Teaching and Learning Initiatives at HKUST

21 June 2019

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Professor of Computer Science & Engineering
Hong Kong University of Science & Technology
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Visit Program on Friday, 21 June 2019

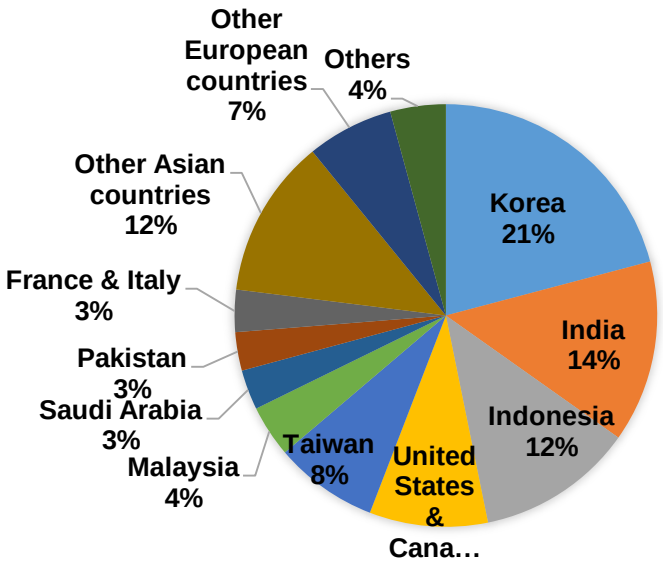
- 9:30am: Arrive HKUST, the delegation will be greeted by Mr. Tony Fung at the Piazza
- 9:30am - 9:45am: 7/F Foyer
- 9:45am – 10:45am: Introduction to HKUST and its education initiatives by Prof. T.C. Pong (Room 4582)
- 10:45am – 11:15am: Visit the Engineering Commons and introduction to E2I by Prof. Ben Chan
- 11:15am – 11:45pm: Visit the UG Student-initiated Experiential Learning (USEL) Lab
- 11:45pm – 12:00pm: Walk along the academic concourse to Library
- 12:00am – 12:30am: Visit the HKUST Library
- 12:30pm – 2:00pm: Lunch at the G/F Chinese Restaurant
- 2:00pm: Depart HKUST

This is HKUST

- **A globally oriented university founded in 1991**
  - 687 Faculty (647 Regular Faculty & 40 Visiting)
  - 15,555 Students (Among UGC institutions with the highest % of non-local UG intake (2015/16))
  - 9,995 UG and 5,560 PG students
- **World-class research university with global reputation of excelling in science, engineering and business, complemented by humanities and social science**

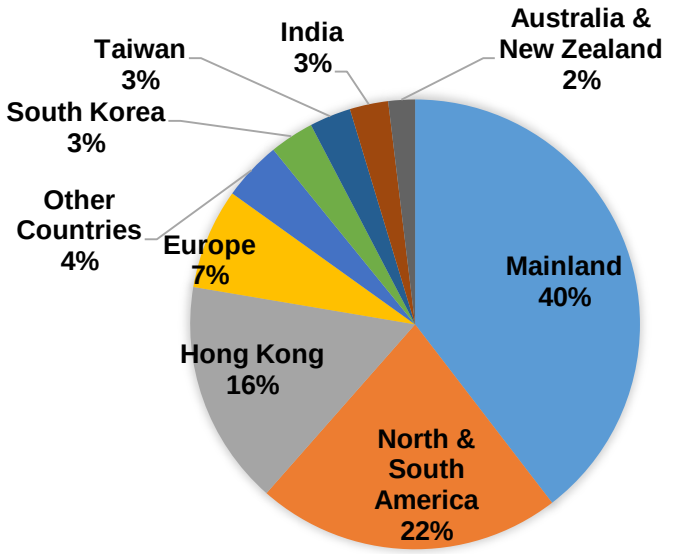
Champion of Diversity

Citizenships of International Students (excl. Mainland China) in 2018/ 19



- Among UGC institutions with the highest % of non-local UG intake (2015/16)
- Over 300 Partners worldwide

HKUST Faculty Diversity 2018



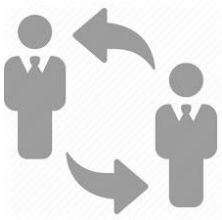
- **100% of tenure track faculty with doctorate degree**
- International faculty from 34 countries/ regions recruited (2018)

International Learning Experience

Student body

50+

Nationalities



1000+

Incoming exchange students

50%

of students study abroad

300+

partners

International Partnership

300+
International Partners

Penn
HKUST MIT Research Alliance Consortium
清華大学 Tsinghua University
Stanford MEDICINE
Berkeley UNIVERSITY OF CALIFORNIA
THE HARVARD MEDICAL SCHOOL
SKOLKOVO Moscow School of Management
UNIVERSITY OF WATERLOO
UNIVERSITY OF CAMBRIDGE
UCL
Karolinska Institutet
University of Glasgow
Caltech
東京工業大学 Tokyo Institute of Technology
Australian National University

Member of 13+ International Alliances

APRU
Asian Universities Alliance
WORLD ECONOMIC FORUM
INTERNATIONAL ASSOCIATION OF UNIVERSITIES
AOTULE The Asia-Oceania Top University League on Engineering

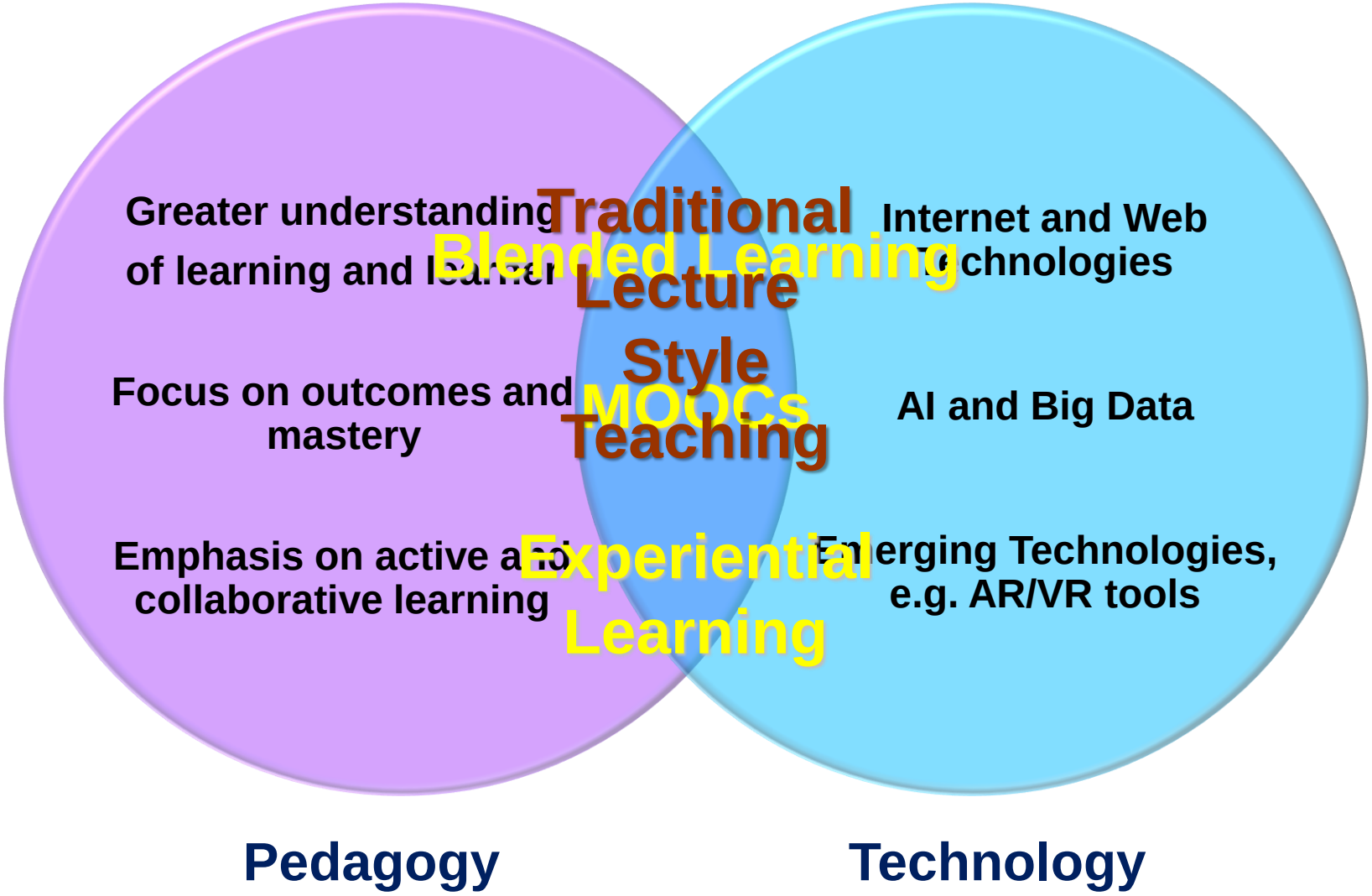
10 Joint Laboratories

WeChat
DiDi
LINE
HUAWEI
FACE++
dji
WeBank 微众银行

Outline

- Overview on pedagogical and technological development in the digital age
- Experience sharing on using MOOCs for:
  - blended learning
  - experiential learning
  - fully online delivery
- Research in innovative e-learning pedagogies
- Concluding remarks

Pedagogical and Technological Developments in the Digital Age



Criticism of Lecture Style Teaching

The criticisms of lecture style teaching can be summarized by a quote attributed to Mark Twain:

- College is a place where a professor's lecture notes go straight to the student's lecture notes, without passing through the brains of either.
- How to make teaching and learning more effective?
- Chinese proverb (Xun Zi 荀子):

