

The background features three abstract blue circular shapes of varying sizes, each composed of concentric circles in different shades of blue. These shapes are positioned in the top right, middle right, and bottom right corners. Two thin, light blue diagonal lines intersect to form a large 'V' shape that frames the central text area.

INSTITUTE OF SYSTEMS SCIENCE

ANNUAL REPORT 2010 (Public)

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MISSION, VISION, STRATEGIES

Mission

“Developing Infocomm Leaders, Driving Innovation – we inspire and prepare Infocomm leaders to innovate over the course of their professional careers”

Vision

“Becoming a global brand in providing thought-leadership in innovation”

Key Strategies

- ⇒ Advancing our commitment to Continuing Education and Training;
- ⇒ Attracting quality local and international applicants to our Graduate Programmes;
- ⇒ Leading in e-Government Leadership Education beyond Singapore;
- ⇒ Conducting Applied Research and sharing research findings in emerging disciplines;
- ⇒ Sharpening Staff Competency and promoting Educational Excellence;
- ⇒ Focusing on creating and nurturing customers by providing high calibre Customer Value;
- ⇒ Leveraging on Partnerships to grow and excel.

CHAIRMAN'S STATEMENT



As one of the world's earliest adopters of infocomm technology in the early 80s, Singapore leveraged Infocomm as a strategic and sustainable enabler of long-term economic growth. Besides its adoption in the public sector where a relentless application of infocomm evolved Singapore into one of the top e-governments in the world; the promotion of an industry sector that now contributes some 7.4% to the GDP of the country; a critical mass of infocomm manpower to implement infocomm solutions in public and private sectors was also established. During the 80s, there was a distinct lack of infocomm professionals in this (then) new sector.

In response to the early needs to rapidly develop and deploy a critical corps of infocomm professionals, the ISS was established in 1981 to be a pioneer in providing infocomm training in Singapore, through a strategy of converting and transforming talents from various disciplines, to prepare them to work in this new field. Thus, the ISS established its reputation – as an organisation that has always been involved in transformation throughout the years – first in preparing the leadership and skilled talents to drive the Infocomm revolution in the country. Today, the ISS continues to lead in the transformation journey of education and skills development in many organisations and countries.

Over time, infocomm training needs have become more sophisticated, as infocomm functions become more complex – evolving from office automation to process re-engineering, from system deployment to service delivery. Infocomm professionals now require deep understanding and suave orchestration of business, technology and people skills, to engineer innovation in their organisations.

Singapore public sector e-transformation has also progressed by leaps and bounds. Singapore is now internationally recognised for its e-government leadership. Many governments acknowledge Singapore's e-government experience, and have sent their civil servants to be trained.

As our customers and their expectations change, ISS must continue to change with them. Thus, ISS implements three strategic thrusts to anchor our position as the leading infocomm continuing education provider:

Firstly, we continue to deepen our intellectual capital through idea discovery. We conduct investigative research in fast emerging areas. We then seamlessly integrate the research findings into our course offerings.

Secondly, we leverage on the immense industry expertise to overcome our resource limitation. With over 60 years of infocomm deployment in Singapore, many companies have the breadth and depth of expertise to design, develop and deploy infocomm systems from small to complex systems and architectures.

Thirdly, we increase international cooperation in order to contribute to the use and deployment of infocomm. As such, ISS co-hosted the inaugural regional collaboration of cyber-security conference with the U.S. National Defense University Information Resources Management College. The event was well attended by over 220 senior government and private sector representatives from Asia and US. The e-Government Leadership Centre (in collaboration with the Infocomm Development Authority of Singapore and the Lee Kuan Yew School of Public Policy) has also been making huge strides into the education and training of public officers from many countries.

I look ahead to another year of opportunities as the ISS continues its mission to prepare the infocomm leaders of tomorrow.

Dr. Christopher CHIA
Chairman, ISS Management Board

FOREWORD BY PROVOST



As a global university, NUS attracts the best and brightest students from Singapore and beyond to pursue their undergraduate and graduate degrees here. The University offers a broad-based yet solid and rigorous academic education that hones learning, inquiry and creative thinking. Through a rounded and holistic educational experience, our students emerge as confident graduates who are well-prepared for the challenges of the 21st century, ready and able to make their mark and contribute to society.

The Institute of Systems Science (ISS) was established to provide continuing education for life-long learners in infocomm leadership and specialisation. As an entity that is dedicated to providing continuing education, the ISS has a somewhat different role from the other schools and faculties of the NUS. Notwithstanding, the ISS is proud and privileged to be a member of the NUS family, especially to partake in the University's tradition and pursuit of excellence. Through the NUS, the ISS has direct access to the latest advancements in academic research and developments. This is a critical advantage in this field as technology is rapidly evolving.

Over the years, the ISS has built up its reputation as a leading provider of continuing education. The organisation had made much progress under the able stewardship and guidance of its Management Board, and with the hard work and dedication of its management team and teaching staff. Above all, the ISS has forged valuable ties with the industry. The close links with industry has enabled the ISS to tailor and adapt courses and curriculum that are highly effective and relevant to meet the needs of the industry. As a testament to the organisation's quality and reputation, the ISS now operates Singapore's first Infocomm Continuing Education and Training Centre.

While the ISS celebrates its achievements, it must also continue to build on its successes. The quest for excellence is a continuous and relentless one. On this note, I wish the ISS the very best in its future endeavours.

Professor TAN Eng Chye
NUS Provost and Deputy President (Academic Affairs)

CEO'S REPORT

ISS is an autonomous infocomm educational institute under the National University of Singapore (NUS) that provides infocomm leadership and specialisation training. Since 1982, ISS has served over 4,000 corporate customers and seen 71,000 infocomm professionals and managers attend ISS education programmes. Our participants work in a wide range of industries, including government, banking, insurance, healthcare, manufacturing, defence, transportation and the service sector. Every year, employees of about 400 organisations worldwide attend our programmes.

