University 2.0
Better Teaching, More Learning
Participative, Collaborative & Sustainable

Dr Daniel Tan
Group Chief Learning Officer
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Student: Dr. Einstein, Aren't these the same questions as last year's [physics] final exam?

Dr. Einstein: Yes; But this year the answers are different.
"If I had asked people what they wanted, they would have said: Faster Horses..."

Henry Ford
Why?
Generation Shift and Change in Student Profiles
Gen Z
Gen Z Connected Locally and Globally

- As global consumers, Gen Z’s have interconnectedness that make them demographically homogenous. Universally, they are exposed to the same brands and marketing, as geographical location has become irrelevant.

- As they come of age, businesses, employers, and even governments will want to steel themselves for this demanding generation: They want things fast, flexible and in tune with their beliefs on a mobile device.

General Response:

- 21st Century skill-sets and attributes
- Many schools are exposing their students to overseas study trips, mission trips, internships and community projects
- Social/Collaborative learning (Problem based Learning, Project-based Learning) paradigms
- Students trying their hand at being entrepreneurs or taking on part-time jobs
- Parents can help them cope with harsh realities by not shielding them too much
- Connect with personal touch via mobile
Gen Y & Z Students

- Tech savvy
  - Continually connected on smart mobile devices
  - Socially connected

- Cosmopolitan
  - Influenced by peers
  - Social concerns
  - More universally homogenous

- Short attention span
  - Skim text and information quickly
  - Demand personal attention

- Achievement oriented
  - Seek recognition, fame and feedback
  - Wants meaningful work and a solid learning curve
  - Stronger entrepreneurial spirit

- Team-Oriented
  - Value teamwork and seek the input and affirmation of others
  - Loyal, committed and wants to be included and involved
  - Connected closer to friends than families
#2

New World of Everywhere Everyone Everything Technology
Current and Near Future
**Current Mode**

Content-based
Teacher-centric

**Education 1.0 Learners**
- Receiving
- Responding
- Regurgitating

Reference: https://usergeneratededucation.wordpress.com/tag/education-3-0/
Emerging Model
Learning-based Learner-centric

- Education 2.0 Learners
  - Communicating
  - Connecting
  - Collaborating

- Education 3.0 Learners
  - Connectors
  - Creators
  - Constructivists

Reference: https://usergeneratededucation.wordpress.com/tag/education-3-0/
Education 3.0 - a Paradigm Shift

Achieved through Holistic Transformation

21st Century Skills
- Faculty development
- Practitioner approach

Interdisciplinary Pedagogy
- Holistic education
- Problems, projects vs subjects

Supported Through an Reform Agenda
- Growth mindset
- Innovation
- Culture
- Context

Enabled by
- Technology,
- Devices and
- Infrastructure

Education 3.0

Education 2.0

Education 1.0

Traditional Education Systems
Curriculum
Teachers
Accountability
Leadership

Source: CISCO Networks
Change in Work Place Expectations & Disconnect of Employers and Graduates
Training Network-Gen Students for Jobs Yet to be Invented

It’s not the content but the pedagogical method

Figure 3: Index of Changing Work Tasks in the U.S. Economy 1960-2009

Source: Dancing with Robots: Human Skills for Computerized Work
Changes in/of Learning

- Innovation
  - Agile & responsive
- Risk taking
  - Fail early, fail fast
- Problem finding
  - Beyond problem solving
  - Sense-making

Learner via the Teacher

Lifelong Learner

Learning Organization

Learning Society
Future of Work
Jacob Morgan:

Future of work determined or significantly influenced by the impact of disruptive innovations.

Many organizations around the world today are in trouble. The world of work is changing around them as they remain stagnant. The larger the gap grows, the greater the chance becomes that these organizations will not survive.

Employees are bringing new approaches, attitudes, expectations, and ways of working into organizations. Managers must adapt to this new way of working by changing the way they lead, which then forces the organization as a whole to adapt to employees and managers.

Our Response
• Research intensive university S$443M FY2013/4

• AY2014/5: 23,713 undergraduates + 7,867 Postgraduates + 1,119 Graduate Diploma

• 39th in QS World University Rankings 2014/15
Centre for Excellence in Learning & Teaching
(April 2010)

Technology and Infrastructure

Division of Learning Sciences and Applications
- Explore, develop and support the use of educational technologies to create engaging learning environments for the NTU community.
- Provides support to students and faculty members in the use of edveNTUre and other eLearning tools to enhance their learning and teaching experience.