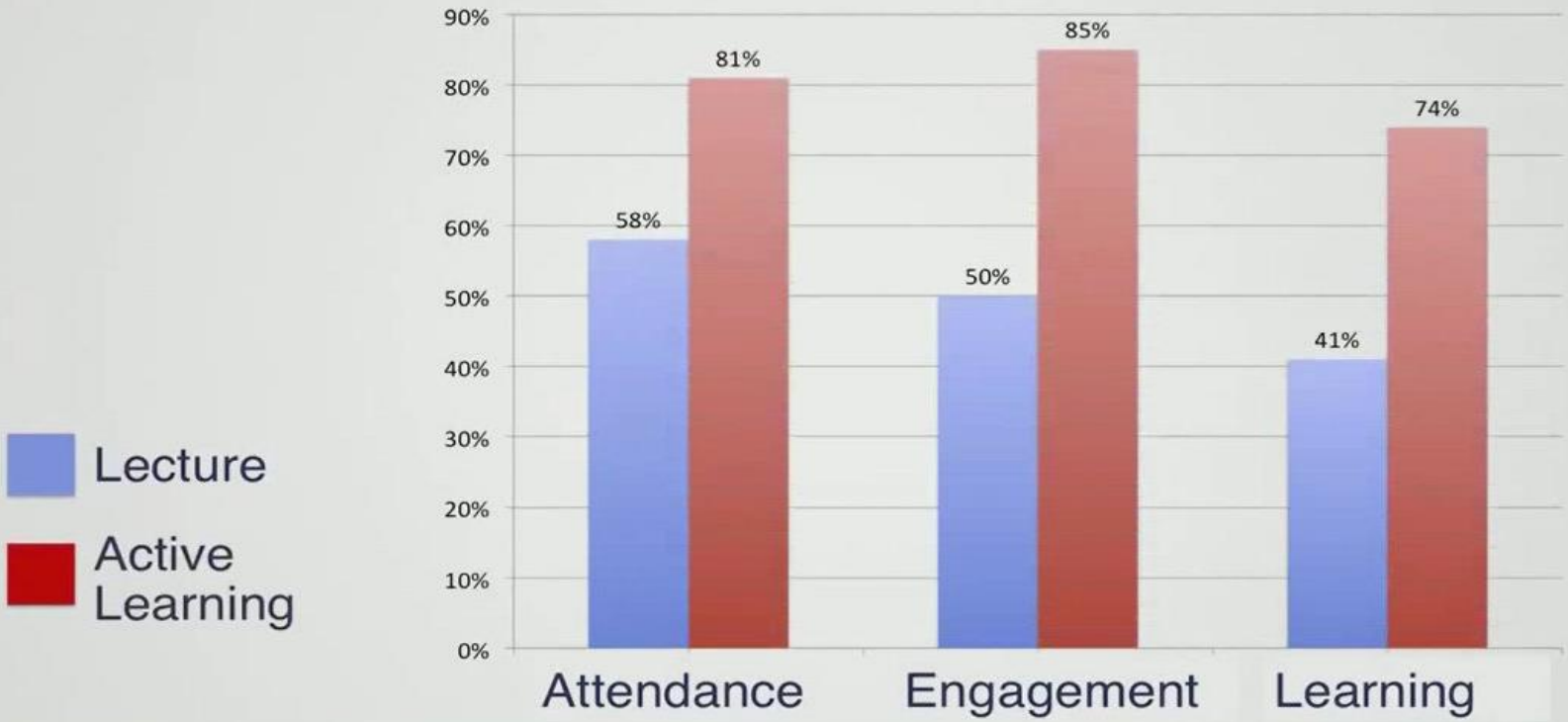
  Tell me and I will forget (闻之不若见之) ,

  Show me and I will remember (见之不若知之) ,

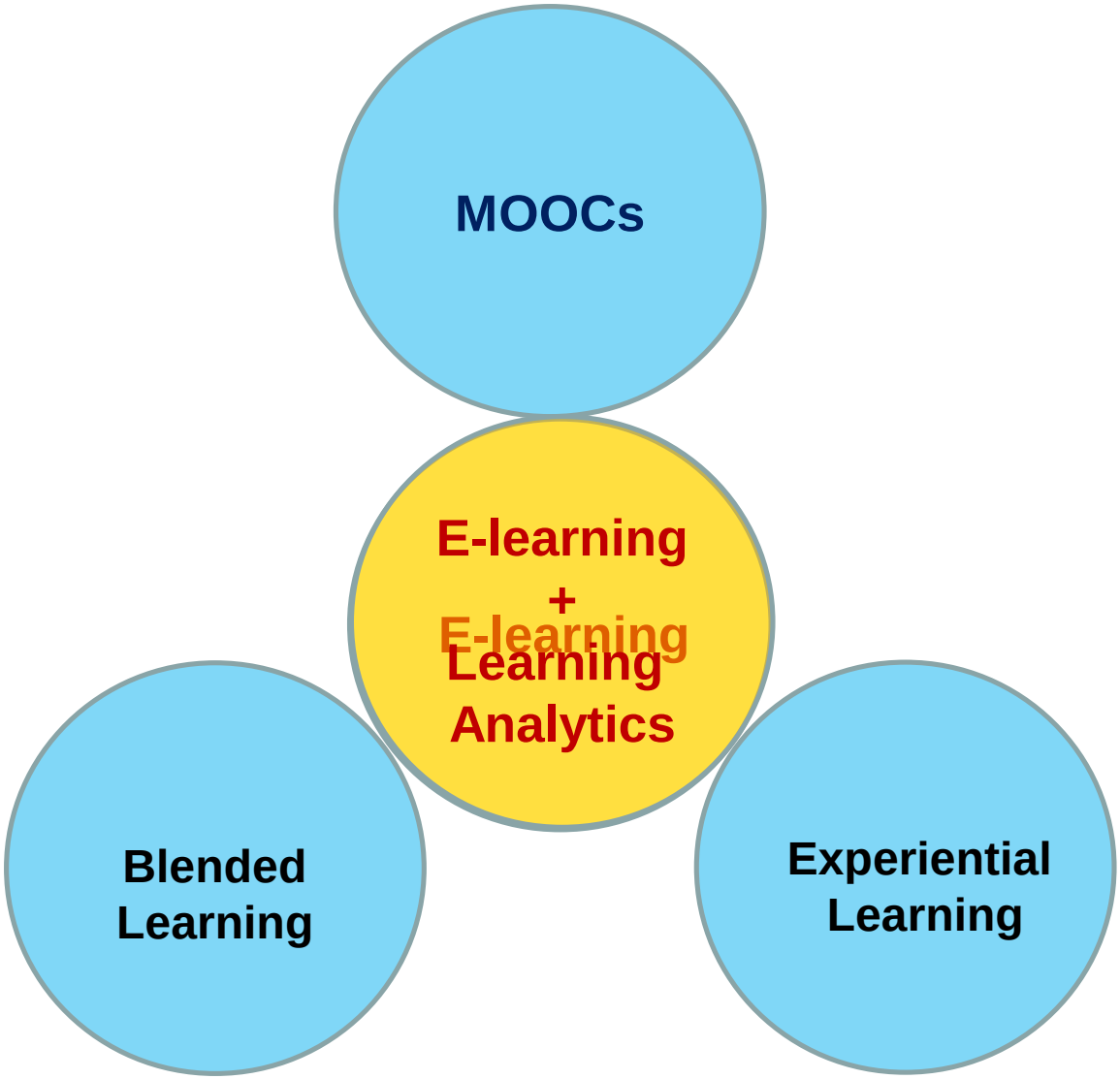
  Involve me and I will understand (知之不若行之) .

Active Learning

"Improved Learning in a Large-Enrollment Physics Class,"
Louis Deslauriers, Ellen Schelew and Carl Wieman, Science (2011).



Innovative E-learning Pedagogies

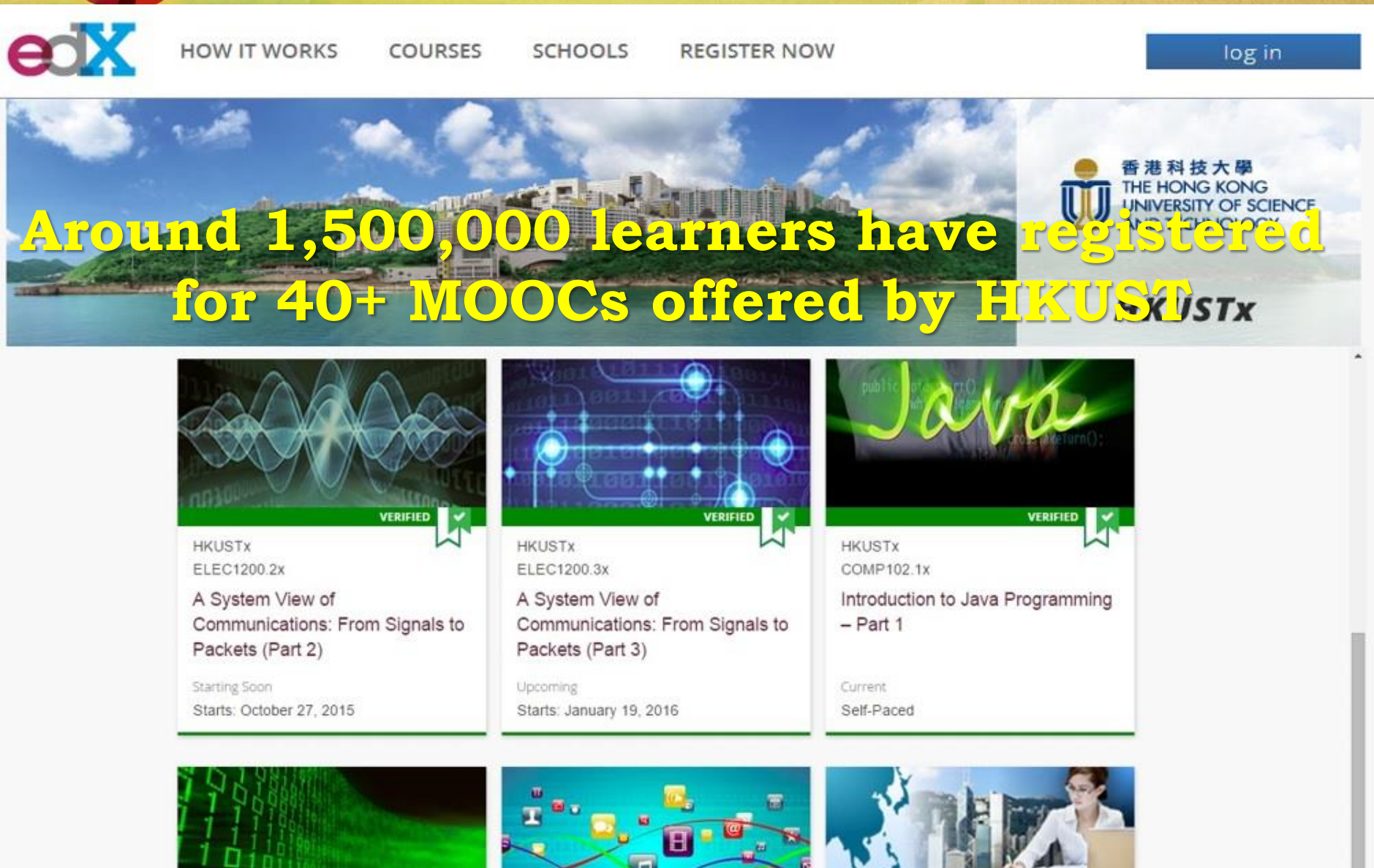


Massive Open Online Courses

A **massive open online course** (**MOOC**) is a type of online course aimed at large-scale participation and open access via the Internet.

