed link connections by students across town, country or globe, or in the campus classroom. Access to all data and course information is password-controlled to protect the student privacy, comply within the copyright laws, and respect intellectual property of faculty. Instructional designers partner with faculty to develop media objects to enrich learning materials.

Mobile communication devices support global connectivity of the faculty and leadership to promote shared situational awareness, informed decision-making, and self-synchronisation. Relational databases are being designed populated and access friendly to provide one-stop-shopping for most business activities. A new curriculum management system is being implemented to facilitate the management of a collaborative curriculum development process, and knowledge management to support version control and archiving of documents, media, and curriculum. Commercially developed software supports the communities of practice initiative that is expanding the college's traditional role in education with more continuous, informal, just-in-time, facilitated communities of practice. As described, the net-centric mission and strategy are driving the major resource decisions of the college.

4. Conclusion

In the mid-1990s when it scanned the environment and anticipated the frontier beyond the horizon, the Information Resources

Management College deliberately and enthusiastically embraced evolving net-centric concepts as essential to its ability to sense and respond to the ever changing needs and expectations of its future students. These students wanted, needed, and more importantly, expected global boundary-less and ubiquitous access, and an “information rich environment populated by vastly increased number of valuable information sources that can be effectively discovered and utilised by those who need and can benefit from it” (Fritzon 2005, p. 3). The college sensed the power of the network paradigm, now called net-centricity, and commenced a transformation to exploit it, thereby creating a new model for a government and academic organisation. The college recognised this comprehensive initiative would demand a significant investment of time and money, and require major departures from the familiar and comfortable traditional hierarchical academic and government models. The college would have to change its systems for sensing and responding to the environment, its leadership policies and derived culture, its role in an expanded partnership community, its internal processes and educational models and products, and the priorities and capabilities of its technologies. The college’s students, life-long learners employed around the world in demanding senior-level positions, information and technologically savvy and already very cognisant of the power of networks, were demanding net-centric educational models and e-services. The decision was obvious – transform to meet their needs and become an agile organisation.

The leadership set the course for the college to become increasingly net-centric and agile, and continues to resource the commitment. The college now has a global student body engaged in life-long professional learning and networking. Its students, faculty, and staff access the learning environment to meet their learning needs 24/7 from any location, when *they* are ready to learn or

do business. The faculty, active participants in global networks in their areas of expertise, develop and deliver leading edge curricula in near real-time. Global and domestic partners from the private and public sectors seek opportunities to collaborate with the college on a variety of critical issues, initiatives and levels. These outcomes indicate that net-centricity, an essential element of the transformation of higher education from a hierarchical to an agile institution, meets the evolving needs and expectations of students, faculty, and stakeholders in the Information Age. As higher education institutions explore and embrace the power of the net-centric model, colleges and universities across the world are beginning to transform. This transformation requires continuous sense-and-respond behaviour toward the learning models, environment, leadership, organisations, processes, and partnership capabilities of the organisation. The innovations, evolved by the Information Resources Management College over the past ten years, will become common best practices across higher education, and innovators will continually evolve processes to meet learner needs in a competitive environment. These needs in turn will expand with higher expectations, interactive leadership, synergised partners, refined processes, and technical capabilities. Considering the rate of change we have experienced and embraced in the past ten years, the future remains unpredictable, truly challenging, and very exciting for those institutions that are responsive to the needs of their students and stakeholders. These institutions of higher education, like their students, will themselves become life-long learners with the potential for sustainable growth.

5. Disclaimer

The views expressed in this article are those of the authors and do not reflect the official policy or position of the National Defence University, the Department of Defence, or the U.S. Government.

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