Better Connected Education

The Future Classroom and Campus

Sue Bryant
Director, Solutions Marketing
South Pacific Region
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sue.bryant@huawei.com
Topics

- The Evolution of Education and the Role of ICT
- The Journey to embrace ICT
- Core Technologies enabling future Education
A thousand year old Industry is about to change in a profound way

Traditional Education is being disrupted …..

New styles of Learning…not just traditional classroom

Increased number of students with higher expectations

Higher Education  Competition

….. and the main culprits are the Internet & ICT Technologies
Education is becoming a Business

Globalization is driving competition for Students

Rise in Foreign Student Numbers

53% of Foreign Students are from Asian Countries

Increase in Offshore Branch Campus

Global Emerging University Brands e.g. 42 IBCs Planned for Asian Countries

>50% Foreign Students

Source: “Education at a Glance” OECD Indicators

Source: The Observatory on Boundless Higher Education
...... and Technology is the equalizer, enabling Knowledge Access for all and Transforming Education

**Ubiquitous Access to Online Knowledge**

- Universities are no longer exclusive Custodians of Knowledge

**Campuses becoming Virtual & Digital Technology Transforming the way Education is Delivered and Accessed**

- MOOCs Disrupting Current Education Model “Bringing the University to the Device”
- Students are “Bringing the device to the University” (BYOD) enabling a Blended Learning experience
How we Learn is Changing

The Learning Pyramid

Proactive Learning
- Teach Others: 90%
- Practice: 75%
- Discussion: 50%
- Demonstration: 30%
- Audio Visual: 20%
- Reading: 10%
- Lecture: 5%

Passive Learning

Future Classroom & Campus
- Virtual, HD & Interactive,
  Creating a Teaching Environment
  Favorable to Learning

Average Student Retention Rates
- Lecture: 5%
- Reading: 10%
- Audio Visual: 20%
- Demonstration: 30%
- Discussion: 50%
- Practice: 75%
- Teach Others: 90%

HUAWEI
Education in the 21st Century

1. Learning is no longer passive
   - Multimedia Interactive Teaching

2. Classrooms are no longer fixed
   - Virtual Community Learning

3. Knowledge no longer hard to find
   - Digital Library

4. Lack of Teaching Resource
   - Cloud enabled Learning

5. Poor Management
   - Principal/Teacher Dashboard

Future Classroom & Campus

Virtual, HD & Interactive, Creating a Teaching Environment Favorable to Learning
The Virtual Interactive Campus

**Pre-Class Preparation**
- Students preview learning materials
- Teachers prepare for class
- Administrators manage teaching

**Extracurricular Learning**
- Learning based on interest
- Teachers improve their competency through interaction with piers

**In-Class Teaching**
- Interactive class – whiteboard & tablet synchronization, In-class exercises
- Teaching analysis

**After-Class Coaching**
- Students review what they have learnt
- Mutual help & exchange - Teachers, parents, & students interact with each other
The Collaborative Learning Platform to support Interactive Classrooms

- **Primary Classroom**
- **Remote Classroom**
- **Mobile Terminal**
- **Teaching Online**
- **Learning at Home**
- **Tele Presence Classroom**

**Interactive Class Platform**

**Video and Audio Sharing**
- Share video & audio resources in real time
- Control of remote screens

**Collaborative Teaching**
- Shares electronic whiteboard and supports integration with other devices
- Shares desktops and applications
- Shares video courseware
- Shares instructional notes

**Interaction - Teachers & Students**
- Free Q & A
- Group discussion
- Quizzes / Tests
- Instant message

**Record and Play**
- Records & stores classes in real time
- Supports courseware-on-demand.
Example Virtual Interactive Campus

1. Pre Class
   - Preview
   - Courseware
   - Materials
   - Data / PPT

2. During Class
   - Mobile Teaching Center
   - Assignments
   - Teacher
   - Classroom
   - Interactive Teaching

3. After Class
   - Home (Teacher, Student, Parents)
   - Internet
   - Education Community Cloud
     - Apps
     - Data
     - Video
Example Interactive Classrooms: China MOE's Higher Education Division

68 High Education Academies
Supporting over 1 Million Students

The Challenge

- **Limited school facilities and qualified teacher resources**
  - The education resource can’t be shared the 68 Academies of MOE’s higher education division
  - Schools lack communications with Academic Experts

- **More and more students are looking for better education**
  - The current practices toward education cannot keep pace with the growing student enrollment and decentralized campus
Example Interactive Classrooms: China MOE's Higher Education Division

