Preparing Graduates for the Workplace of the 21\textsuperscript{st} Century

Professor LEE Sing Kong
Vice President (Education Strategies)
President’s Office
NTU EDUCATION is dedicated to creating knowledge to meet the global challenges of the 21st century and nurturing innovative and socially responsible leaders to shape the future of Singapore, Asia and beyond.
External Drivers
How to move NTU Education forward?

Global Environment
• Changing Economic Landscape
• Technological Advancements
• Challenges to Sustainability
• Global Interdependence

Social Transformation
• Speed & Scale of Change
  • Cultural Diversity
  • Social Media
  • Social Inclusiveness
  • New Moral Dilemmas

EPIC Learners
• Experiential
• Participatory
• Image driven
• Connected

21st Century Skills
• Interpersonal Skills
• Collaborative Skills
• Thinking Skills
• Communication Skills
• Disciplinary Depth
• Interdisciplinary problem-solving
• Professional Integrity
Blue Ribbon Commission
How to move NTU Education forward?

To better prepare our graduates for the new demands of the 21st century workplace, a Blue Ribbon Commission was appointed in 2007 to undertake a comprehensive review of undergraduate education and identify the necessary changes needed to meet the challenges. It culminated in a roadmap to revamp NTU Education.
Key Components of NTU Education

- **Academic Life**
  Learning within the curriculum

- **Student Life**
  Learning beyond the curriculum
Desired Attributes of a NTU Graduate

- Communication
  - Leadership, Teamwork, Mutual Respect & Communication Skills

- Civic-mindedness
  - Professionalism, Public Service, Social Engagement & Global Citizenship

- Creativity
  - Entrepreneurship, Innovation & Interdisciplinary Synthesis

- Character
  - Ethical Reasoning, Integrity & Moral Character

- Competence
  - Self-discipline, Disciplinary Depth & Lifelong Learning

I am an NTU student
Desired Attributes of a NTU Graduate

COMMUNICATION
- Leadership
- Teamwork
- Mutual Respect
- Communication Skills

CHARACTER
- Ethical Reasoning
- Integrity
- Moral Character

CREATIVITY
- Entrepreneurship
- Innovation
- Interdisciplinary Synthesis

COMPETENCE
- Self Discipline
- Disciplinary Depth
- Lifelong Learning
- Professional competencies

CIVIC-MINDEDNESS
- Professionalism
- Public Service
- Social Engagement
- Global Citizenship
What Factors Support NTU Education?

**CURRICULUM**
- A broad-based flexible foundation
- Diverse content
- Exchange programmes and service learning

**STUDENTS**
- Students that excel in both academic and beyond academic activities
- Students as co-owners, co-drivers and co-creators of their student experience

**FACULTY**
- Recruitment of faculty with excellent teaching and research competencies
- Continuous faculty support and professional development

**CAMPUS ENVIRONMENT**
- High quality student services and support
- Positive campus culture and climate
## How Do They Achieve the Desired Outcomes?

### Curriculum Structure & Programmes
- Revamping the Curriculum Structure; *Introducing New Interdisciplinary Content & New Programmes*; Increasing Variety & Choices of Overseas Experience

### Excellence in Learning & Teaching
- Fostering Excellence & Encouraging Innovation in Teaching; *Setting up of Teaching Excellence Academy*; Increasing Effectiveness in Learning, *Inculcating Self-Directed Learning*; Building Physical Infrastructure for Pedagogical Changes; *Using IT to cater to the Net Generation*

### Academic Culture
- Recruiting of Quality Faculty; *Balancing the Distribution of Faculty workload*; Holistic Appraisal of Faculty; *Professional Development of Faculty*

### Student Life
- Implementation of a Formal Freshman Orientation Programme; *Developing Residential Education Experience*; Strengthening Pastoral Care and Counselling Service; *Building a Township Campus*; Encouraging Student Representation, *Involvement & Accountability*; Fostering Learning Beyond the Classroom; *Creating a one-stop Service Support Centre*