- ***In addition to online video lectures, learners are involved actively in the learning process.***
- ***MOOCs go beyond just offering courses and content. Learning analytics allow us to understand how students learn and how teachers can improve their teaching.***

HKUST's MOOC Experience



edX: 10 Most Popular Courses in 2016

10 The Science of Happiness
Berkeley
4.5 / 5
Enroll Now

9 Conversational English Skills
4.5 / 5
Enroll Now

8 Introduction to Project Management
THE UNIVERSITY of ADELAIDE
4.5 / 5
Enroll Now

7 Introduction to Linux
LINUX FOUNDATION
4 / 5
Enroll Now

6 Introduction to Java Programming – Part 1
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
4.5 / 5
Enroll Now

5 The Science of Everyday Thinking
THE UNIVERSITY OF QUEENSLAND
5 / 5
Enroll Now

4 Introduction to Computer Science and Programming Using Python
Massachusetts Institute of Technology
4.5 / 5
Enroll Now

3 TOEFL® Test Preparation: The Insider's Guide
ETSx
4.5 / 5
Enroll Now

2 Analyzing and Visualizing Data with Excel
Microsoft
4.5 / 5
Enroll Now

1 Introduction to Computer Science
HARVARD UNIVERSITY
4.5 / 5
Enroll Now

Top edX Courses in 2017

HARVARD UNIVERSITY
The Architectural Imagination
HarvardX (Self-Paced)

W3C
HTML5 and CSS Fundamentals
W3Cx (Starts January 1, 2018)

THE LINUX FOUNDATION
Introduction to Linux
LinuxFoundationX (Self-Paced)

THE UNIVERSITY of ADELAIDE
Introduction to Project Management
AdelaideX (Self-Paced)

香港科技大學 THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Introduction to Java Programming – Part 1
KHUSTx (Self-Paced)

CATALYST
Communication Skills for Bridging Divides
CatalystX (Starts January 9,2018)

ETSx
TOEFL® Test Preparation: The Insider's Guide
ETSx (Self-Paced)

THE UNIVERSITY OF QUEENSLAND AUSTRALIA
IELTS Academic Test Preparation
UQx (Self-Paced)

Microsoft
Essential Statistics for Data Analysis using Excel
Microsoft (Starts January 1, 2018)

UNIVERSITAT POLITÈCNICA DE VALÈNCIA
Basic Spanish 1: Getting Started
UPValenciaX (Self-Paced)

Berkeley UNIVERSITY OF CALIFORNIA
The Science of Happiness
UC BerkeleyX (Starts January 9, 2018)

ASU ARIZONA STATE UNIVERSITY
English Composition
ASUx (Starts January 8, 2018)

MIT Massachusetts Institute of Technology
Introduction to Computer Science and Programming Using Python
MITx (Self-Paced)

COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK
Artificial Intelligence (AI)
ColumbiaX (Starts January 29, 2018)

R·I·T
Cybersecurity Fundamentals
RITx (Starts January 9, 2018)

COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK
Machine Learning
ColumbiaX (Starts January 29, 2018)

Penn UNIVERSITY of PENNSYLVANIA
Robotics: Fundamentals
PennX (Self-Paced)

Coursera Top 10 Computer Science Specializations of 2016

Year in Review:
Top-Rated Specializations of 2016

Choosing a 2017 Specialization? These 10 were among the best-rated on Coursera this year - join today to see what the buzz is about.

Top-Rated in Computer Science

1 Python for Everybody

University of Michigan

Enroll Now

Rating: ★★★★½

Review: "A fantastic course for anyone who comes from a non-programming background"

Course #1: Programming for Everybody

2 Web Design for Everybody

Basics of Web Development and Coding

University of Michigan

Enroll Now

Rating: ★★★★½

Review: "So very well-explained and easy to follow… th… absolute beginners"

Course #1: Introduction to HTML5

3 Object Oriented Java Programming

Data Structures and Beyond

UC San Diego

Enroll Now

Rating: ★★★★½

Review: "Excellent course...I loved how the assignments built from easy to challenging"

Course #1: Object Oriented Programming in Java

4 Game Design and Development

Michigan State University

Enroll Now

Rating: ★★★★½

Review: "If you want to create your own video game with Unity, this course is the first step"

Course #1: Introduction to Game Development

5 Graphic Design

CalArts

Enroll Now

Rating: ★★★★½

Review: "Looking at the design materials I made, I almost cannot believe I did it by myself!"

Course #1: Fundamentals of Graphic Design

6 Full Stack Web Development

The Hong Kong University of Science and Technology

Enroll Now

Rating: ★★★★½

Review: "Gives you the big picture of how JavaScript, HTML, and CSS interact with each other"

Course #1: HTML, CSS, and Javascript

7 Software Product Management

University of Alberta

Enroll Now

Rating: ★★★★½

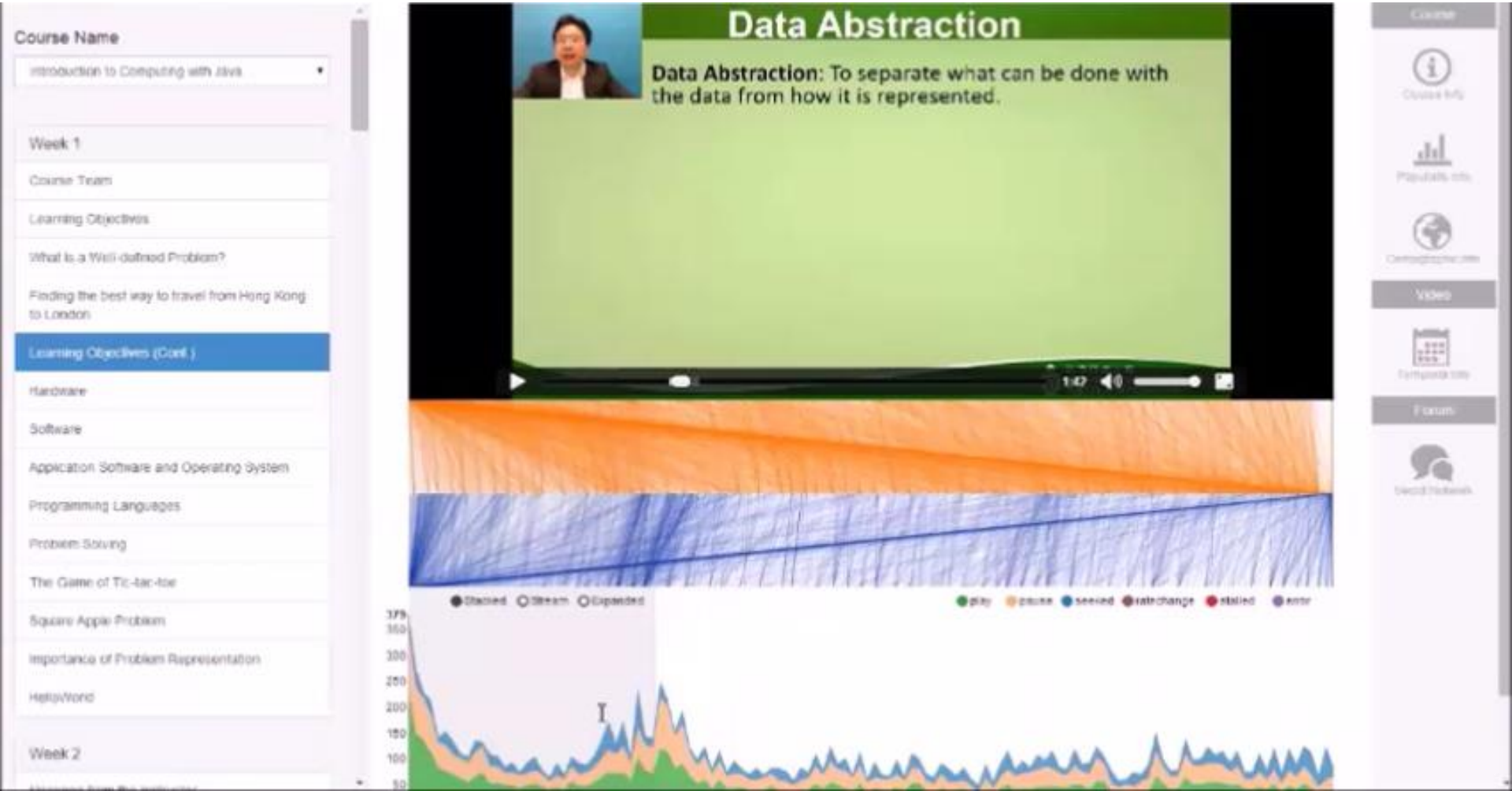
Review: "As a new Product Manager, I will be able to apply these lessons in real life situations"

Course #1: Introduction to Software Product Management

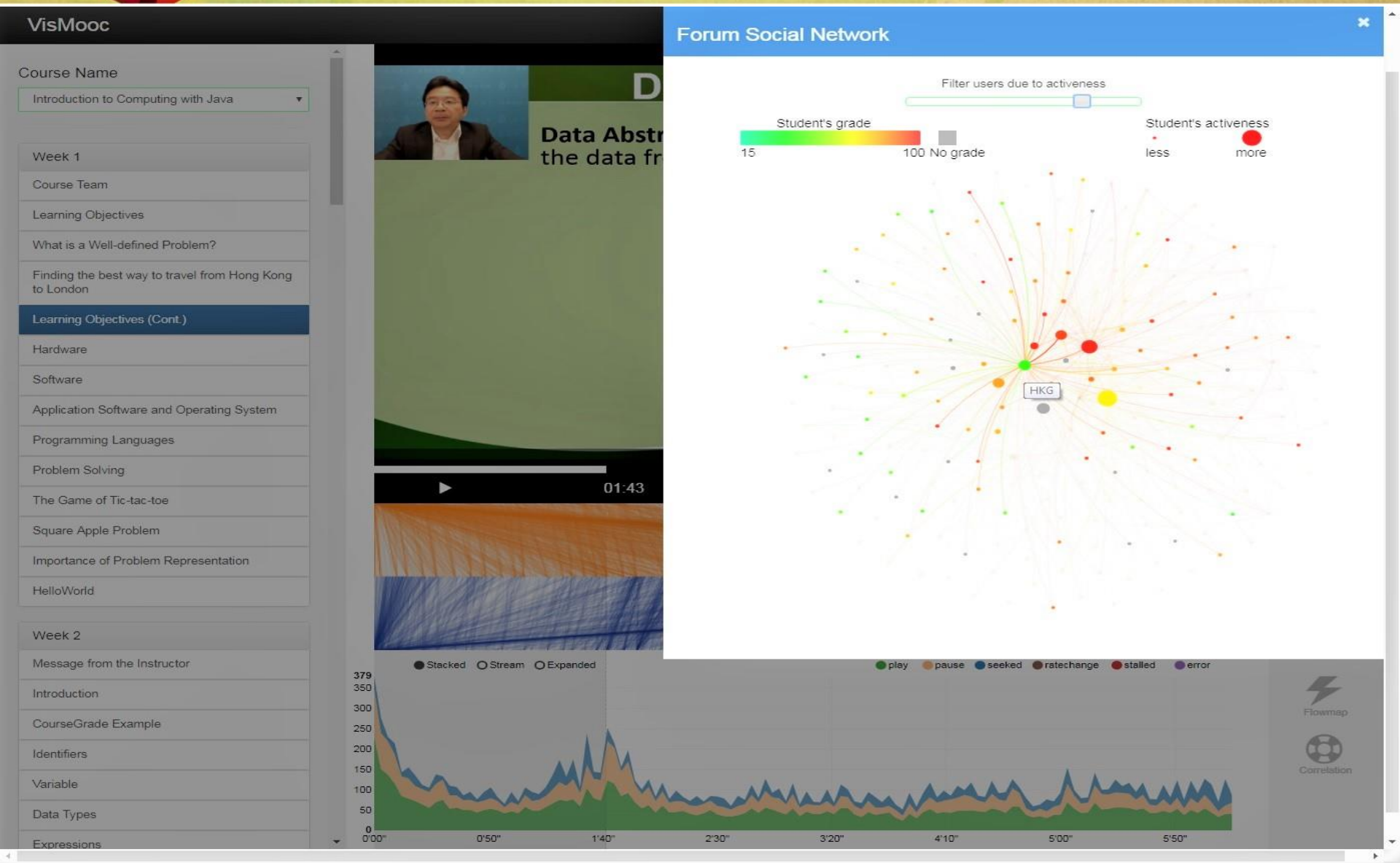
Offered by Profs. Jogesh Muppala and David Rossiter of HKUST

Learning Analytics on MOOCs

VisMOOC: A visual analytics tool for MOOC developed by Prof. Huamin Qu's research group



