



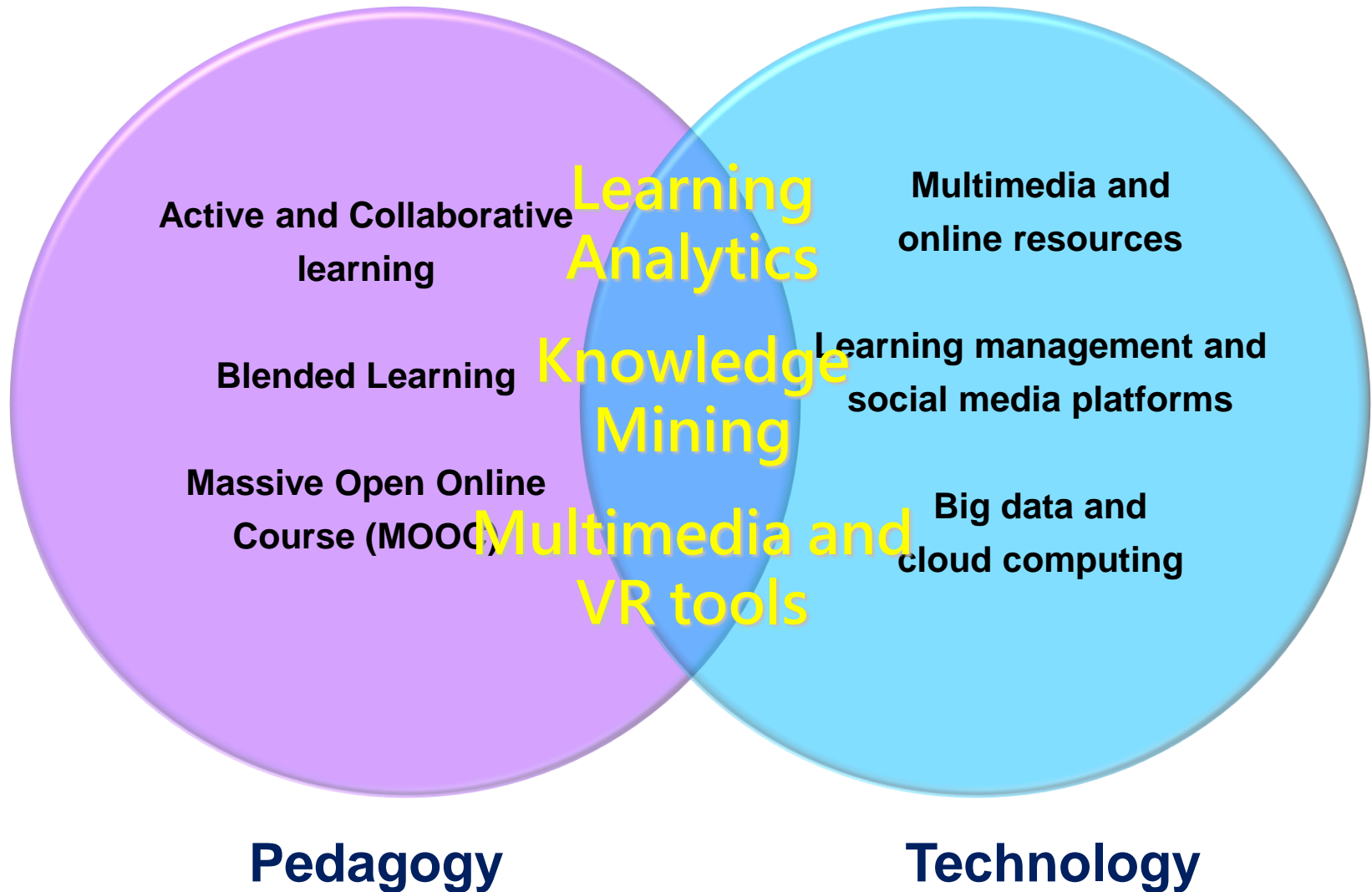
# **Digital Technologies for E-learning**