- **Supports Student Increases**, particularly in more remote regions
- **Enables improvement in education through sharing of Academic Talent & Access to Knowledge**
- **Provides the Students with tools to manage their education**
  - A personalized portal to access all information and communicate with peers
  - Access to class material through various devices
- **Reduces Travel Costs of Academics**

- **Digital Library**
- **eCourseware**
- **Interactive Class**
- **Portal**
- **68 Academies**
- **Students & Teachers**

The Benefit:

- Supports Student Increases, particularly in more remote regions
- Enables improvement in education through sharing of Academic Talent & Access to Knowledge
- Provides the Students with tools to manage their education
- Reduces Travel Costs of Academics
Topics

- The Evolution of Education and the Role of ICT
- The Journey to embrace ICT
- Core Technologies enabling future Education
Many countries have lifted "ICT in Education" to a National Strategy

- **"A National program for ICT in Schools"**
- **"ICT in education in New Zealand, agenda for the future"**
- **"ICT in education in New Zealand, agenda for the future"**
- **2012, "10-Year Development Plan for ICT in Education": learning society; fair education, quality education, lifelong education; accelerating the construction of education information infrastructures**
- **In 2000, " National Educational Technology Plan ", the information expressway;**
- **In 2010, a new round of " National Educational Technology Plan 2010": learning powered by technology**
- **Bridge" digital divides"**
- **Eliminate "information silos"**
- **In 1996, the IT-enabled education overall plan with 3 phases**
- **In 2011, launched a fourth phase plan of the comprehensive educational information**
The ICT Journey …..
Enabling a Shift from Teacher-Centric to Student-Centric

- **Teacher-Centric**
- **Student-Centric**

**Approach 1**
Becoming Aware of ICT (Trained Teachers & Support Staff)

**Approach 2**
Supporting Work Performance i.e. School & Teaching Management

**Approach 3**
Learning How to Use ICT

**Approach 4**
Understanding How and When to Use ICT

**Pedagogical Usages of ICT**
- Enhancing Traditional Teaching i.e. Adapt the Curriculum to incorporate ICT / “Online Knowledge”
- Facilitating Learning i.e. Embedding ICT into the Curriculum
- Creative Innovation Open Learning Environments i.e. Personalized, MOOCs
- Specializing in the Use of ICT

Source: UNESCO Modeling ICT Development in Education
Example: China’s “Intelligent Education” Path

Emerging & Applying
- 211 Projects
- 985 Projects
- School-School Connection
- Remote Education in Rural Schools
- Campus Network Project in West Universities

By 2012

2012

Applying & Infusing
- Sky and Ground Education Network Infusion
  - CERNET Bandwidth ≥ 1000G
  - Bandwidth of all universities ≥ 1G
- Digital Resource
  - Public digital resource ≥ 200 TB
- ICT Application in Education
  - Increase ratio of computers

By 2015

By 2020
- All Coverage of Sky and Ground Education Network
  - CERNET Bandwidth ≥ 5T
  - Bandwidth of universities ≥ 2G
- Rich Digital Resource
  - Public digital resource ≥ PB
- Deep Infusion of ICT and Education to enable the educational innovation
- Learning Society

Building the Core Infrastructure to enable Advanced Education

- Siloed systems → complex mgmt
- Decentralized systems → heavy O&M workload
- Resource sharing and mobile bring about new demands

10-Year Plan (2011-2020)

BRIDGING THE DIGITAL DIVIDE

- INTEGRATE MORE ICT INTO TEACHING
- IMPROVE LEARNING WITH ICT

- Increase ICT hardware and software investment, and enhance resource sharing
- Apply more ICT into more teaching sectors
- Build a ubiquitous learning environment

Keep up with mobile and cloud megatrends. Give due consideration to education equality and efficiency.
ICT Tools enabling the Journey

Emerging
- Productivity Tools
- Internet Access

Applying
- Multimedia Classroom
- Interactive Multimedia

Infusing
- eLibrary – Knowledge Management
- eCourse – Learning Management

Transforming
- Personalization

Communication & Collaboration
- Office / eMail
- Multimedia Classroom
- Interactive Multimedia
- eClass Collaboration

Network
- Local Area Network
- Campus / WiFi, Wide Area Network, Mobile

Devices
- Personal Computers
- Mobile Smart Devices, eReaders etc.