Social Network Analysis on MOOCs



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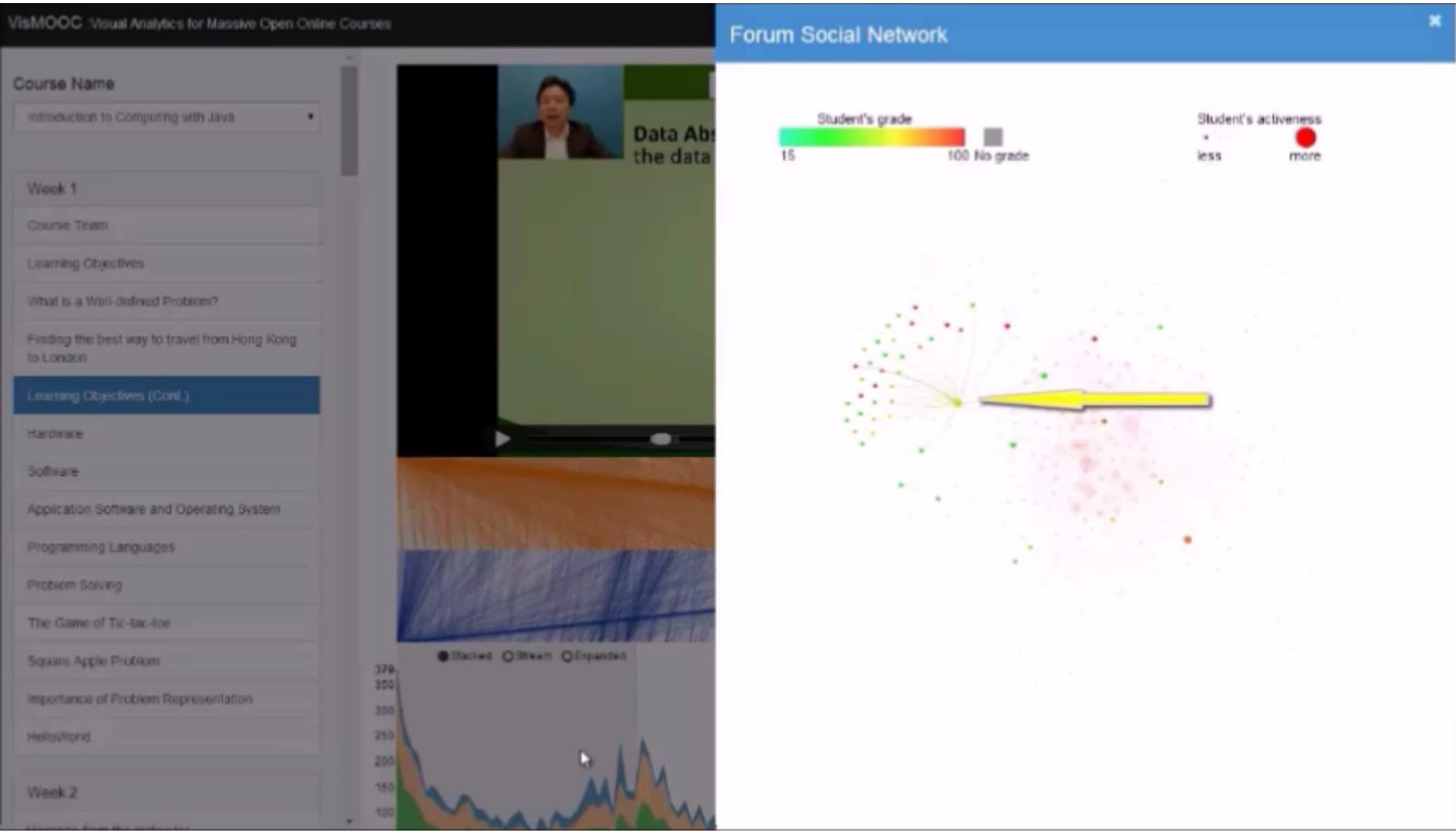

Massive Open Online Degrees

Intelligent Tutor at Georgia Tech

DOW JONES, A NEWS CORP COMPANY

DJIA 18123.80 -0.49% S&P 500 2139.16 -0.38% Nasdaq 5244.57 -0.10% U.S. 10 Yr 0/32 Yield 1.692% Crude Oil 43.19 -1.64% Euro 1.1157 -0.77%

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Inside W... High-Fa... Culture

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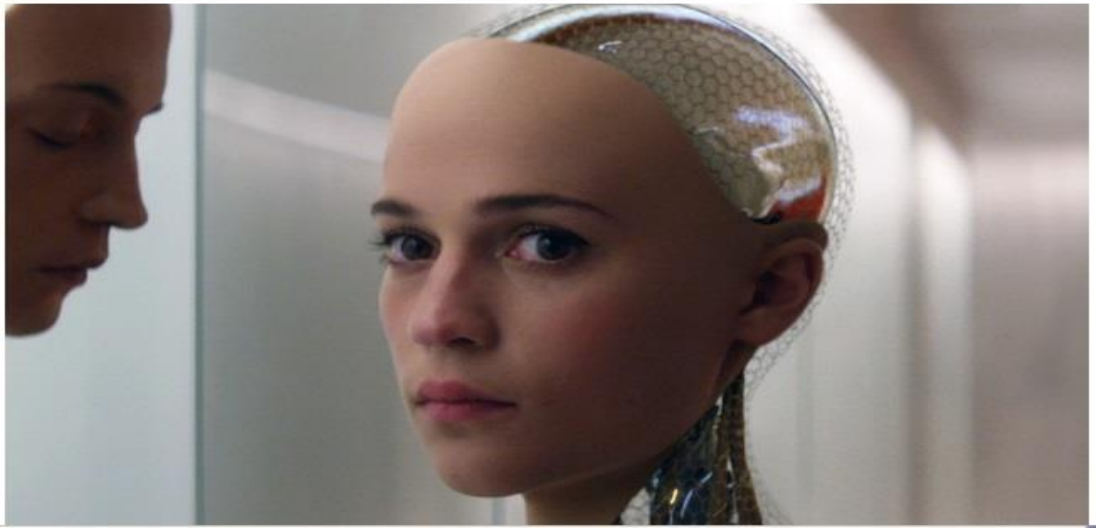
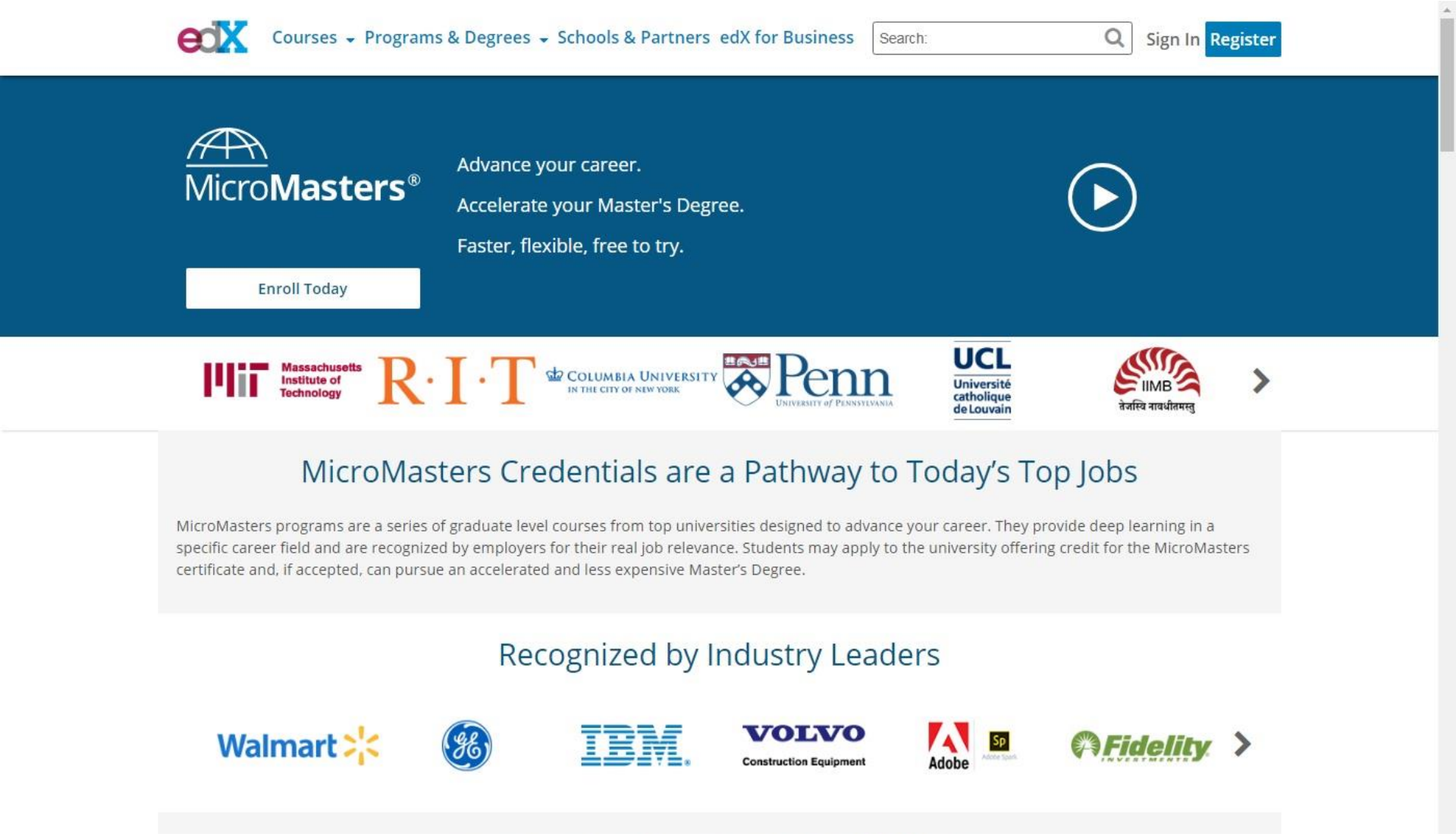
A-HED

Imagine Discovering That Your Teaching Assistant Really Is a Robot

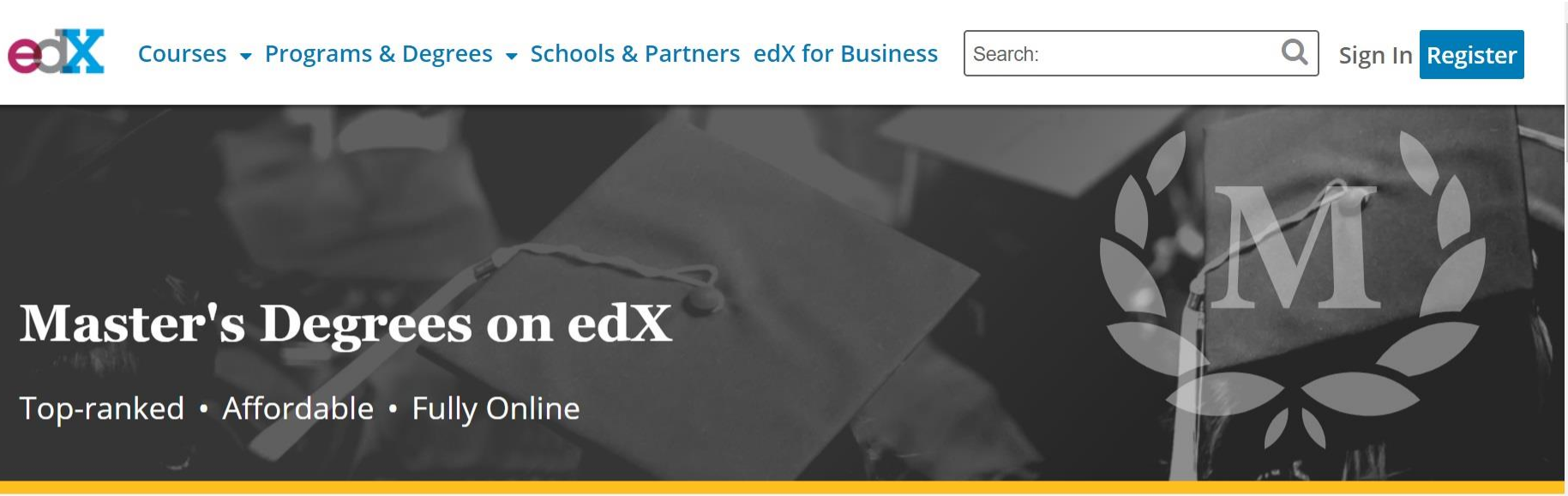
Students mostly couldn't tell 'Jill Watson' wasn't human; 'Yep!'