I am pleased to report that we have made significant progress in the execution of our 7-prong strategy. Particularly, **2010 was a bumper year for our Continuing Education and Training Centre**. In the year alone, we trained 3,252 professionals and issued 10,977 Workforce Skills Qualifications Statements of Attainment (WSQ SOAs). In fact, we had fully utilised the training grant from the Singapore Workforce Development Agency (WDA) and Infocomm Development Authority (IDA) by September, and were given additional funds to continue supporting our participants till year-end.

ISS relentlessly expands the scope of our Graduate Programmes to heighten the standard. In 2010, we introduced six new Basic Electives into our Master of Technology programme.

- Enterprise .NET I
- Enterprise .NET II
- Cloud Computing
- Architecting Software Solutions
- Open Source for the Enterprise
- Service Innovation

Our e-Government Leadership Centre also outperformed its target. In its 4th year of operation from 1 August 2009 to 31 July 2010, we trained 336 participants. Cumulatively, we have trained 1,021 participants. In fact, we have exceeded the 4-year target by about 50%, and have already achieved the cumulative 5-year target set by IDA.

ISS Applied Research team made substantial headway in our selected research disciplines, notably in Service Innovation. We completed a study that offered empirical evidence on the favourable attributes of a service-dominant design. We presented the findings at five conferences and in two journal papers.

In 2010, **we intensified our investment in Staff Competency and Educational Excellence.** We introduced new technologies and facilities to reinvigorate and rejuvenate our human capital, and to provide a conducive environment for our staff to actualise their intellectual aspirations. We encouraged staff to provide consulting services to engage with the industry. To further enhance learning effectiveness, we injected more interactive workshops, hands-on projects, real-life case studies, e-learning and online coaching. We also experimented with new pedagogies like impact teaching, competency-based training

and assessment, as well as participant-centred learning.

To provide better Customer Value, ISS fosters linkages with renowned organisations. Our partnership with The Association of Information and Image Management (AIIM), Singapore Association of Information Security Professionals (AISP), and Singapore Computer Society (SCS) came to fruition in 2010 when we respectively launched certifications in Business Process Management, IT Security, and IT Business Continuity Management. These have enriched our existing repertoire of IT Outsourcing Management, Project Management, and Enterprise Architecture certifications.

ISS engages Industry Partners and regularly refreshes our offerings to ensure industry relevance. In 2010, we added eight new courses to our suite of 50 professional development courses.

- ITIL® Intermediate Certificate: Service Strategy
- ITIL® V3 Managers Bridge Course
- Java Web Services and Security for Practitioners
- NICF – AIIM Business Process Management Master

- NICF – Certified ScrumMaster
- NICF – Enterprise Business Analysis
- NICF – ITIL® V3 Foundation for IT Service Management
- NICF – Technopreneurship

Beyond standard classes, **ISS tailors our course content to customers' unique requirements and challenges.** In 2010, we conducted customised programmes for various companies.:

- ❖ Central Provident Fund Board Datacraft Asia Pte Ltd
- ❖ Defence Science & Technology Agency
- ❖ Infineon Technologies Asia Pacific Pte Ltd
- ❖ Infocomm Development Authority
- ❖ Inland Revenue Authority of Singapore
- ❖ Nanyang Technological University
- ❖ Neptune Orient Lines Ltd Oversea-Chinese Banking Corporation Ltd
- ❖ ST Electronics (Info-Software Systems) Pte Ltd
- ❖ Yokogawa Engineering Asia Pte Ltd

ISS provides fast-paced, practice-oriented snapshots for busy executives to keep them abreast of the latest changes and innovations in the technology landscape. In 2010, we organised seven technology and innovation update seminars, conducted by academic professors and industry gurus, as well as our own passionate faculty members.

Professor Bo Edvardsson, Professor of Business Administration and Director of the Service Research Centre at the University of Karlstad in Sweden and Visiting Fellow at ISS for Service Innovation Practice. Professor Bo speaking at ISS' Innovation Update Seminar 2010.



Professor Sharon Dawes, Founding Director and Senior Research Fellow at the Center for Technology in Government, State University of New York at Albany and Courtesy Visiting Fellow at ISS for e-Government Practice. Professor Dawes speaking at ISS' Innovation Update Seminar 2010.



Dr. Robert Firth, Evangelist, Software Engineering Programme, ISS. Dr. Firth speaking at ISS' Innovation Update Seminar 2010 on his latest research in Service Innovation.



2010 had been an exciting and fulfilling year for ISS. I express gratitude to the NUS Provost Office, WDA, IDA and our many stakeholders and customers. It is your recognition and endorsement that gives us the impetus to better ourselves year after year.

LIM Swee Cheang
Director / CEO

MESSAGES FROM MANAGEMENT BOARD MEMBERS

Dr. Christopher CHIA (Chairman)

Senior Advisor

Ministry of Information, Communications and the Arts

"The ISS Management Board comprises infocomm thought leaders with extensive experience. I am thankful for their valuable contribution and support to ISS. As the Management Board Chairman, it is my commitment to work with ISS management and staff to place ISS as the Institute that prepares the infocomm leaders of tomorrow."



Dr. CHONG Yoke Sin

Chief Executive Officer

Integrated Health Information Systems Pte Ltd

"IHIS is a satisfied customer of ISS Enterprise Architecture services. Beyond our first engagement for SingHealth's Enterprise Architecture in 2008, we have been collaborating with ISS on many other fronts, including further Enterprise Architecture work."



Rosina HOWE-TEO

*Group Director, Innovation & InfoComm Technology Group
Land Transport Authority*

"Over the years, LTA has rolled out various award-winning infocomm and technological innovations like One.Motoring, MyTransport.SG, PublicTransport@SG, GIS@LTA and Planning for Land Transport Networks (PLANET) using advanced data analytics to provide better and personalised services to each of our diverse land transport customers. It is our pleasure to work with ISS to share our expertise in e-transformation, geographical information technology and business analytics with other agencies and organisations."