Approach 1
Approach 2
Approach 3
Approach 4
Topics

- The Evolution of Education and the Role of ICT
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- Core Technologies enabling future Education
Status of ICT Spend in Education Sector

Worldwide Spending for ICT in Education Sector

Across 5 Areas
- Connected
- Digitized
- Automated & Efficient
- Information Management
- Teaching & Learning

ICT spend worldwide and United State

Source: Gartner

Source: EDUCAUSE
New Technologies can deliver for future Education

- Mobility & 5G
- Social Network
- Cloud
- IoT
- 4K Video
- BYOD
- Big Data
- SDN
- Smart Devices
eBooks…… Changing how Education is Delivered

50+ countries have promoted the use of electronic textbooks

America:
60% of the country has implemented digital

Australia:
eBooks365 from Syncordia makes 700,000 titles available to students across Australia

South Korea:
In 2012 Tablet-based teaching has been realized across Korea

Japan:
e-schoolbag used in the experimental schools

Taiwan:
Intelligent classroom construction project

France:
Future space learning project

Singapore:
IPAD-based experimental project

eBook Tablets

Anytime, anywhere online and offline learning

• Built-in learning software, such as e-reader, dictionary, schedule, and media player
• Pre-installed Classroom client
• LCD display + electronic ink display
• Supports for iOS & Android
Cloud

Community Clouds ….. enabling resource access

Education Community Clouds are starting to gain success

Targeted at Communities which are generally part of an end to end value chain or ecosystem. They share in a process, data, applications, security, privacy etc.

• Highly Shared Resources
• Instant / Easy Access to Applications and Data Anytime and Anywhere
• Secure Environment

Community Cloud

EDUCATION SERVICES
- eLearning
- Courseware
- Interactive Class
- Collaboration
- Digital Library
- School Management

ACCESS
- Students
- Teachers
- Principal
- Parents

PCs, Smart Phones, Tablets, VDI
Image / Data Management ... enabling Digital Library

- Resource Digitalization Process
- Digital Content Management
- Digital Copyright Management
- Intelligent Online Retrieval
Software Defined Networking (SDN)

Evolution of networking where network devices are programmed by a Centralized Controller and SDN Applications.

Provides the framework and tools to enable symbiotic linkage between network and applications

- Prioritization of Network Capacity based on Services being Delivered or other Priorities e.g. Video, Priority Applications or End Users
- Data Center Centric Architecture
## 5G …… Next Generation Mobile Access

### Connections

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<tr>
<th>3G</th>
<th>4G</th>
<th>5G</th>
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<tbody>
<tr>
<td>100ms</td>
<td>50ms</td>
<td>1ms</td>
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### Latency

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### Speed

<table>
<thead>
<tr>
<th>8G HD movie download</th>
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<tbody>
<tr>
<td>3G: 70 min</td>
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<tr>
<td>4G: 7 min</td>
</tr>
<tr>
<td>5G: 6 sec</td>
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### e-Health

- **Online Health Records**
- **HD-Video**
- **Emergency Consultation**
- **Interactive 3D Brain Imaging**

### Latency

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### Applications

- **4G**:
  - 1.4 M
  - HSDPA
  - TE cat 4

- **5G**:
  - 10G
  - e-Health
  - Online Health Records
  - HD-Video
  - Emergency Consultation
  - Interactive 3D Brain Imaging

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Huawei's Global Presence and Continuous Investments in the Education Industry

- Presence in 30+ countries and regions
- US$1 billion sales revenue in the education industry
- Dozens of international exchange opportunities every year

Huawei’s "Telecom Seeds for the Future" Program
- Set up 16 training centers globally in 14 countries, including France, Germany, UK, Russia, Spain, Indonesia, Singapore, and Thailand
- Worked with 50 universities, providing scholarships, internships, and funds for thousands of students

Huawei Authorized Network Academy (HANA)
- Plan to develop 500 HANAs for the next 3 to 5 years

UK
- Launched the Huawei Undergraduate Work Experience Program; provided funding to the Prince’s Charities Foundation

Spain
- Launched the "Telecom Seeds for the Future" Program

France
- Organized the first technical conference at ESIEE Engineering School

Malaysia
- Signed contracts with 10 universities in Malaysia and set a target of training 10,000 ICT professionals for Malaysia

Tanzania
- Implemented the Huawei ICT Star Program for Tanzania Education, which improves ICT in education

Australia
- Implemented Seeds for the Future & MOU with Australian Technology Network of Universities
“We need technology in every classroom and in every student and teacher’s hand, because it is the pen and paper of our time, and it is the lens through which we experience much of our world.”

David Warlick
THANK YOU