MicroMasters on edX

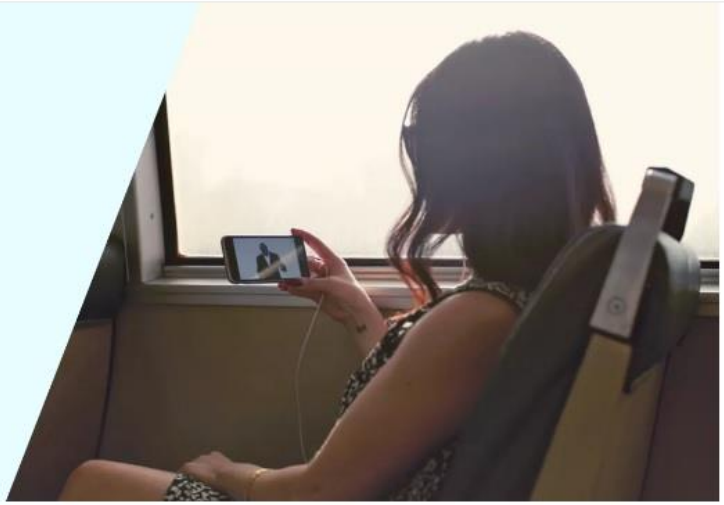


Fully Online Degrees on edX



Earn your Data Science Degree online

Request Info



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Learn more >

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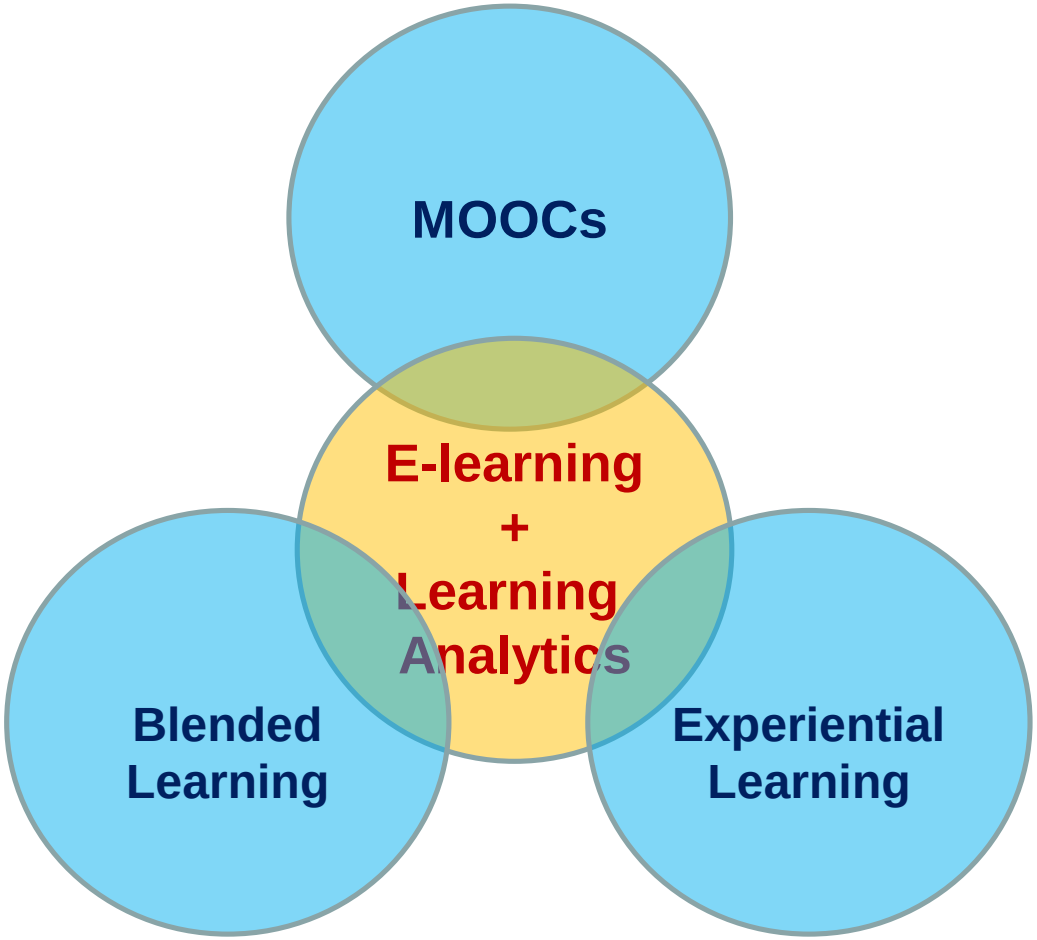
  Imperial College London
- **Master of Public Health**
  University of Michigan

Innovative E-learning Pedagogies

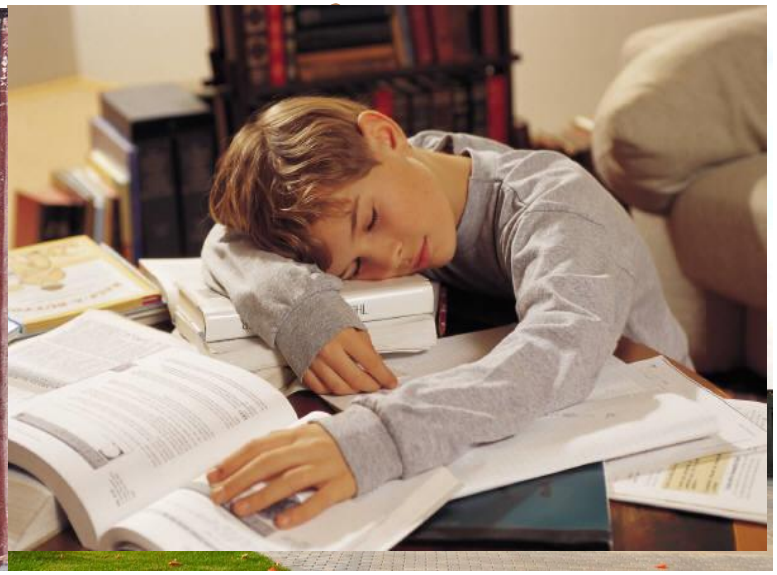


Using MOOCs for Asynchronous Flipped

Flipped Classroom pedagogy inverts traditional teaching

In classroom

Outside classroom



Using MOOCs for Asynchronous Flipped

Flipped Classroom pedagogy inverts traditional teaching

Outside classroom

In classroom

In **Asynchronous Flipped**, students finished all online learning activities before engaging in classroom learning

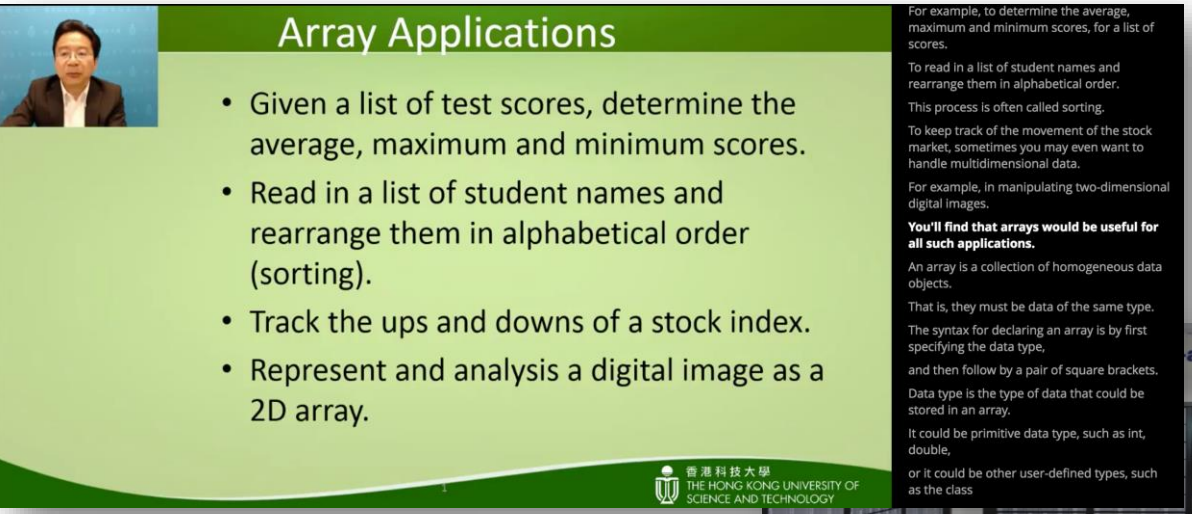
Using MOOCs for Asynchronous Flipped

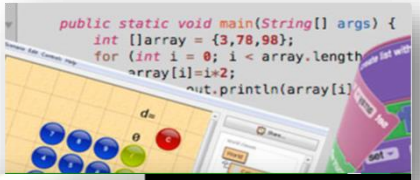
The Java programming course was conducted using asynchronous flipped in Spring + Summer of 2016-17 and 2017-18.