Teresa LIM

Managing Director

IBM Singapore Pte Ltd

"The world's economies are largely driven by services, and it is no different for Singapore where services account for about two-thirds of the economy. It is therefore imperative that we develop 21st century T-shaped professionals - those with a deep specialisation in one area as well as a multi-disciplinary set of skills - which will be key to fuelling the growth of Singapore's services economy. IBM is proud to collaborate with ISS to align with the national agenda and help Singapore build a high-value and highly skilled workforce."



Lynn NG

*Senior Director, Incentives Policy & Management Division
Singapore Workforce Development Agency*

"ISS has a long and established history of producing quality programmes for the infocomm sector. WDA is honoured to partner ISS in driving continuing skills upgrading and training for the sector, through the National Infocomm Competency Framework. I encourage infocomm employers and professionals to explore the many innovative and quality programmes that ISS has laid out for the sector."



Alphonsus PANG

*President, Singapore Computer Society and
Director, Corporate Services*

Defence Science & Technology Agency

"ISS has a rich history and exciting opportunities going forward. As the Institute of Systems Science, I believe ISS can carve out a niche as a centre of excellence where systems science and infocomm technical competencies help produce the next generation infocomm professional."



BG (Ret) PANG Hee Hon

Chief Executive Officer

Keppel Telecommunications & Transportation Ltd

"I applaud ISS for initiating THINK IT to address the capability gap in the logistics and supply chain management industry. Indeed, industry-specific business process transformation skills are lacking and in critical demand."



SEAH Chin Siong

Chief Executive Officer

IDA International Pte Ltd

"ISS has established a long-standing image providing mainstream and conversion skills development. With its focus in e-government leadership, I am keen for IDA International to work with ISS to offer the best of Singapore's e-government solutions and training."



Jessica TAN

Managing Director

Microsoft Singapore Pte Ltd

"By embarking on joint industry collaborations, ISS will become intimately familiar with industry technologies. In addition to courseware development, I challenge ISS to build on that knowledge to address the higher level technology-interoperability issues."



Wilson TAN

Chairman

EZ-Link Pte Ltd

"The iN2015 masterplan paints the vision for Singapore to be an intelligent nation and a global city powered by infocomm. Educating the infocomm manpower is one side of the coin. Equally important is educating the non-Infocomm manpower so that the benefits of infocomm can be felt throughout all sectors. This is exactly what ISS does and should continue to do."



RADM (NS) Ronnie TAY
Chief Executive Officer
Infocomm Development Authority of Singapore

“The infocomm ecosystem is driven by a cycle of three key activities: (1) innovation to generate viable ideas, (2) productisation to bring ideas to market, and (3) utilisation that fuels future innovations. ISS can train the manpower involved in this ecosystem to innovate, develop and use infocomm.”



A/Prof. TEO Hock Hai
Head, Information Systems Department
School of Computing
National University of Singapore

“I would like to congratulate ISS for playing an instrumental role in providing continuous lifelong education and training to our infocomm professionals. Through its executive and Masters programmes, ISS has helped many infocomm professionals upgrade their skills and knowledge to spur innovation and productivity growth in the industry. In this sense, I believe SoC and ISS complement each other in the ultimate goal of grooming Singapore’s future infocomm leaders.”



Prof. Lawrence WONG
Deputy Director, Strategic Development
Interactive and Digital Media Institute
National University of Singapore

“In the last few decades, new Interactive Digital Media (IDM) has significantly changed our way of communication. More and more would emerge in the coming years and these would impact our society and life. I encourage ISS to look at IDM as a focus area.”



WU Choy Peng
Group Chief Information Officer
Neptune Orient Lines Limited

“ISS possesses the unique proposition of combining academic rigour with vendor-independent perspective. ISS is also often the trailblazer in government capability development initiatives. For example, ISS has end-to-end experience in NICF that no other companies have. I urge ISS to maintain these leading advantages.”



Stavros N YIANNOUKA
Executive Vice Dean
Lee Kuan Yew School of Public Policy
National University of Singapore

“LKYSchool educates the next generation of Asian policy-makers and leaders to raise standards of governance throughout the region. We are glad to support ISS and IDA in the e-Government Leadership Centre, to strengthen Singapore’s position as a thought leader in e-Government.”



AWARDS & EVENTS

At the inaugural Workforce Skills Qualifications (WSQ) Partnership Night on 2 November 2010, ISS received the WSQ Distinguished Partner accolade from Deputy Prime Minister and Minister for Defence, Mr Teo Chee Hean. The accolade was awarded by WDA, in recognition of ISS' outstanding contribution to the development and expansion of the WSQ System.



On 22 January 2010, the Singapore Association of Information Security Professionals (AISP) and ISS officially launched the ISS-AISP Student Chapter. With immediate effect, ISS full-time graduate students would be able to access AISP resources, expertise, promotions and upcoming events.



On 11 March 2010, The Logistics Institute - Asia Pacific, and ISS embarked on a THINK IT initiative to research on IT-related optimisations and innovations for the logistics and supply chain management industry. A steering committee was set up and chaired by BG (Ret) Pang Hee Hon, Chief Executive Officer of Keppel Telecommunications & Transportation Ltd.



On 30 March 2010, ISS inked an agreement with Microsoft Corporation to embark on a Government Enterprise Architecture (EA) research collaboration, to gain insights into the current state and influence of Government EA practices, and to design a meta-framework for Government EA.

On 8 July 2010, Singapore Computer Society (SCS) and IDA unveiled the new Certification in IT Business Continuity Management (CITBCM) that covers business continuity management, IT disaster recovery and data centre management. ISS was appointed as authorised agent for the CITBCM course and examination.

On 13-14 July 2010, ISS co-hosted the inaugural regional collaboration of cybersecurity conference with the U.S. National Defense University Information Resources Management College, at the Shangri-La Hotel. Over 220 senior government and private sector representatives from Asia and U.S. attended the event.