### Academic Advising & Career Guidance
- Formalising Academic Advising; Enhancing Career Services & Placement
NTU Education:
Curriculum Structure & Programmes

BRC Curriculum Structure

New Programmes

Premium Scholars Programmes
BRC Curriculum Structure

- Broad-based curriculum with about 30% in General Education Requirement (GER) and about 70% in Major Discipline of Study.
- 8 compulsory GER courses covering Communication Skills, Career Preparations, Singapore Studies, Ethics, Sustainability, Enterprise & Innovation.
- At least 3 Prescribed Electives from the three GER categories of Business & Management, Liberal Arts, and Science, Technology & Society.
- 5 to 10 courses of Unrestricted Electives.
- Flexibility to read one of the 38 Minor programmes.
- Flexibility for high calibre students to pursue multi-disciplinary learning from a wide selection of 4 Premier Scholars’ Programmes, 16 Second Major programmes, 15 Double Degree programmes, and 6 Fast-Track Integrated programmes.
New Programmes launched in AY2012-14

- To exploit our comparative advantage and expertise in specific disciplinary areas and add diversity, new programmes in niche areas are being offered.
- To date, the University offers **35 Single Degrees, 15 Double Degrees, 6 Fast-Tack Integrated bachelor’s + Master’s, 16 2nd Majors, and 38 Minors**.
- Noteworthy new programmes include:
  - MBBS programme involving joint partnership between NTU Lee Kong Chian School of Medicine and Imperial College London.
  - BSc (Environmental Earth System Sciences); a multi-disciplinary programme examining intersections between earth, atmosphere, hydrosphere and biosphere.
  - 2nd Major in Food Sc & Tech developed in collaboration with Wageningen Uni; a world leading institution in food sc who provides the teaching of core courses in the programme.
**New Programmes launched in AY2012-14**

**NEW BACHELORS**
1. Joint MBBS Programme with Imperial College London
2. BSc (Environmental Earth System Sciences)
3. BA (History)
4. BA (Philosophy)
5. BA (Public Policy & Global Affairs)

**NEW 2nd MAJORS**
1. Chemical Biology / Psychology for BSc(Bio Sc)
2. Bio Sc for BA(Psychology)
3. History / Philosophy / Public Policy & Global Affairs for BA, BFA and B Comm Studies
4. Food Sc & Tech for BSc(Bio Sc), BSc(Chemistry) and BEng(Chemical & Biomolecular)
5. Business for B Eng

**NEW MINORS**
1. Environmental Sustainability
2. Philosophy
3. Flim Studies
4. Global Asia
5. Chinese Creative Writing
6. Art History
Premier Scholars’ Programmes:
Stretching the Intellectual Limits of Top Students from among an annual 6000 student intake

Renaissance Engineering Programme (REP)
- Grooms future CEO & CTOs in the increasingly complex, innovation driven world.
- Elite programme targeted at top 2% of admission cohort.
- Top Engineering programme in Singapore since 2012.
- Experienced-based pedagogy integrating Eng Science & Business Mgmt with Liberal Arts flavour.
- Dual degree in Bachelor of Eng Science & Master of Science (Tech Mgmt) with Berkeley & Imperial College connections.

C N Yang Scholars Programme (CNY)
- Named after Nobel Laureate, Prof Chen-Ning Yang
- Designed for top students with deep passion in science and eng for the high-tech world of the 21st century.
Premier Scholars’ Programmes: Stretching the Intellectual Limits of Top Students from among an annual 6000 student intake

**University Scholars Programme (USP)**
- Designed for top students in all majors at NTU.
- Deep immersion in the core ideas underpinning major disciplines, forging connections across many disciplines relating to bus & entre’ship, culture, knowledge, society, the arts, tech & multi-media world, and scientific & social-scientific systems.
- Supplements core curriculum with rich & diversified course selection, scholar-led initiatives, seminars by distinguished professors and Nobel Laureates, and overseas programmes.