- In 2016-17
  - Around 130 students completed the MOOC in the Spring semester
  - Participated in an assessment to confirm participation
  - 41 Students (12 from Hong Kong, 14 overseas exchange and 15 Mainland China) were selected to enroll in a 2-week face-to-face Summer session
  - Took an exam to earn academic credits for the course
- Two professors from Hong Kong and Spain jointly offered the course in 2016-17

MOOCs on Java Programming

https://www.edx.org/professional-certificate/java-android-foundation





https://www.edx.org/professional-certificate/uc3mx-introduction-java-programming

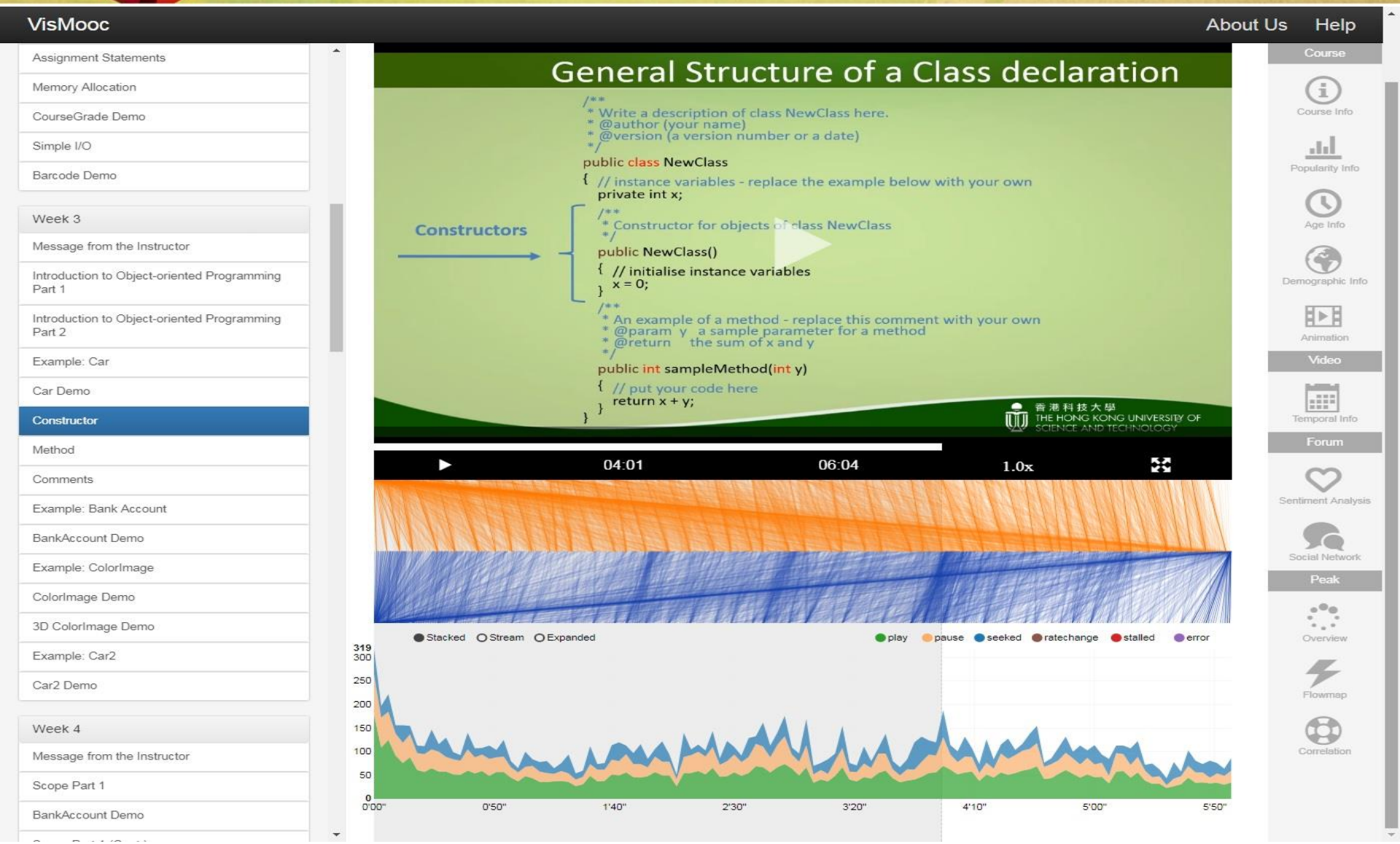
Asynchronous Flipped at HKUST

Using MOOCs for Asynchronous Flipped

A pilot trial was conducted in Spring / Summer 2016-17 on the Java programming course:

- Two professors from Hong Kong and Spain
- 41 Students – 12 from Hong Kong, 14 overseas exchange and 15 Mainland China:
  - Complete the MOOC in the Spring semester
  - Take an assessment to confirm participation
  - Enroll in a 2-week face-to-face Summer session
  - Take an exam to earn academic credits for the course
- Using learning analytics in designing in-class learning activities

Using Learning Analytics in Designing In-class Activities



Student Feedback Questionnaire

COMP1022P – Introduction to Computing with Java Summer 2016)
5-level answers to each question: Strongly agree - 100 Strongly disagree - 0

• The course has been well designed to help me learn.	90
• The online materials have stimulated my interest in this subject, and encouraged me to think.	85.2
• I was provided with clear instructions and adequate support to help me self-study the online components.	87.5
• The online content and activities prepared me well for the face-to-face sessions.	92
• The online platform has helped to support my learning in this course.	93.2
• The instructor facilitated the face-to-face activities well, stimulated my interest and encouraged me to think.	93.2
• In the face-to-face discussions and activities, there have been a lot of opportunities for me to apply/practice the concepts and theories I have learnt from the online components.	90.9
• There have been a lot of opportunities for me to interact with the instructor, TA and students which has deepened my learning.	93.2

Using MOOCs for Asynchronous Flipped

The Java programming course was conducted using asynchronous flipped in Spring + Summer of 2016-17 and 2017-18.

- In 2016-17
  - Around 120 students completed the MOOC in the Spring semester
  - Participated in an assessment to confirm participation
  - 41 Students (12 from Hong Kong, 14 overseas exchange and 15 Mainland China) were selected to enroll in a 2-week face-to-face Summer session
  - Took an exam to earn academic credits for the course
- A model to use MOOCs for expanding student / faculty exchange programs and outreach to secondary school students

Global Virtual Exchange Alliance

Outcomes workshop Virtual Exchange

2-3 November 2017, Hong Kong

香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

The University Of Queensland AUSTRALIA
EPFL ECOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE
RICE
Australian National University
Universiteit Leiden The Netherlands
THE UNIVERSITY of ADELAIDE
WAGENINGEN UNIVERSITY & RESEARCH
TU Delft Delft University of Technology

Global Virtual Exchange Alliance

- Nine Universities signed agreement in Dec 2017
  - US: Rice;
  - Europe: EPFL, TU Delft, Leiden, Wageningen;
  - Australia: ANU, UQ, Adelaide;
  - Asia: HKUST

- Credit-bearing online courses with proctored examinations.
- Students get credits from host university & transfer credits back to home university (just like exchange program but done online instead).
- Benefits:
  - Provide culturally diversified on-line courses for students locally on campus

Global Virtual Exchange Website

HKUST Study Abroad

OUTBOUND | PROGRAMS | FINANCES & SUPPORT | ACADEMICS | RESOURCES | ASSISTANCE | RETURNEE | LOGIN

Term-Time Exchange | Summer Study Abroad | Exchange Partners | Virtual Exchange

GLOBAL VIRTUAL EXCHANGE

ABOUT

The Virtual Exchange Alliance

HKUST has entered into a Virtual Exchange Alliance consisting of top universities from around the world. As a member of the Alliance, HKUST recognizes the quality of the online courses, including MOOCs (massive open online course), offered by the member universities. HKUST undergraduate students are able to apply and enroll in a selected number of online courses and apply for HKUST credit transfer upon successful course completion.

Participating Universities:

- The Hong Kong University of Science and Technology
- Australian National University (Australia)
- Delft University of Technology (The Netherlands)
- École polytechnique fédérale de Lausanne (Switzerland)
- Leiden University (The Netherlands)
- Rice University (USA)
- University of Adelaide (Australia)
- University of Queensland (Australia)
- Wageningen University and Research (The Netherlands)

COMP1022P on GVEP

HKMOOC **HKUST:** COMP1022P Introduction to Computing with Java (Fall 2018-19) Help TC

View this course as: Staff

Home | Course | Course Outline | Grading Scheme | Resources | Discussion | Progress | Instructor

Welcome to HKUST's COMP1022P!

Introduction to Computing with Java (Fall 2018-19)

Resume Course

Course Updates and News

VIEW UPDATES IN STUDIO

September 14, 2018 Hide

Induction session summary

Dear Students,

The induction video is now available in the induction module on the HKMOOC platform. You can access it through this **link**. For those who have attempted to attend the induction session but encountered technical difficulties, please report to us either through the discussion forum on HKMOOC.

The due date of all the online exercises and labs in Module 01 – 05 is confirmed to be on **Monday, 08 October at 23:59pm (GMT+8) Hong Kong time**, that is, **08 October at 17:59pm (GMT+2) Europe time**. You are suggested to work on the exercises and labs evenly instead of finishing all of them in a short period of time.

The contents of Module 06 – 10, as well as the additional lab exercises will be released at a later point. More details will be announced later.

Course Tools

Bookmarks

Important Course Dates

Course End
2 weeks ago - Dec 28, 2018

This course is archived, which means you can review course content but it is no longer active.

Today is Jan 13, 2019 13:51 HKT

Course Handouts

1. You may refer to the clock below for the current Hong Kong time (GMT+8) for assignment submission due date and time:

COMP1022P on GVEP in Fall 2018

Student groups	No. of students	Midterm	Final	Overall
HKUST face-to-face	282	75	76	78
Global Virtual Exchange	32	84	84	87
Total	314	76	77	78

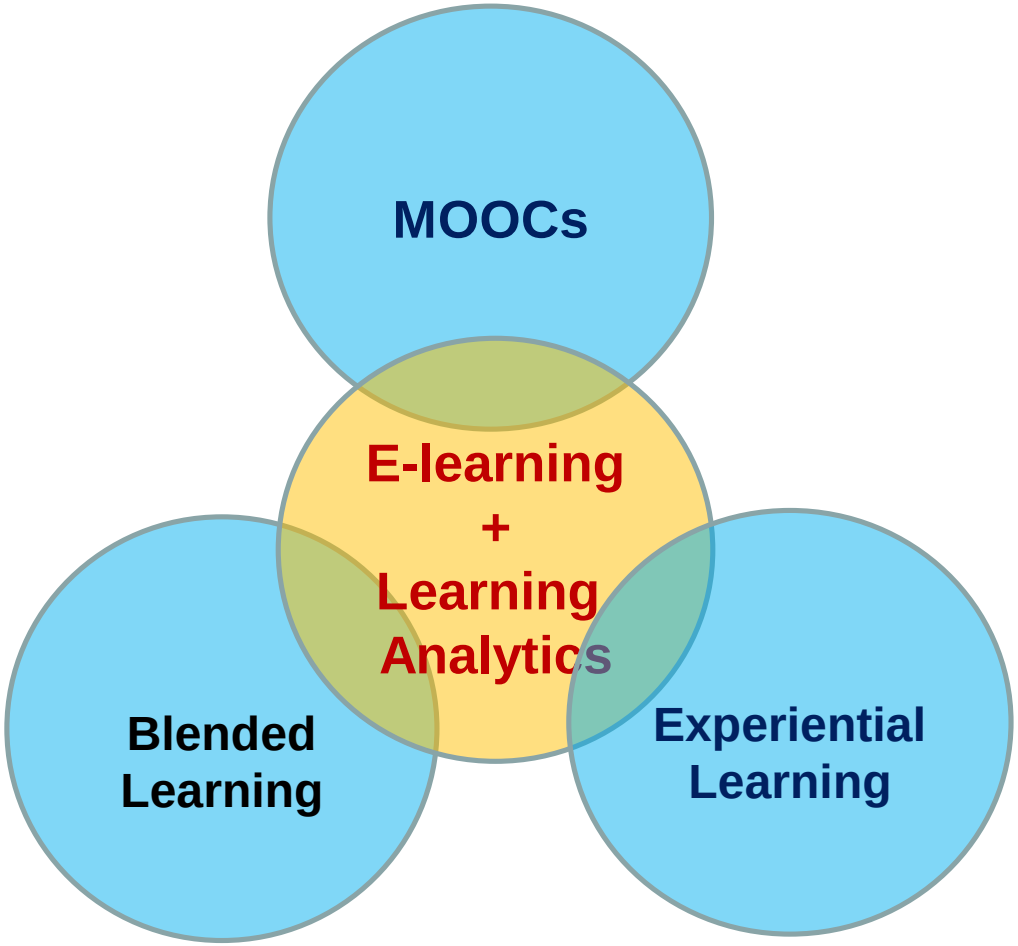
Joint Institutions Online Course

Joint Institutions Online Course

COURSE LIST: THREE ICONIC ONLINE COURSES

No	Course Name	Instructor	
1	Modern Japanese Architecture	Prof. David Butler Stewart, Specially Appointed Professor of School of Engineering, Tokyo Tech	
2	Social Inequality in China, 1700-2000, in Comparative Perspective	Prof. James Lee, Chair Professor of Humanities and Social Science, HKUST	
3	Java Programming Bridging Course	Prof. Ting Chuen Pong, Director of Center for Engineering Education Innovation, HKUST	