Division of Learning Technologies
- Lead in educational technology areas such the design, implementation, operations and management of online eLearning applications, academic software design, physical and virtual learning spaces.

Division of Pedagogical Practice
- Designs and offers formal professional development programmes to equip faculty members with the 21st century teaching skills, training and support of Teaching Assistants, ‘Learning to Learn’ initiative for student lifelong learning, and providing language support for teaching staff.

Pedagogical Support for students and faculty

Faculty and Professional Development
The **WHAT** to do next is easy when you know **WHY**
#1 Dimensions of Quality
You have taught them;

Have they learnt?

Thomas C. Reeves
Professor Emeritus of Learning Design, and Technology
University of Georgia
Quality from Different Perspectives

Quality of content
- Usually not the issue
- Standard textbooks, derivative material, multimedia courseware
- Library
- Open Educational Resources

Quality of teaching process
- Professional & faculty development
- Teaching evaluation

Quality of the (self-directed) learning process

Impact on
- Student performance
- Institutional reputation
- Student value-add quality

You have taught them
have they learnt?
Quality of Content
Quality of Teaching

Quality of Learning

Student Population

Grades

$2\sigma$
#2 Social (Participative & Collaborative) Learning
New Pedagogies

It's not about matching traditional models with existing tools anymore

It's about developing a brand-new pedagogical model and implementing the Next Generation web environment upon it.

• Antonio Fumero, 2006

Participative Learning to enhance Learning Quality

Learning Quality via Social Learning
Learning is Everywhere with Everyone

Participative
Collaborative
Sustainable
Professor-friendly
Learner Understanding During Lecture Presentation

- 30% Lecture
- 65% With clicker activities
- 100% Re-learn/review via lecture recording

Professor’s belief
Benefits and Effectiveness of Social Learning

Source: Pierre Dillenbourg (LASI14, Harvard)
Design Thinking
A standard design cycle

Practitioners observe people during the design thinking process. They watch how they behave and interact. They talk to people about what they are doing and how they are feeling. They ask questions and reflect on what they see. The Understand and Observe phases of design thinking help practitioners develop a sense of empathy.
Learning Design Philosophy

- Focus on process of learner, not just content
- Implicit collaborative Learning Activities in the design process
- Can incorporate single learner content and collaborative tasks
  - Discussion, voting, small group debate, etc
- “Wrap” Learning Objects with a sequence of collaborative tasks
- Learning Designs can be stored, re-used, re-purposed, customised
#4 Paradigm Shift from ICT to SMICT Plan

- Social Mobile Info Comms Technology
- Campus-wide impact
Computerization

Plan

IT
Plan

ICT
Plan

SMICT
Plan

Mainframes

Terminals

Desktop

PC

Local Area

Network

Internet

Web 2.0

Education 1.0

Technology is the easy part
IT-ization of education

Educational technology has grown faster, and today has a bigger institutional impact than traditional MIS.
Holistic-Integrative-Big Picture Learning Topology

- Infrastructure
- Interface
- Platform & Tools

Distributed Internet (Cloud) Computing
3D Visualisation, Academic Analytics and Interaction
Smart Mobile Technology
Collaborative Intelligent Digital Literacy Curate

Formative & Reflective Learning

Inspired Source: Steve Wheeler
MAGICS

Mobile
Analytics
Gamification
Information (Big Data)
Cloud (MOOCs)
Social Media
Outcome based Curriculum

Generic skills
Employability
Global perspective
Mapping
## Operational Elements of University 2.0@NTU (2013)

<table>
<thead>
<tr>
<th>edveNTUre</th>
<th>Ecosystem Framework</th>
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<td>Faculty and professional program</td>
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<td><a href="http://edutotrium.ntu.edu.sg">http://edutotrium.ntu.edu.sg</a></td>
<td>HWG702: University Teaching for Teaching Assistance</td>
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<td>TR+</td>
<td>Classroom Learning Space for participative and collaborative learning</td>
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Campus-wide Lecture Capture Project
Night scene of Nanyang Auditorium
Object – Concept and Properties

- An object is an abstraction of something in a problem domain, reflecting the following together:
  - its information
  - tasks that it can perform or can be performed on it

- Objects have state and behaviour:
  - **State**: the condition of an object at any moment, affecting its behaviour
  - **Behaviour**: what an object can do, how it can respond to events or tasks

- Object is specified by:
  - a set of attributes to describe its state
  - a set of operations to describe its behavior