**T.C. Pong**

**Department of Computer Science & Engineering  
Hong Kong University of Science & Technology**

**12 October 2015**

# Research Challenges in E-learning



# 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

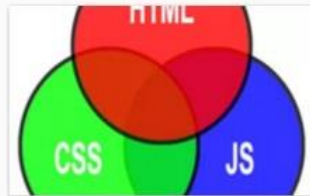
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## The Hong Kong University of Science and Technology

HKUST - A dynamic, international research university, in relentless pursuit of excellence, leading the advance of science and technology, and educating the new generation of front-runners for Asia and the world.



HTML, CSS and JavaScript  
On-Demand



Server-side Development with NodeJS  
On-Demand



Multiplatform Mobile App Development  
with Web Technologies  
On-Demand



Front-End Web UI Frameworks and  
Tools  
On-Demand



Front-End JavaScript Frameworks:  
AngularJS  
On-Demand



Full Stack Web Development  
Specialization Capstone Project  
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# HKUST's MOOC Experience



HOW IT WORKS

COURSES

SCHOOLS

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HKUSTx  
ELEC1200.2x  
A System View of  
Communications: From Signals to  
Packets (Part 2)  
Starting Soon  
Starts: October 27, 2015



HKUSTx  
ELEC1200.3x  
A System View of  
Communications: From Signals to  
Packets (Part 3)  
Upcoming  
Starts: January 19, 2016



HKUSTx  
COMP102.1x  
Introduction to Java Programming  
– Part 1  
Current  
Self-Paced

Over 350,000 learners have registered for 10 MOOCs offered by HKUST



HKUSTx  
ELEC1200.1x  
A System View of  
Communications: From Signals to  
Packets (Part 1)  
Current  
Starts: August 25, 2015



HKUSTx  
COMP107x  
Introduction to Mobile Application  
Development using Android  
Archived  
Starts: July 28, 2015



HKUSTx  
EBA102x  
English for Doing Business in  
Asia- Writing  
Archived  
Starts: June 2, 2015

# Learning Analysis on clickstream pattern using stacked graphs



## Course Name

Introduction to Computing with Ja

### Week 1

Course Team

Learning Objectives

What is a Well-defined Problem?

Finding the best way to travel from Hong Kong to London

Learning Objectives (Cont.)