Innovative E-learning Pedagogies



Experiential Learning in Makerspace

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY | SCHOOL OF ENGINEERING

ABOUT ACADEMICS RESEARCH PEOPLE DEPARTMENTS AND UNITS NEWS CENTER

- Undergraduate Education
  - USEL
    - USEL - ASM Pacific Technology Award 2018
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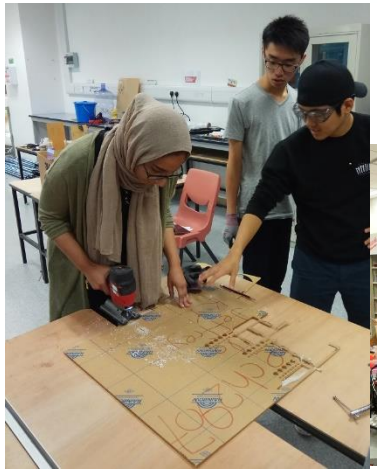
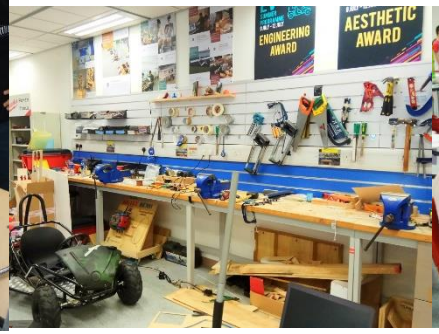
    - Approved Projects
    - Equipment and Tools
    - Share Your Idea

Undergraduate Student-initiated Experiential Learning (USEL) Program

Background

In order to encourage students to develop their own project idea, the School of Engineering is providing student-driven practicum opportunities to UG students through the Undergraduate Student-initiated Experiential Learning Program. Students may initiate projects of their interest under guidance of a faculty member of School of Engineering.





1st Year Cornerstone Engineering Design Project Course

A cornerstone engineering design project course for over 700 1st year engineering students every year:

- To provide students exposure to knowledge and skills from different engineering disciplines
- To engage students in team projects that connect engineering design with real-world problems
- To use a blended experiential learning approach for scaling up

HKMOOC Platform developed at HKUST

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the MOOC platform for Hong Kong's Tertiary Education Sector.

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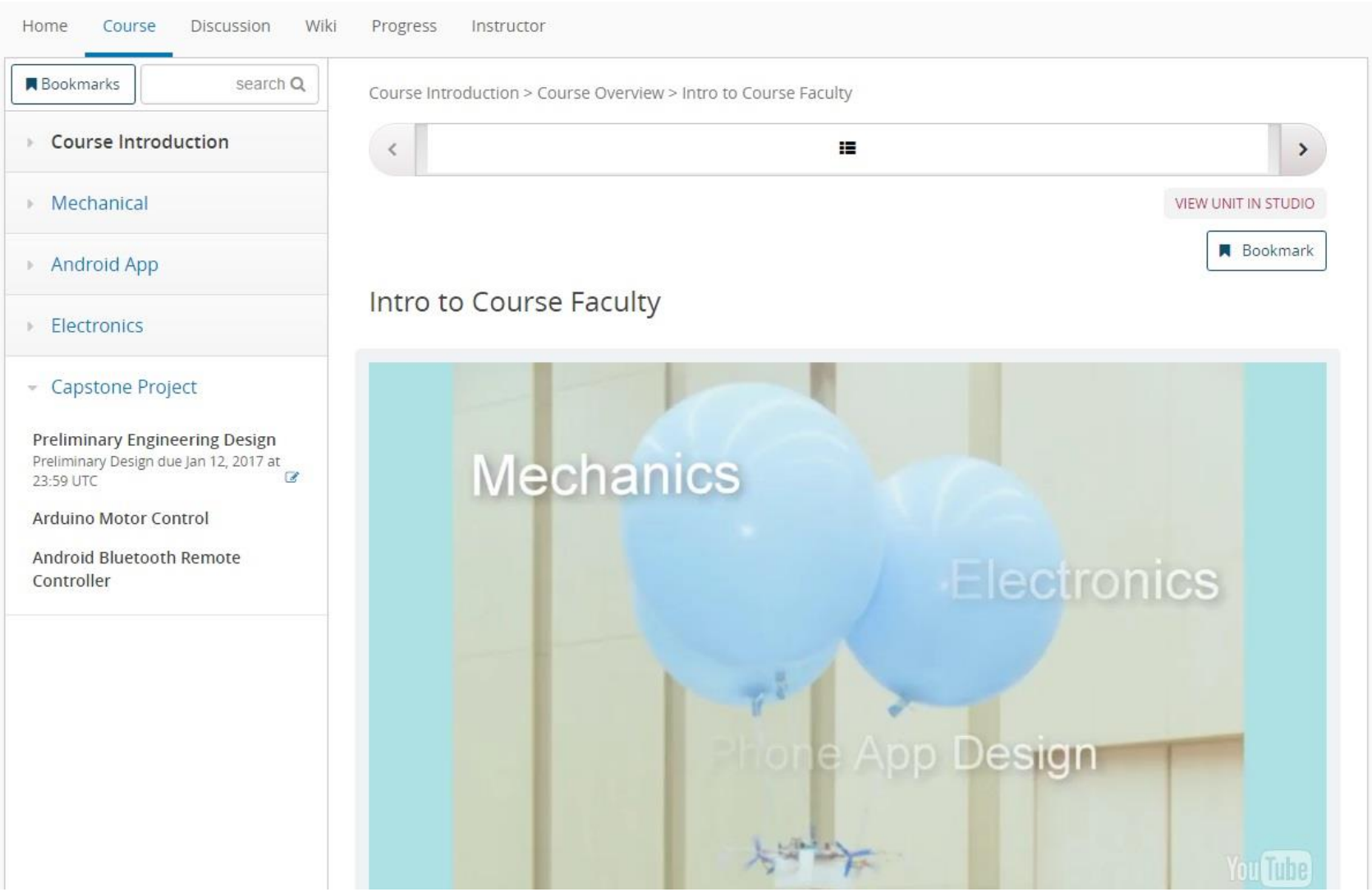
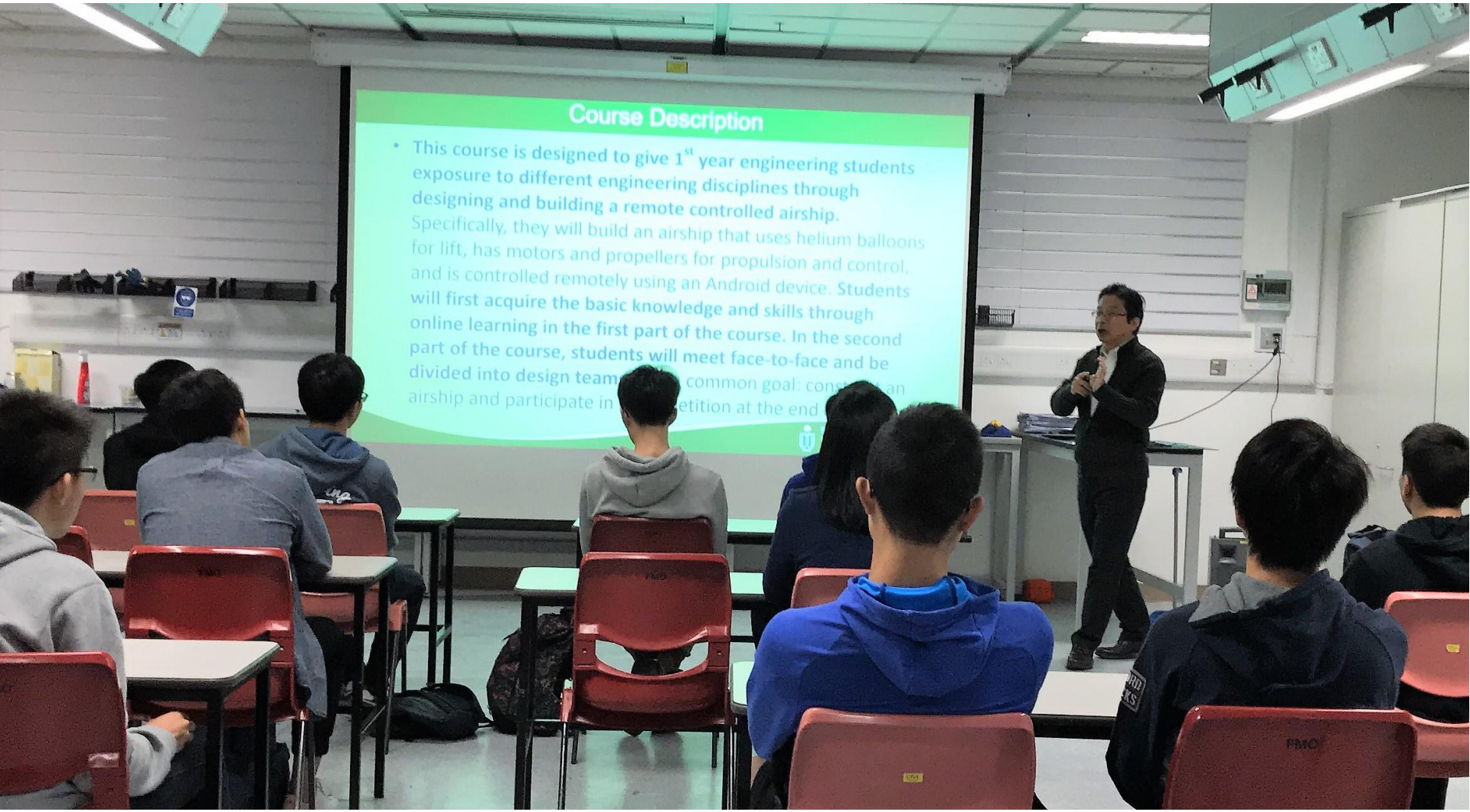
A Blended Experiential Learning Course on Cornerstone Design Project