- Objects in a system interact: Relationships are used to specify the interactions between objects.
Mobile Learning: Lecture Recording
(Sample Output)
Impact and Usefulness of Lecture Recording

Not learning more content
- More content
- More workload

Learning (quality) better the content
- Mastering the core content
- Learn, re-learn, unlearn
Target: Campus-wide Full Capacity Recording

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<td>semesters</td>
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Best Seat Location + Teleprompter
Centralized Command Centre for Lecture Recording

Campus-wide Lecture Recording is a key strategic eLearning initiative endorsed by the University’s management
Remote Monitoring at Centralized Command Centre
and the HELP Model

Learning Activities Management System
• Open-source software developed by Macquarie University

Easy to use; drag-and-drop interface
Rapid content design development
Many learning activity tools, supporting interactive pedagogy

HELP Model: Highly Engaged Learning Pedagogy
• Enabled by pedagogically-driven activities
• Integrated into edveNTUre
Learning Design Philosophy

• Focus on process of learner, not just content

• Implicit collaborative Learning Activities in the design process

• Can incorporate single learner content and collaborative tasks
  ◦ Discussion, voting, small group debate, etc

• “Wrap” Learning Objects with a sequence of collaborative tasks

• Learning Designs can be stored, re-used, re-purposed, customised
Example: Experimental Aerodynamics

Background:

- Instructor interested in developing a package to help students better understand wind and water tunnels in exploring aerodynamics

- **Limitation**: wind and water tunnel facility cannot accommodate class of 140 enrolled students

- **Solution**: instructor create documentary-style video to induct students to wind and water tunnels
Lecture I - Setup of Experiments and Wind Tunnels

The next activity is a lecture on how to plan and setup an experiment and on how wind tunnels are designed.

To access the lecture click on the link below.

Recorded Lecture - Wind Tunnel (25m 06s)
Dimensional Analysis

- For high speed flows even more problems:
  
  \[
  Ma = \frac{U}{c} \quad Re = \frac{UL}{v}
  \]

- Ma and Re need to be held constant

Two possibilities:
1. Pressurized wind tunnel to change speed of sound
2. Assume Reynolds independency at high Re (incomplete similarity)
An example involving Experimental Aerodynamics
An example involving Experimental Aerodynamics
Question:
Wind tunnels take up a lot of space compared to the relatively small size of the test section that can be used for experiments. Can you explain why?
So?
What does all this mean?
Findings: Quality of we-Learning

View video course content segmentation + interactive learning activities + group participation

• More engagement as more senses are used
• More active participation
• More thought
• More reflections

More self-directed learning

More peer-peer collaborative learning and assessment and latent feedback

Develops more discerning learners

Professors have a better gauge of students’ learning
Outcomes of Learning Activities

Use of LAMS open-ended questions

• Responses read by class-mates enhances students’ learning
• Students learn from each other - peer learning and peer assessment
• Students compare their responses with other students \(\rightarrow\) awareness of different responses to same question
• Student develops (higher order critical thinking skills) judgment on response quality
You have taught them;

Have they learnt?

Thomas C. Reeves
Professor Emeritus of Learning, Design, and Technology
University of Georgia
Outcomes

However beautiful the strategy, you should occasionally look at the results.

Winston Churchill
### edveNTUre eLearning System Usage

**No. of Page Views (or mouse clicks)**

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2.5 billion cumulative page view hits since July 2000

Estimated 0.5B page views per academic year
Weekly Page Views
Aug – Nov 2012 (Acad Year 2012 Sem I)

Average page-views during semester time: 2.7M per day
Statistics for UniWood Lecture Recording

No. of new recordings in AY2012/13 > 18.9%↑

Record Hits in AY2012/13 1.63 million

Record viewership in AY2012/13 80.2 Years
UniWood
From AY2005/06 Sem I to AY2012/13 Sem II

55,562 video recordings
6,946,304 viewing hits
324.2 years of viewing time
Usage of Clickers by Students

- Using Clickers
- Issued with Clickers

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Shine with Taylor's
### Professional & Faculty Development Programme (2012)

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Promoting eLearning: Lunch & Learn
Old Tutorial Room Design
TR+: New Professor-friendly Learning Space
80 Tutorial Rooms
2 New Learning Hubs of over 60 TR+ each
Learning is Everywhere with Everybody!

we-Learning
What kind of the university do you want?

Good universities

teach

Great universities

transform
Thank You!

Dr Daniel Tan
Group Chief Learning Officer
Taylor’s Education Group
e: danielth.tan@taylors.edu.my