On 29 October 2010, IT Management Association (ITMA) and ISS jointly organised the IT Best Practices Seminar titled “Do IT Right – Create Value, Enhance Performance”. The event covered topics in security, social media, cloud computing, business intelligence, virtualisation and IT talent development, by influential speakers from Google, HP, IDA International, KPMG, NetApp and Symantec.



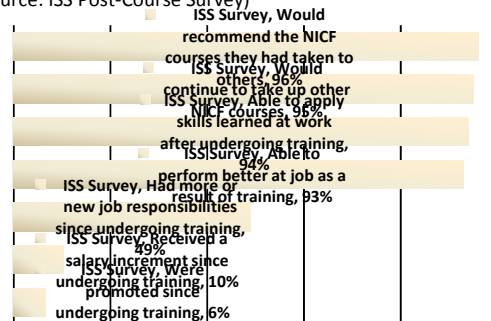
PROFESSIONAL DEVELOPMENT COURSES

ISS provides a comprehensive suite of 50 continuing education and training courses for the upgrading of infocomm professionals, managers and user executives. 13 of these courses are funded by IDA under the Critical Infocomm Technology Resource Programme (CITREP). Another 19 are Workforce Skills Qualifications (WSQ) courses aligned with the National Infocomm Competency Framework (NICF) and funded by WDA and IDA.

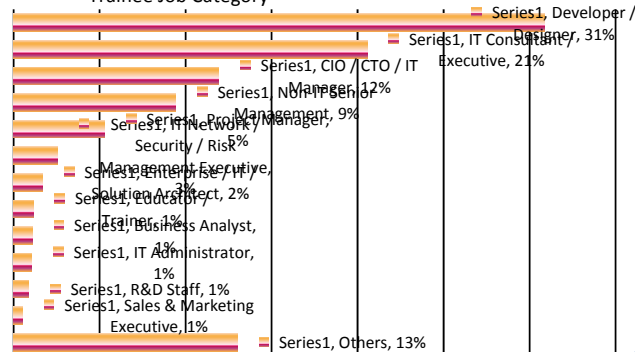
Our courses are very well received by our participants. In the last two years, 193 classes have been conducted, with an average of 25 participants per class. The NICF – Project Management for Information Systems, NICF – Business Process Re-engineering, and NICF – Certified Enterprise Architecture Practitioner Programme have been the three most popular courses.

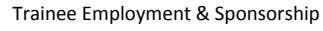
Our courses have demonstrated positive impact on learning effectiveness. More importantly, they have enhanced our participants' work performance and employability. While the majority of our participants are Developers / Designers (31%) and IT Consultants / Executives (17%), they attend our project management (23%) and Business-IT alignment (20%) courses to build up their T-shaped competency. Our participants have been willing to self-sponsor their training (27%), though 96% majority are under employment, in order to advance their career.

NICF Courses' Impact on Learning and Work (Source: ISS Post-Course Survey)



Trainee Job Category





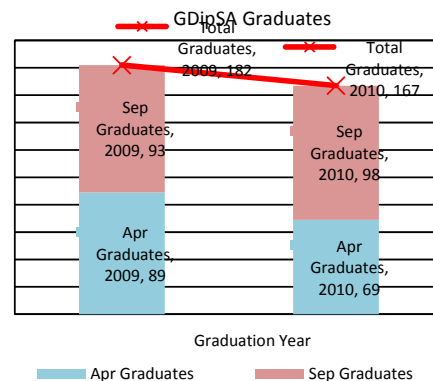
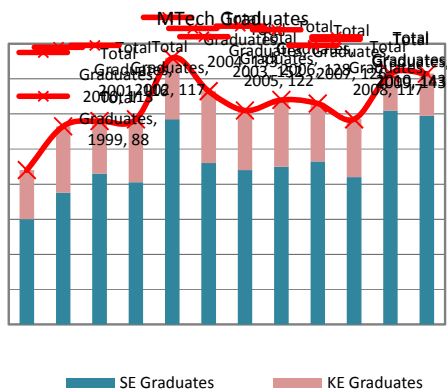
Our participants also tap on our career counselling and job placement services. For the working infocomm professionals, we advise them on the pertinent skill sets to upgrade, and shift them to the new growth areas or upwards in the value chain. For participants undergoing career transitions, we assist them to re-skill and become employed in infocomm jobs.

GRADUATE EDUCATION

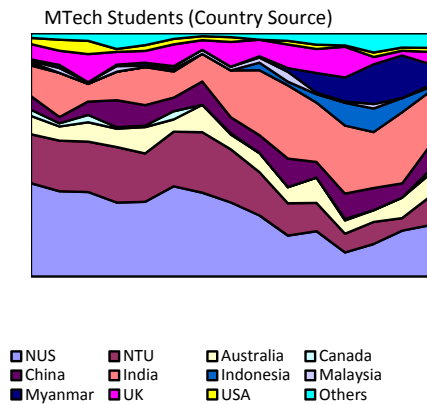
ISS, in collaboration with School of Computing and the Department of Electrical and Computer Engineering, offers the NUS Master of Technology (MTech) degree programme, to provide a professional degree designed to upgrade the Singapore infocomm manpower. The MTech programme offers specialisation in either Software Engineering or Knowledge Engineering, as full-time or part-time classes.

ISS offers the Graduate Diploma in Systems Analysis (GDipSA) programme to equip graduates with the latest infocomm knowledge and skills, and to advance their careers in their current field. GDipSA also provides an opportunity for non-infocomm graduates to craft a new career path in the infocomm industry. This is indeed a programme to develop T-shaped professionals by adding the infocomm competency to a non-infocomm graduate who will become more effective in exploiting infocomm in the business domain he or she specialises in. For the year under review, GDipSA had two intakes, in February and August.