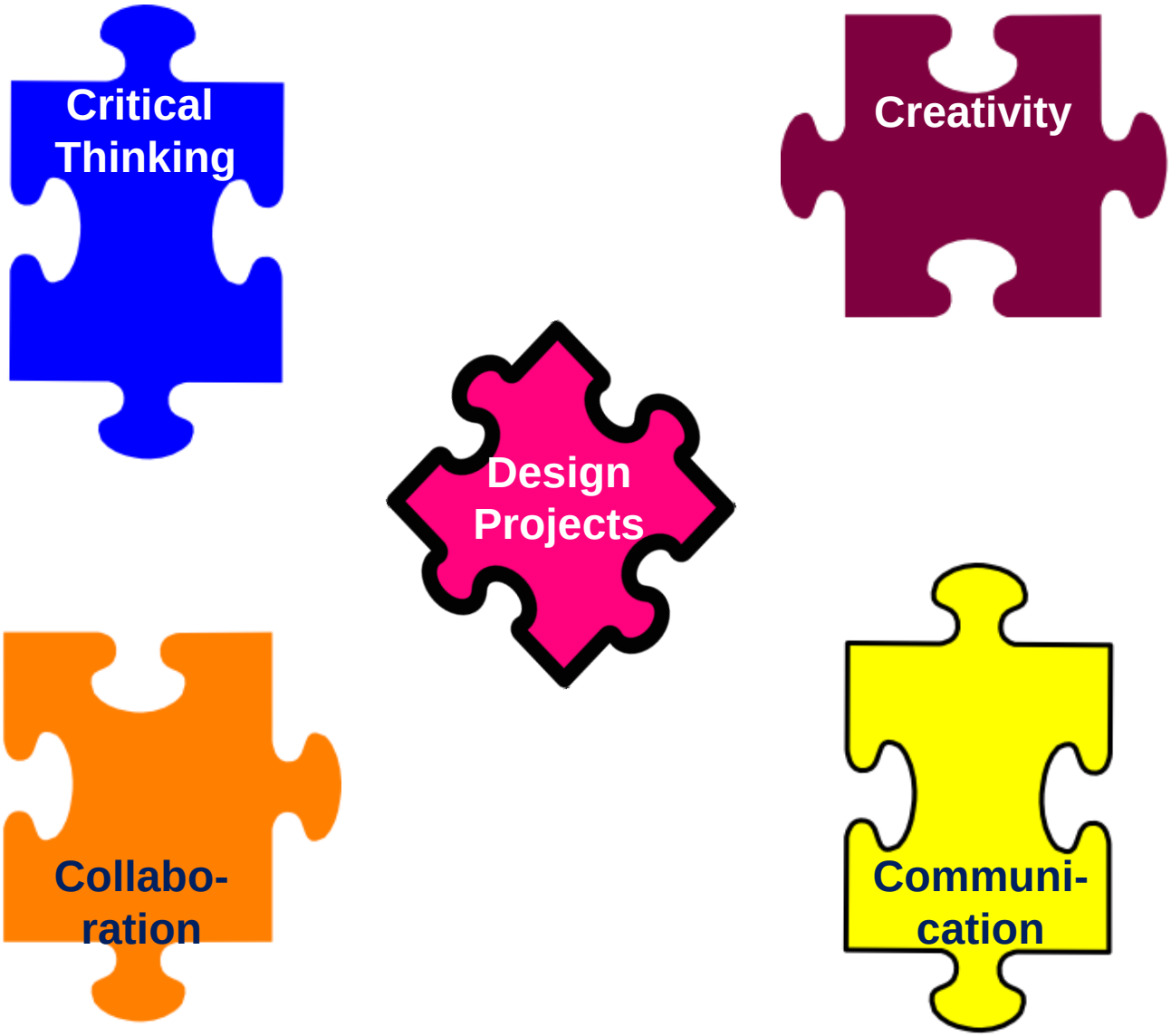


1st Year Cornerstone Engineering Design Project Course

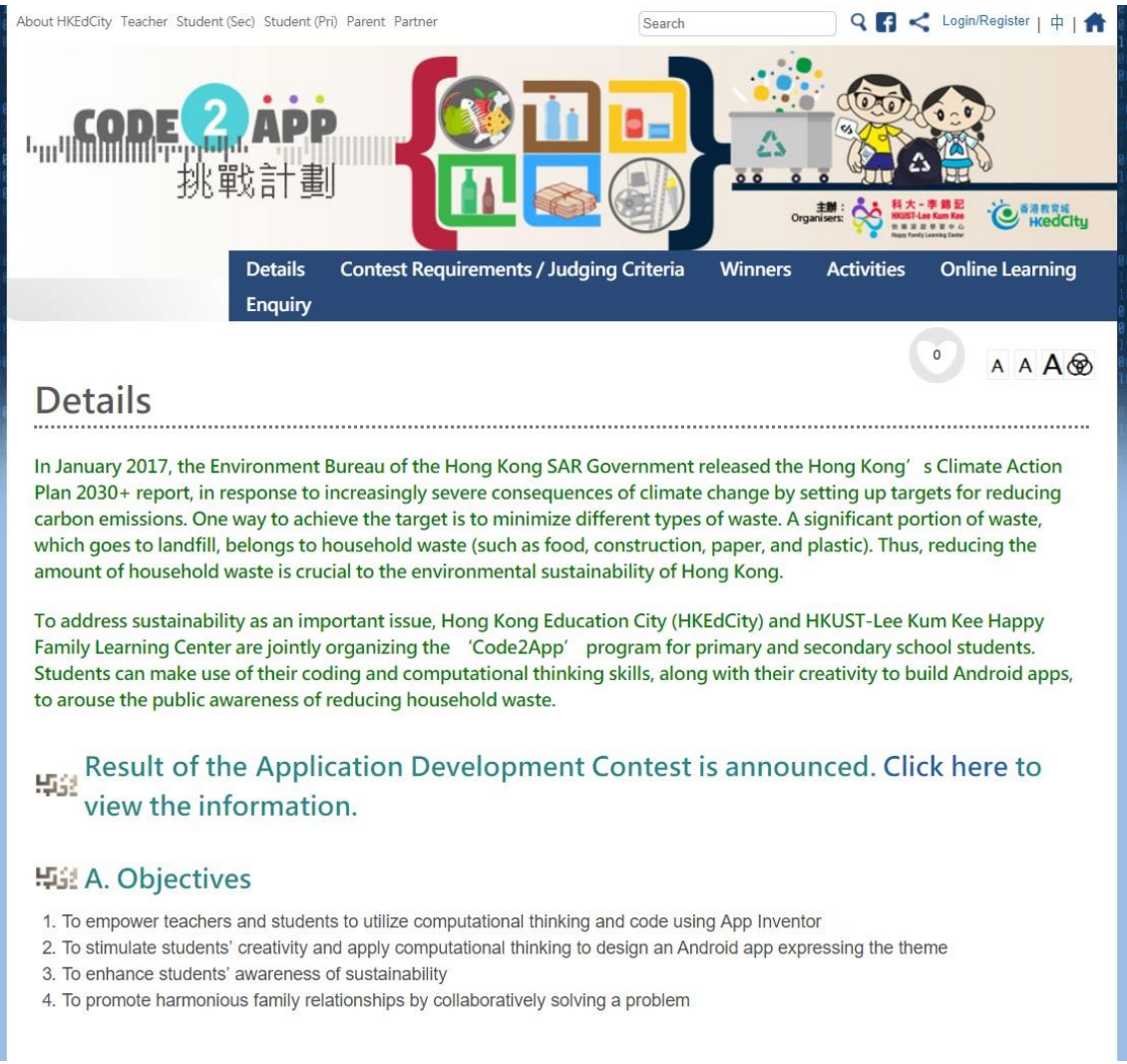


Engineering Design Project Course – Final Competition

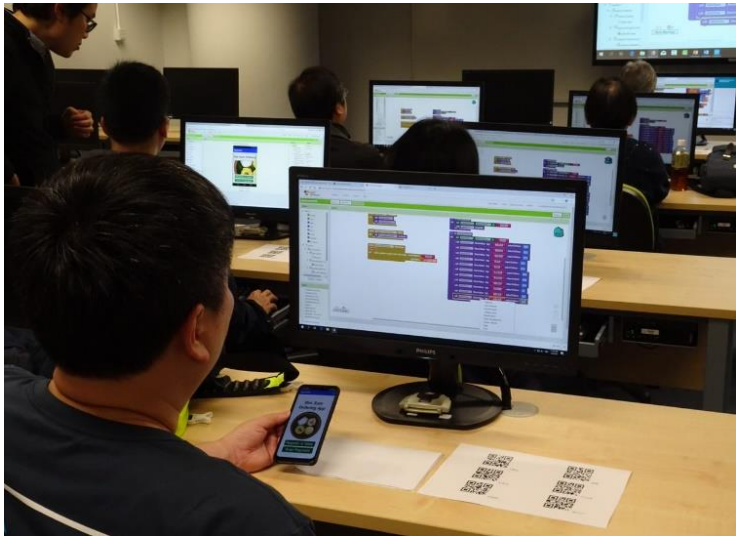
Using Design Projects to Nurture Students' Competencies



Code2App Challenge to Promote Computational Thinking to K-12



Workshops



Code2App Challenge to Promote Computational Thinking to K-12

Division	# of submissions	Shortlisted Teams
Primary School Division	15	6
Secondary School Division	64	6

Sample Submissions

HKUSTxMinerva Scholars Program

Minerva School at KGI

MINERVA SCHOOLS AT KGI

Global Experience Academic Programs Career Development

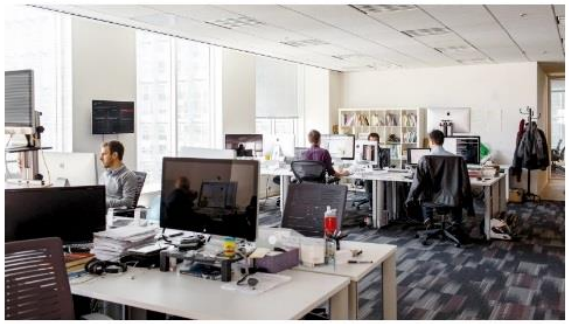
This college startup has a 1.9% acceptance rate, making it tougher to get into than Harvard

Abby Jackson
Apr. 5, 2016, 11:16 AM 31,609

FACEBOOK LINKEDIN TWITTER EMAIL PRINT

College startup Minerva Schools, whose students explore up to seven cities during four years of study, has received 16,000 applications for 306 available places this year, the Financial Times reported.

That acceptance rate for the unconventional college, at 1.9%, is far lower than at any schools in the Ivy League, as well as at Stanford.



The Minerva offices – where all employees work at open-plan stations – recall a typical tech startup far more than they do an academic building. Ike Edeani / The Atlantic

FINANCIAL TIMES

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United States of America + Add to myFT

San Francisco start-up Minerva 'more selective than Ivy League'

16,000 apply for mainly online Minerva education as traditional college costs soar

25 Save

by: Andrew Edgecliffe-Johnson in New York

ancisco start-up aiming to offer an Ivy League-level education at half the cost
S colleges has accepted a smaller fraction of its applicants than Harvard or
s third year of operation.

Research and Development in E-learning

- A Data Science and E-learning Research Cluster established under the HKUST-MIT Research Alliance Consortium which leverages Hong Kong Innovation and Technology Commission's ITF 9:1 matching fund. Three projects have been funded for a total of HK$40M:
  - An Open Learning Design, Data Analytics and Visualization Framework for E-Learning
  - A Personalized E-Learning Platform
  - Evidence based Education based on Data Analytics
- Funding from the UGC Teaching and Learning Funding Scheme for developing a Hong Kong MOOC Platform and Cornerstone projects for a total of HK$18M.
- Other collaborative projects related to e-learning HK$50M.

VR / AR in Education

Application of VR / AR in different education-related topics:

- STEM subjects
- Medicine and health care
- Language
- Culture and history
- Sustainability
- Art and music
- ...


Thank you!