**NTU-NIE Teaching Scholars Programme (TSP)**
- Designed for outstanding students with a passion & calling to be education leaders.
- Grooms graduates with intellectual rigour, strong leadership & global perspective to make significant contributions to education.
- Supplement core curriculum with diversified electives, seminars, leadership programmes & learning opportunities promising to broaden perspectives.
NTU Education:
Culture of Learning and Teaching

- Infrastructure & Facilities
  - State-of-the-Art TR+
  - Self-Learning Spaces
  - Learning Hubs
  - Campus-wide video recording of Lectures
  - eLearning Platform & Initiatives

- Programmes for Teaching the Teachers

- Holistic Teaching Appraisal
- Multi-tiered Teaching Awards

- Working Committees for Teaching & Learning (programmes & rewards)
- Teaching Excellence Academy (TEA)
Learning & Teaching Facilities:
State-of-the-Art TR+:

- About 119 tutorial rooms reconfigured into collaborative learning spaces called TR+:
  - Equipped with LCD screens, wireless network, whiteboard-mounted walls & AV facilities
  - Students sit in clusters of six
  - Facilitate collaborative learning and enhance communication among students
Learning & Teaching Facilities:

Learning Hub (LH) South

- Due for completion in end 2014.
- Fully operational by end of AY2014.
- Built at a cost of S$45M incorporating the latest learning space concepts to facilitate active learning pedagogies.
Learning and Teaching Facilities:
Learning Hub (LH) South

**LH NORTH in the planning**
- Caters for students in the North Acad Complex.
- Slated for completion by 2016.
- Multi-purpose LT for lectures, seminars, and film screenings.
- Facilitates ease of conversion into small discussion groups.
- 50 new TR+
- Cafes and retail kiosks

**FEATURES**
- 56 new TR+ to support collaborative learning.
- Accessible 24/7 for students to engage in group discussions and self-study.
- Writing & Comm. Centre for F2F tutor-assisted writing skills coaching
- Library outpost
- F & B outlet
- Rooftop garden & student activity space
Learning and Teaching Facilities:
Informal Learning Spaces

- Informal learning spaces are scattered throughout the North and South Academic Complexes.

- Located in libraries, reading rooms, open spaces, atrium, near food courts and canteens, Student Activities Center, Global Lounge, Learning Pod, enclosed corridors, etc.

- Most of these spaces are open 24/7.

- To date, a total of 3,830 air-con and 3,789 non air-con spaces are made available for group discussion and self-study.
Learning and Teaching Facilities:  
E-Learning Platform and E-Learning Initiatives

- Comprehensive platform of tools that enable eLearning
  - Collaborative & participatory learning (NTULearn, LAMS, iNgage, acuConference, eUreka, Learner Response System)
  - Assessment of learning (Respondus, OASIS, Analytics)
  - eContent (NTULearn, LAMS, Ingage, acuStudio, MOOCs on Coursera)
  - Academic integrity (Turnitin, iThenticate)
  - Course management & communication (NTULearn, NTU Mobile, NTU Connect, acuConference)

- Campus-wide lesson recording facilities in all LTs since 2010.

- Electronic Clicker (audience response system) issued to all freshmen since 2009.

- Technology-enabled Learning
  - Progression to elearning 2.0 to leverage on flipped classroom approach.
  - 5-year roadmap as of 2015 to target 50%-100% of non-lab courses for online conversion.

- Launch of MOOC courses on Coursera platform in 2014
  - First 2 courses on Symmetry & Forensic Science received almost 100,000 enrolments to date.
Excellence in Learning & Teaching: Holistic Teaching Appraisal & Emphasis

- New Student Feedback on Teaching form launched in AY 2011/12:
  - two elective questions (for different pedagogical emphases)
  - core questions (for student-centred and active learning)

- New Teaching Appraisal Scheme launched in AY2012/13 employing holistic evaluation based:
  - student feedback on teaching (40%)
  - peer review on teaching (20%)
  - teaching portfolio *
  - academic advising and mentoring*

- Equal Weighting on Teaching & Research in Performance Appraisal

- Teaching Ability a Key Requirement in Appointments, Promotion & Tenure.