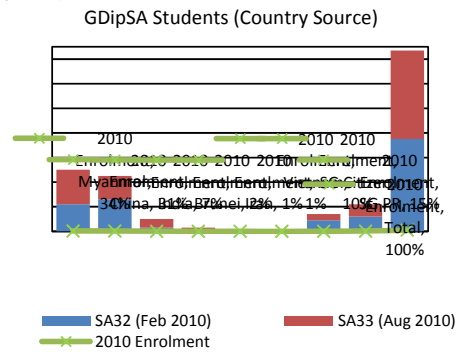
ISS' graduate programmes attract huge number of international students from India, China, Australia and Myanmar. In 2010, the MTech programme received 336 applications, of which 118 were accepted and enrolled. For the GDipSA programme, we had 488 applicants and subsequently 147 registered students. The MTech and GDipSA have about 2,000 graduates from each programme since 1982. In 2010, 143 students graduated from MTech, with another 167 graduates from GDipSA.



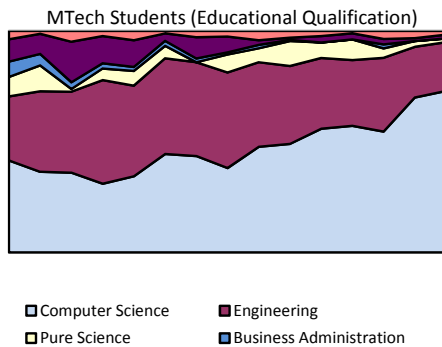
Most MTech students came from overseas, with India as the main source (22%).



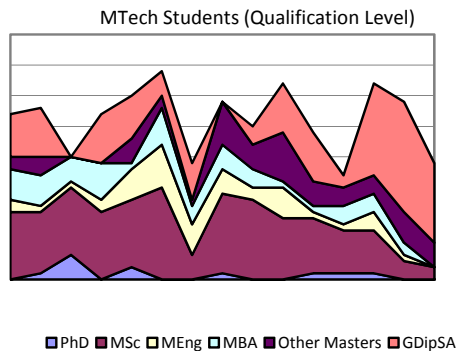
Most GDipSA students came from overseas, primarily from Myanmar (34%) and China (31%).



Majority had Computer Science (73%) undergraduate degrees prior to pursuing MTech.



MTech is an excellent upgrading pathway for GDipSA graduates. For the incoming cohort, 13 were our GDipSA graduates (11%).



e-GOVERNMENT LEADERSHIP CENTRE

The e-Government Leadership Centre (eGL) recognises that the government sector worldwide faces the lack of execution and supervision capability among the middle management, and the critical shortage of local infocomm workforce. The eGL undertakes to address these capability gaps. The strategies going forward are:

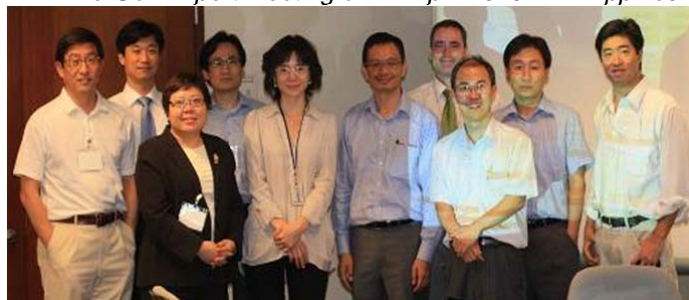
- ⇒ **Education** – delivering courses targeting at middle management, in-country capability development and quality control;
- ⇒ **Research** – intensifying research collaboration with local and international partners, and incorporating made-in-Singapore e-Government solutions into course curriculum and industry promotion;
- ⇒ **Advisory** – focusing on ISS' core competencies in business process re-engineering, enterprise architecture, requirements engineering, procurement and outsourcing as well as information security;
- ⇒ **Industry Development** – opening marketing opportunities for our local infocomm enterprises, and at the same time, allowing our clients access to best-of-breed solutions.

The eGL continues to leverage on the strategic partnership with the Civil Service College, Commonwealth Secretariat, IDA International, International Enterprise (IE) Singapore, and Ministry of Foreign Affairs, to reach out to overseas public sector executives. From 1 August 2009 to 31 July 2010, we shared the knowledge and lessons learnt in Singapore e-Government with senior foreign delegates from about 60 countries. We organised 10 customised programmes and three sponsored programmes, as well as participated in five speaking engagements.

e-Government Conference for Kuwaiti Delegation on 3 to 6 May 2010



ADB e-Gov Expert meeting on 27 April 2010 in Philippines



CONSULTING SERVICES

ISS understands that every organisation has its own needs and unique challenges. To ensure educational excellence and customer value, ISS consults with our corporate clients and tailors the workshop content to their specific requirements. As part of our consulting services, we facilitate workshops and discussions, conduct focused interviews with client's employees, perform reviews and assessments, and provide advice and guidance to lead to successful outcomes.

Our areas of specialisation for consulting services are Capability Maturity Model Integration[®] (CMMI[®]), distributed object computing, e-business management, enterprise architecture (EA), intelligent systems, IT management, knowledge management, and National Infocomm Competency Framework (NICF).

In its continued involvement with the development of the Singapore Government Enterprise Architecture (SGEA), ISS worked closely with IDA and developed the Government EA Guidebook, a compilation of scenarios demonstrating the utility of EA and Methodology for Agency Enterprise Architecture (MAGENTA) to address various management and technology concerns faced by government agencies. Extending our expertise to the healthcare sector, ISS advised Singapore Health Services provides advisory support in developing and internalising its cluster-wide EA. This multi-stage engagement raised the profile and the positioning of EA as a management meta-discipline.

As the forerunner, ISS is the only organisation with end-to-end NICF expertise. We have experience in NICF competency standards development, NICF implementation consultancy, Workforce Skills Qualification course design, and operations of a Continuing Education and Training Centre. In 2010, Neptune Orient Lines (NOL), Resorts World Singapore, and Singapore Changi Airport Group engaged ISS to provide consultancy to implement NICF in their companies.