* This may vary from College to College.
Excellence in Learning & Teaching:
Multi-tiered Nanyang Education Award

- Annual Nanyang Award for Excellence in Teaching recognizes outstanding teachers at Schools.
- Expanded in 2013 to become the multi-tiered Nanyang Education Award (NEA) to recognize, encourage and reward good teaching throughout the University.
- NEA include School Award, College Award & University (Gold / Silver / Bronze) Award.
- Each winner receives a trophy, certificate and cash award of $5,000.
- Special grant of $5k, $10k, $15k and $25k also given to College, University Bronze, Silver and Gold Award winners respectively for funding projects and activities that contribute towards scholarship of learning and teaching.
- Winner of the highest level of a award for the year is further bestowed with the title of Educator of the Year.

2013 Award Year

- 18 winners for School Award; 12 winners for the inaugural College Award
Excellence in Learning & Teaching:
Teaching Excellence Academy (TEA)

• Establishment of TEA in Feb 2014 to underscore the importance of teaching in NTU.
• NEA College and University winners are installed as Lifelong Fellows of TEA.
• The inaugural 12 NEA College winners are the pioneer pool of TEA Fellows.
• **Objectives**
  ✓ To act as the resource for implementing peer review.
  ✓ To promote best teaching practices by award-winning NTU professors & lecturers to raise teaching standards throughout the university.
  ✓ To provide leadership, support and encouragement for innovation, scholarship, and research in education.
  ✓ To advise the NTU management on teaching-related issues.
  ✓ To provide mentoring and support for all faculty members.
  ✓ To conduct master-class teaching workshops.
Excellence in Learning & Teaching:
Teaching, Learning and Pedagogy Division (TLPD)

- TLPD serves as the main centre in the professional development of faculty through administering programmes and initiatives relating to the advancement of teaching pedagogies and fostering of excellence in teaching.

- **Roles**
  - provides training and consultation on teaching innovations.
  - serves as the secretariat of the Teaching Excellence Academy and the University Education Award Committee.
  - runs courses and workshops in areas such as new teaching and learning technologies & tools, and presentation & communication skills.
  - creates grants to award deserving faculty members who wish to raise the bar in teaching through research in instruction and learning.
FULT aims to give new faculty a “kick-start” to teaching at NTU.

Since Jul 2012, all newly recruited faculty are required to attend FULT course within one year of starting work at NTU.

Course consists of four 3-hour modules covering:
✓ Communication and Presentation
✓ Effective Teaching Strategies
✓ Curriculum Planning and Design
✓ Learning Assessment

Runs once per semester.

Followed up by a series of workshops to further hone the teaching skills of these faculty.
Excellence in Learning & Teaching: Faculty Development Programmes

- Learning & Teaching Workshops for Faculty to provide practical strategies & underlying pedagogical rationale for innovative teaching.

- Framework used to develop the Workshops is the same that was used to develop the Student Feedback on Teaching form, where the aim is to link workshop topics and approaches explicitly to the criteria on which students evaluate teachers in the Student Feedback on Teaching.

- A completely redesigned registration system now enables a resourceful channel for search of relevant workshops addressing the particular questions in the FST forms.

- About 25 workshops offered per semester, such as
  - incorporating various tools meaningfully into teaching.
  - How to design curriculum from an outcome-based perspective.
  - How to develop a teaching portfolio for Promotion & Tenure
  - How to develop Team-based Learning.
Excellence in Learning & Teaching: School-based Workshops, Consultations & Seminars

- School-based workshops and individual consultations for faculty provided by TLPD where requested.

- Intensive individual consultations by TLPD for faculty whose teaching needs development.

- Annual Seminars
  *From Good to Great*
  - Cover current issues in higher education addressed by international experts.
  - Designed to allow faculty to discuss the big (often theoretical) issues.
  - 2014 Theme – “Transformative Knowledge: Teaching for Conceptual Understanding”. Included presentations by EdeX grant holders.