ISS also extends our consulting services to foreign governments and companies. For example, we teamed up with the Jiangsu Productivity Centre of Nanjing to deliver CMMI[®] training, provide on-the-job coaching and conduct appraisals for their companies. Upon achieving the CMMI[®] standards, the companies were able to put to practice the engineering discipline and attain quality performance in software development and services, which gave them the advantage when bidding for the China government's IT projects.

In 2010, ISS provided assistance to the Government of Oman in its construction of the Oman e-Government Architecture Framework (OeGAF). The OeGAF is an integral part of Oman's e-government programme and has contributed to the country's e-government maturity. It received the 2nd Open Group Arabia Award from The Open Group in December 2010.

APPLIED RESEARCH

ISS conducts research to keep abreast of leading scholarly works in the various knowledge disciplines. Our research agenda is directed at practice-leadership, to develop and propagate new applications in leading-edge infocomm technology, combined with tested management methods and best practices, to address real needs in specific domains.

ISS' four key research disciplines are e-government, enterprise architecture, service innovation, and technopreneurship. We actively collaborate with academic and industry partners to ensure the continued relevance of our research. Our research results are disseminated via publications, teaching cases, forums, conferences and seminars.

Event / Journal	Paper
❖ 70 th Annual Meeting of the Academy of Management	Effectual Logic in Entrepreneurial Decision Making: Timing as a Contingency Effect
❖ International Conference on Information Systems	Developing a Customer-Centric, Inclusive eGovernment: Lessons from the Central Provident Fund Board of Singapore
❖ Journal of Service Management (SERVSIG 2010 Special Issue)	Does Service Dominant Design Result in a Better Service System?
❖ SERVSIG International Service Research Conference	Is Service-Dominant Design Better Than Goods-Dominant Design?

e-Government

Our research topics for e-Government include Public Service Innovation, Green IT Policy, Citizen Participation, and Y-Generation's Perception of e-Government and Policies. We are advised by Professor Sharon Dawes, Founding Director and Senior Research Fellow at the Center for Technology in Government, State University of New York at Albany.

ISS has developed case studies on e-government innovation for Building and Construction Authority (BCA), Immigration & Checkpoints Authority (ICA), Land Transport Authority (LTA), and Ministry of Manpower (MOM). These are more recent research works added to our previous compilation for Central Provident Fund Board (CPF), National Library Board (NLB), National Service Men Portal, and Singapore Changi Airport Group.

Enterprise Architecture

Our special focus in enterprise architecture (EA) has been to investigate its impact on government transformation, public sector reforms and evolution of government functioning. The EA group is an eclectic mix of academia and practice, allowing us to keep our research and innovation activities grounded in relevancy and pragmatism. We were directly involved in the development of the Singapore Government EA, and were the recipient of the Microsoft

research grant in the area of Government EA supported by the United Nations (UN) and the World Bank.

We have been invited as keynote and distinguished speakers by overseas renowned universities and institutes, global companies, as well as foreign and local governments. Our work has been featured and cited by Carlsberg, The Open Group, UN, United States Department of Defense (DoD), World Health Organization (WHO), and has contributed to the World Bank's EA Guidelines for Vietnam.

Service Innovation

The motivation to conduct service innovation research is a growing recognition that IT can be a strategic core to produce a service of value in enterprises today. Our service innovation research is advised by Professor Bo Edvardsson, Professor of Business Administration and Director of the Service Research Centre at the University of Karlstad in Sweden. We also partner with IBM to research on Service Science, Management and Engineering (SSME).

Our foray into service research was a study that offered empirical evidence on the favourable attributes of a service-dominant design. We concluded that a well-conceived service system is capable of dynamically configuring resources that empowers the user to co-create value. This has significant implication for the core disciplines at ISS. We further expanded from normative to prescriptive and descriptive research, deepening our studies to formulate constructs of "co-creation" with case research within the healthcare and energy domains. Each of our proposed areas of new research has been accepted by leading service conferences in the world.

Technopreneurship

Our research in technopreneurship is focused on two areas: entrepreneurial decision making and new forms of innovation such as shanzhai. Effectuation models entrepreneurial decision making as being means-based design thinking where goals emerge as an outcome. Our research looks at the innovativeness of the decision outcome from effectuation, based on a quantitative and qualitative study of Singapore's entrepreneur community.

In addition to this research, we also investigate new forms of innovation in emerging markets. A common form of innovation often encountered in China is "shanzhai," high-quality, very rapid imitation of new, branded products by low-cost, no-brand competitors. Because these competitors often customise for the local market the products they copy, shanzhai is often regarded as intellectual property (IP) theft. A review of shanzhai new products and the rapid evolution of the aggressive shanzhai producing firms reveal a vibrant entrepreneurial ecosystem, driving penetration while producing free ideas and market research. What are the key characteristics of the successful shanzhai competitors? How can firms leverage this new model of competition?

SPEAKING ENGAGEMENTS

ISS is respected for our vast spectrum of expertise, ranging from technical to management, mainstream to emerging. We actively participate in seminars, conferences, forums, roundtables and closed-door meetings – locally, regionally and globally – to exchange ideas on topics of common interest.

In 2010, we were invited as speakers and moderators at 35 public and private platforms, in Australia, Brunei, Canada, China, Jordan, Malaysia, Portugal, Singapore, Spain, United Arab Emirates, and United Kingdom. We shared our knowhow and research findings in e-government, enterprise architecture, service innovation and technopreneurship, with representatives from government agencies, universities, research centres and private companies.