*Innovations in Teaching*
- Focuses on practice, implemented innovations, and presentations from NTU faculty.
- 2014 Theme – “Technology for Pedagogy”. Included segment on case studies of innovations by NTU faculty and implementation of Team Based Learning.
Excellence in Learning & Teaching:

**Education Excellence (EdeX) Grants**

- Designed as competitive grants to encourage scholarly research & innovation in teaching practice and dissemination of innovative teaching to NTU.

- Focus on projects with potential to help shift conceptions of teaching, with contexts of NTU & S’pore taken into account in formulating new teaching approaches.

- Grant holders are to attend TLPD progress workshops, showcase projects & implement in taught courses to be evaluated in terms of improvements to student learning.


- Projects presented by 2012 EdeX Grant holders at 2014 showcase day were 1) *Digital Signal processing: from concepts to real-world applications using mobile e-pedagogical approaches* 2) *Assessment Engineering for High-Impact, Programming-Centric Courses in S & T*, 3) *Remote 24-Hour Hardware Lab Experimentation*, 4) *Virtual Language Table – a smartphone app to enhance collaborative language learning*
Excellence in Learning & Teaching:
University Teaching for Teaching Assistants

- All teaching assistants required to attend a “University Teaching for Teaching Assistants” course before they are allowed to teach.
- Provides PhD students with skills for small-class teaching.
- All PhD students required to pass course before taking the Qualifying English Test.
- Introduce principles of teaching for future careers as faculty.
- Comprises:
  - 5 core modules (communication teaching & eLearning strategies, + one micro-teaching session) that is peer reviewed & graded by facilitator
  - 3 elective modules
Excellence in Learning & Teaching: Residential Learning

- More academic aspects of residential learning to be incorporated to the current residential hall activities revolving around the social, recreational and sporting needs of student residents.

- Postdoctoral fellows and graduate students will be introduced as Residential Mentors to create a more robust support network for undergraduates.

- The new hall system will have a non-resident Patron heading the house, with support from a number of Faculty-in-Residence, residential mentors, undergraduate students and be governed by the hall council.

- Over the next few years, specific new halls will form thematic clusters for each of the premier scholars programmes, and LKCMedicine to evolve their unique character and ethos and integrate more academic activities in addition to the other social and recreational pursuits.
Academic Integrity

- NTU is a member of the Centre for Academic Integrity.
- Easy access to the academic integrity policy on NTU’s website.
- Appointment of a Student Academic Integrity Officer (SAIO) for each school to ensure compliance and handle cases of academic misconduct.
- From AY2011, undergraduates read educational modules academic integrity, and take compulsory quizzes on these topics.
- From AY2014, modules became part of the mandatory GER Course on Ethics.

Academic Advising

- Implementation of a formal Academic Advising system since Aug 2010.
- Increase in no. of student counselors to cater for more personal counseling sessions, workshops, talks for students, faculty & staff, and peer-helpers.
The Career and Attachment Office operates on a tripartite basis with faculty & industrial corporations to offer quality career placement & development services in these 3 areas:

**Careers & Employer Relations**
- Help plan and manage students’ career development and goals
- Market NTU students to future employers
- Source job placements and opportunities for students
- Facilitate placement of scholars and students with top companies
- Organize Recruitment activities & Connectivity events to match students with employers & alumni mentors

**Internships (Placement to Assessment)**
- Manage local and overseas internships
- Source and develop opportunities (employers)
- Place students directly for overseas work/research attachments

**Career Preparations**
- Margaret Lien Centre for Professional Success
- Compulsory Career Preparatory Courses to prepare students for the working world
- Career Coaching & Advisory
Educational Quality Assurance (EQA)

Framework for Quality Assurance
- Quality Assurance Framework for Universities (QAFU)

Ensuring EQA in terms of:
- Quality of Programmes
  - Professional Accreditation
    - Engineering Accreditation Board (Institution of Engineers, S’pore)
    - Association to Advance Collegiate Schools of Business (AACSB)
- Quality of Teaching & Educational Experience
  - Freshmen Survey
  - Student Experience Survey
  - Student Feedback (Programme & Faculty)
- Monitoring of Outcomes
  - Employment Survey
  - Post-work Attachment Survey
Thank You