Event	Organiser
❖ 2 nd International Conference on Service Science and Innovation @ Beijing, China	Beijing Research Center of Urban Systems Engineering
❖ 70 th Annual Meeting of the Academy of Management @ Montreal, Canada	Academy of Management
❖ 8 th Regional Asia Information Security Exchange Forum Meeting @ Singapore	Regional Asia Information Security Exchange (RAISE) Forum
❖ Art & Science of Service Conference @ Madrid, Spain	IE Business School
❖ Australia Government Architecture Summit @ Adelaide, South Australia	Government of South Australia
❖ CloudAsia 2010 - CXO Breakfast @ Singapore	National Grid Office (NGO)
❖ IDA-AISP Information Security Seminar @ Singapore	Infocomm Development Authority (IDA) & Singapore Association of Information Security Professionals (AISP)
❖ iGov Global Forum @ Singapore	Infocomm Development Authority (IDA)
❖ International Conference: Advances in Distributed & Parallel Computing 2010 @ Singapore	Global Science and Technology Forum
❖ IT Architecture Regional Conference @ Singapore	International Association of Software Architects
❖ IT Best Practices Seminar @ Singapore	IT Management Association (ITMA)
❖ MIS Asia IT Seminar @ Singapore	MIS Asia
❖ Roundtable on Service Research @ Cambridge, UK	Cambridge Service Alliance
❖ SecureAsia @ Singapore	International Information Systems Security Certification Consortium (ISC) ² & Singapore Association of Information Security Professionals (AISP)
❖ SERVSIG International Service Research Conference @ Porto, Portugal	Universidade do Porto
❖ Singapore Business Review Roundtable @ Singapore	Singapore Business Review
❖ SNEF 30th Anniversary CEO & Employers Summit @ Singapore	Singapore National Employers Federation (SNEF)
❖ Standards Innovation Exchange Seminar @ Singapore	IT Standards Committee (ITSC)

PARTNERS

ISS establishes partnerships with leading global companies, international institutions, renowned associations as well as Singapore and foreign government agencies to offer courses and professional certifications.

- ◇ **Association of Information Security Professionals (AISP)** – appointed ISS to develop a certification course cum examination to benchmark our infocomm security professionals against international and national standards;
- ◇ **Association for Information and Image Management (AIIM)** – licensed ISS to deliver the Business Process Management Master certification;
- ◇ **Carnegie Mellon Software Engineering Institute** – licensed ISS to deliver SCAMPISM consulting and appraisal services and Introduction to CMMI[®] courses;
- ◇ **EXIN International B.V.** – appointed ISS as the Accredited Training Provider and Accredited Examination Centre for Information Technology Infrastructure Library Version 3 (ITIL[®] v3) Foundation;
- ◇ **GoodAgile** - delivers Scrum courses in Singapore through ISS;
- ◇ **IBM Singapore** - IBM content used in ISS Services-Oriented Architecture Essentials course; MOU on Service Science, Management & Engineering curriculum development & research;
- ◇ **Infocomm Development Authority** - jointly set up e-Government Leadership Centre in ISS;
- ◇ **International Information Systems Security Certification Consortium (ISC)²** – appointed ISS as the Education Affiliate for two (ISC)² certifications;
- ◇ **IT Management Association (ITMA)** – jointly organised with ISS the annual IT Best Practices Seminar (since 2007);
- ◇ **Lucid IT** – signed an agreement to jointly deliver a suite of 11 certification courses for COBIT[®], ITIL[®], P3O[®] and PRINCE2[®] ;
- ◇ **National Defense University Information Resources Management College** – jointly organised the cyber-security conference and conducted the IT Management Executive Development Programme for MINDEF (since 2009);
- ◇ **NetProfitQuest** - jointly deliver Social Media Marketing course;
- ◇ **Project Management Institute (PMI[®])** – appointed ISS as the Global Registered Education Provider (since 2005);

- ◇ **Singapore Computer Society (SCS)** – appointed ISS to conduct certification courses and examinations on IT project management (since 1999), IT outsourcing management (since 2006) and IT business continuity management (since 2010);
- ◇ **Singapore Workforce Development Agency** - ISS appointed as CET Centre to develop and deliver courses aligned to NICF;
- ◇ **The Association for Information and Image Management** - licensed ISS to deliver Business Process Management Master certification programme;
- ◇ **The International Institute of Business Analysis (IIBA)** – endorsed the ISS' Certified Business Analysis Professional (CBAP®) Preparatory Course and Requirements Engineering course;
- ◇ **The Logistics Institute** - launched THINK IT (a CIO Consortium on IT / logistics research); ISS developed and delivered customised courses for logistics professionals; and
- ◇ **The Open Group** – licensed ISS to provide consulting and training on The Open Group Architecture Framework (TOGAF) (since 2005).

GOVERNANCE

As an integral part of NUS, ISS operates within the framework of NUS governance by applying the standard university-wide policies, guidelines and rules to achieve academic rigour, excellent performance and effective day-to-day operation. Stewardship and oversight of ISS are tightly controlled.

ISS believes in the importance of good governance. We established corporate governance and reporting structure with clear responsibility and accountability. ISS CEO is appointed by and reports to the NUS Provost on operational matters. In addition, ISS is guided by a Management Board with members from stakeholders and other industry leaders. The Chairman is appointed by the NUS President. The Board members are appointed by the Chairman. The terms of reference for the appointment are as follows:

- ◇ To advise ISS on strategic business direction;
- ◇ To review ISS programmes and products to ensure they meet the changing needs of the industry and help ISS establish strategies to remain innovative with a leading edge;
- ◇ To advise ISS on appropriate organisational and personnel policies to support its mission and strategy;
- ◇ To assist in establishing links with the industry and other leading institutions.

ISS is ISO 9001:2008 certified for training and consulting services, as further assurance of our commitment to deliver quality in our work. As a result, we are able to meet the stringent requirements of our customers and often exceed their expectations.

MANAGEMENT



Senior Management		
1.	LIM Swee Cheang	Director / CEO
2.	YUM Hui Yuen	Deputy Director
3.	Leonard NEE	Deputy Director & Chief, Graduate Programme
Chiefs (Practice)		
4.	Swarnalatha ASHOK	Advanced Technology Applications Practice
5.	Daniel BOEY	Project Management Practice
6.	Virginia CHA	Research Practice
7.	GOH Boon Nam	New Initiatives & Strategic Planning
8.	David Robert HUFTON	Software Engineering Programme
9.	LOONG Chay Ching	Teaching Excellence Practice
10.	Gloria NG	Service Innovation Practice
11.	Charles PANG	Knowledge Engineering Programme
12.	Esther TAN	Systems Analysis Programme
13.	Joseph TEO	Director, Singapore e-Government Leadership Centre
Directors (Support Unit)		
14.	Theresa Veronica CHAN	Associate Director, Business Development
15.	Shirley SING	Senior Associate Director, Operations
16.	TAN Bee Leng	Associate Director, Finance
17.	Richard TAN	Chief Information Officer

STAFF

ISS maintains an international and multi-disciplinary team comprising 42 full-time faculty members and 36 support staff. Our teaching and consulting members are industry practitioners with an average of 20 years of working experience in research, development, consultancy and management. Majority have at least a Masters degree. Six are currently pursuing a doctorate in various subjects of e-Government, Innovation, Mobile Context Awareness, Model-Driven Development, as well as Variability Management and Traceability for Software Product Line Testing. In 2010, 30 existing staff acquired or renewed industry certifications in our areas of specialisation. Eighteen were recruited as part of the rejuvenation process to inject fresh perspectives.

As a team, ISS staff have diverse experience in business continuity management, business process management, e-government, enterprise architecture framework, enterprise business analysis, information systems audit, intelligent systems, IT governance, IT security, IT service management, object-oriented technology, outsourcing management, project management, quality management, risk management, service innovation, software requirements engineering, strategic IT planning, and technopreneurship.

We also have a network of 31 adjunct teaching staff and consultants to augment our intellectual capital. They are alumni and individuals from academia, industry and government organisations. They have expertise in areas such as business law, green IT, human-computer interaction, intellectual property litigation and anti-counterfeiting, mobile computing, process re-engineering, IT governance, IT risk management, IT service management, and Scrum.

FEEDBACK

"I felt I really lucked out when I came upon this course. This is the only IT outsourcing course that I've come across. Although I have been managing outsourcing for five years, I don't really have formal training in this. That is why this is very exciting for me. It was perfect for me; it was exactly what I was looking for and with the SPUR (Skills Programme for Upgrading and Resilience) subsidy, I can afford to pay for this very easily."

HSHIEH Su Yuan, Participant of NICF – IT Outsourcing Management for Practitioners

"It allows me to apply what I learned into my working area and that gives me a value-add in my perspective as well as to my company. I like this place. The venue is very conducive for learning. On top of that, I find the instructors very friendly."

Josephine FOON Fong Leng, Manager, Participant of NICF – Object-Oriented Design Patterns

"The course helps us in planning, critical thinking, and execution. It helps to equip us in both work and personal life. Also help us to enhance our entrepreneurship spirit. Shanzhai Culture / Innovation, good insight & great stuff. Personal sharing by the lecturers was great. Virginia is an excellent lecturer, facilitator, mentor, etc. Great learning experience."

TAN Willie, Participant of NICF – Technopreneurship

"The course is very well-structured and well-paced. The exercises and assignments gave very good practical knowledge which is useful for job searching. I am currently in Software Engineering field, developing applications for Production and Yield Monitoring. Thanks to the GDipSA programme, I feel that I have a solid programming foundation to cope with all kinds of challenges at work!"

LU Heng, Software Engineer, GDipSA Graduate

"I have learned hard skills including Systems Analysis, .Net and Java technology, and soft skills such as Project Management, communications and presentation skills in the GDipSA programme. The last four months of internship definitely enhanced my knowledge and technical skills. I have learnt many other techniques required in my work and I feel more confident and competent in IT jobs."

LI Weihua, Application Engineer, GDipSA Student

"What I have gained from this module has basically increased my confidence level to accept most challenges and more responsible roles in my career."

Balakumar MANICKAM, MTech (Software Engineering) Student

"When we first started our Master of Technology in Knowledge Engineering (MTech KE) programme at NUS-ISS in 2008, we were already very excited about what we should do for our final year project. The final year project is an integral part of the MTech KE programme and offered a very good opportunity to apply all that we had learned in the course and put them into reality by creating a prototype Artificial Intelligence (AI) system. Our team members come from different backgrounds and we have our own day jobs in different fields. Time management and team work were important things that we learnt in order to make the project successful. Each of us has our own strengths and weaknesses. We complemented one another in many ways as we learnt from one another. The project had been tough for all of us but it was all well worth it especially when we won the best project award. Working on the project had been such an inspiration to us, and one of the greatest moments in life. It was fun and we enjoyed every part of it!"

Aming Handoko LIOE, 2010 Best MTech (Knowledge Engineering) Project

"I enjoyed working with the team as we come from different background, culture and having different experiences. Our team members came from India, China, Myanmar and Singapore, and having to work together on a project of such long duration had definitely enhanced our learning experience in ISS. As a non-software developer and the Project Manager for the team, the most challenging aspect for me was to manage the process and the technical part of the project. ISS has prepared me for the role as the software development process was rigorously taught throughout the course, with a good mix of lectures and workshops. I was also very fortunate to have a very understanding team!"

Martin LIM Siang Dat, 2010 Best MTech (Software Engineering) Project

"The concept of this course will help me in expediting my work plan and look at the whole picture."

Awad Al-Sheikh ISMAIL from Jordan, Participant of Use of IT in Public Administration

"I am very satisfied with the excellent hospitality & quality of the program."

Zainurrijal ABDULLAH from Brunei Darussalam, Participant of Use of IT in Public Administration

"Overall, the course was relevant & it will definitely help me address some of the issues I faced in my work & home."

Tashi DORJI from Bhutan, Participant of Use of IT in Public Administration