Hardware

Software

Application Software and Operating System

Programming Languages

Problem Solving

The Game of Tic-tac-toe

Square Apple Problem

Importance of Problem Representation

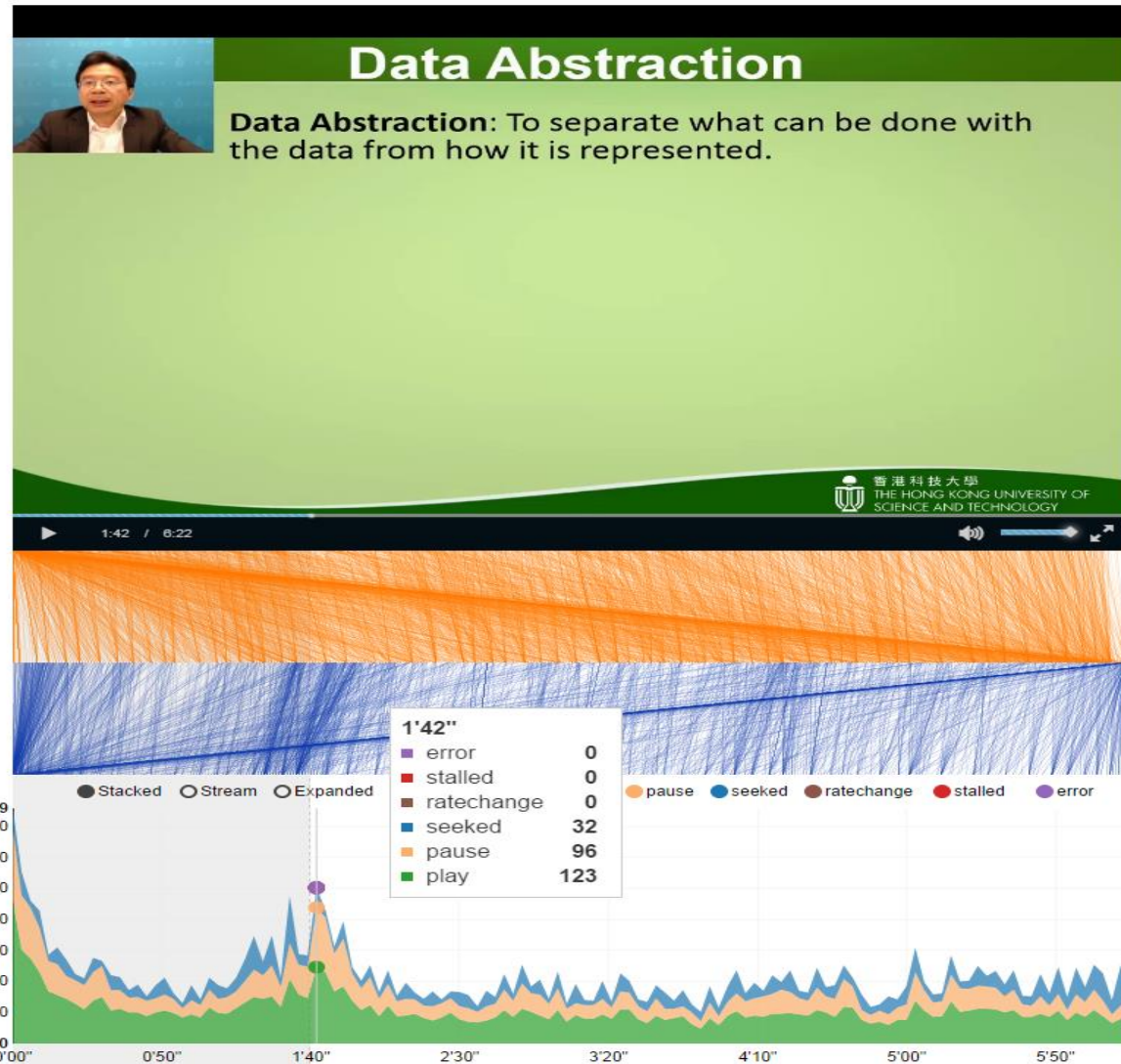
HelloWorld

### Week 2

Message from the Instructor

Introduction

CourseGrade Example



## Course

Course Info

Popularity Info

Demographic Info

## Video

Temporal Info

## Forum

# Learning Analysis on clickstream patterns



VisMOOC : Visual Analytics for Massive Open Online Courses

Course Name  
A New History for a New China, 1700-2000

Week 1

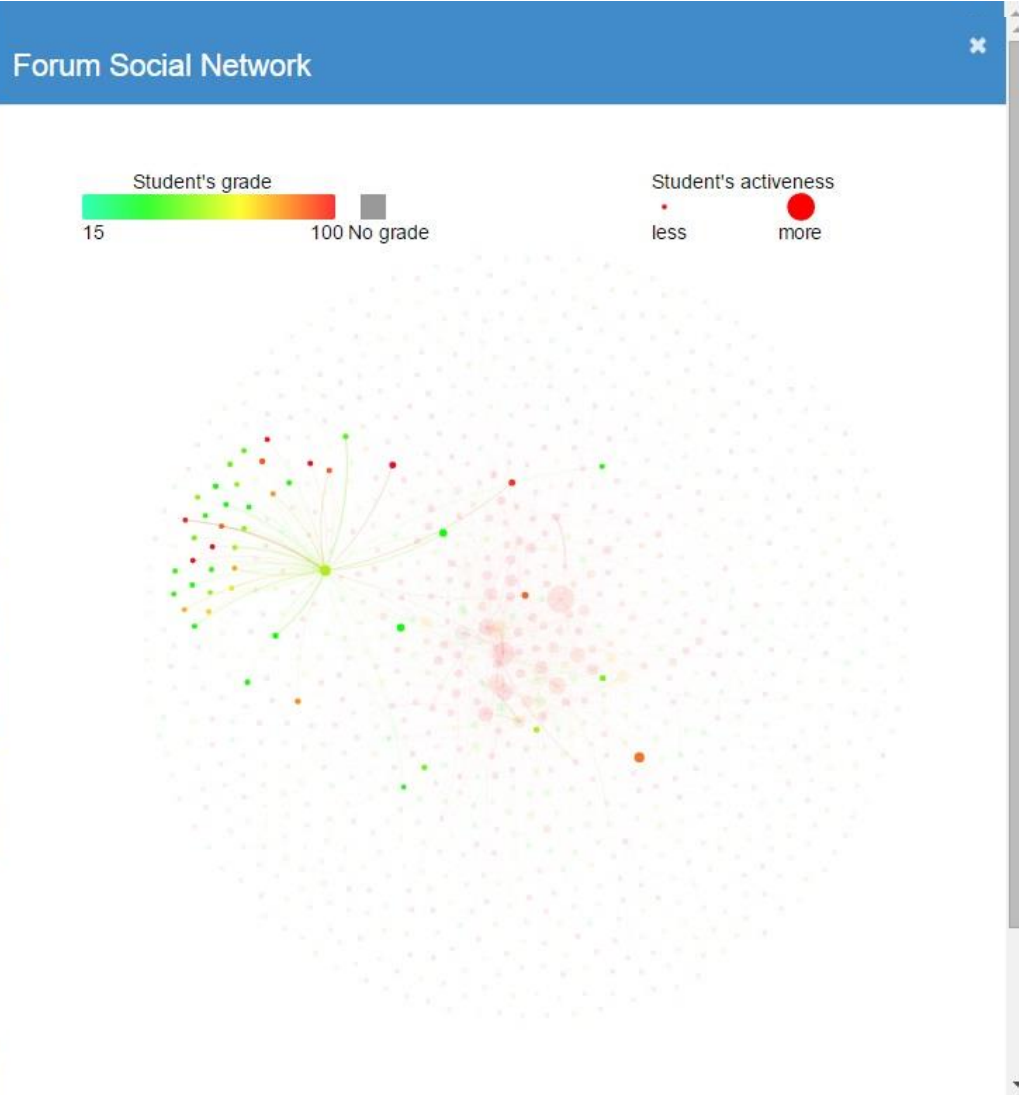
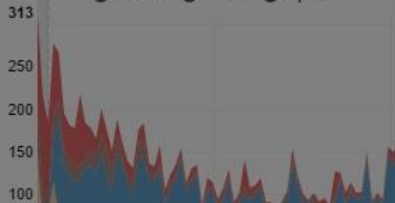

- 1.1: Introduction (15:5)
- 1.2: Who Gets What and Why? (3:34)
- 1.3: Social Mobility and the Examination System in Late Imperial China (20:25)
- 1.4: Cultural Reproduction and Education in Late Imperial and Contemporary China (14:10)

Week 2

- 2.1: Comparing Inequality in Education and Income Between China and the West (11:3)
- 2.2: Student Diversity at Peking University 1950-1999 and Suzhou University 1950-2003 (19:55)
- 2.3: China's Silent Revolution's Ladder of Success (14:41)

Week 3

- 3.1: Wealth Distribution in the UK and US, 1700-2000 (7:49)
- 3.2: Population Categories and Wealth





# Knowledge Mining from Lecture Videos



Knowledge mining from a lecture video corpus of an academic subject using Multimodal Analysis

- Facilitate the searching of concepts in a lecture video corpus
- Extract the relationships between concepts so as to identify effective learning strategies for the academic subject



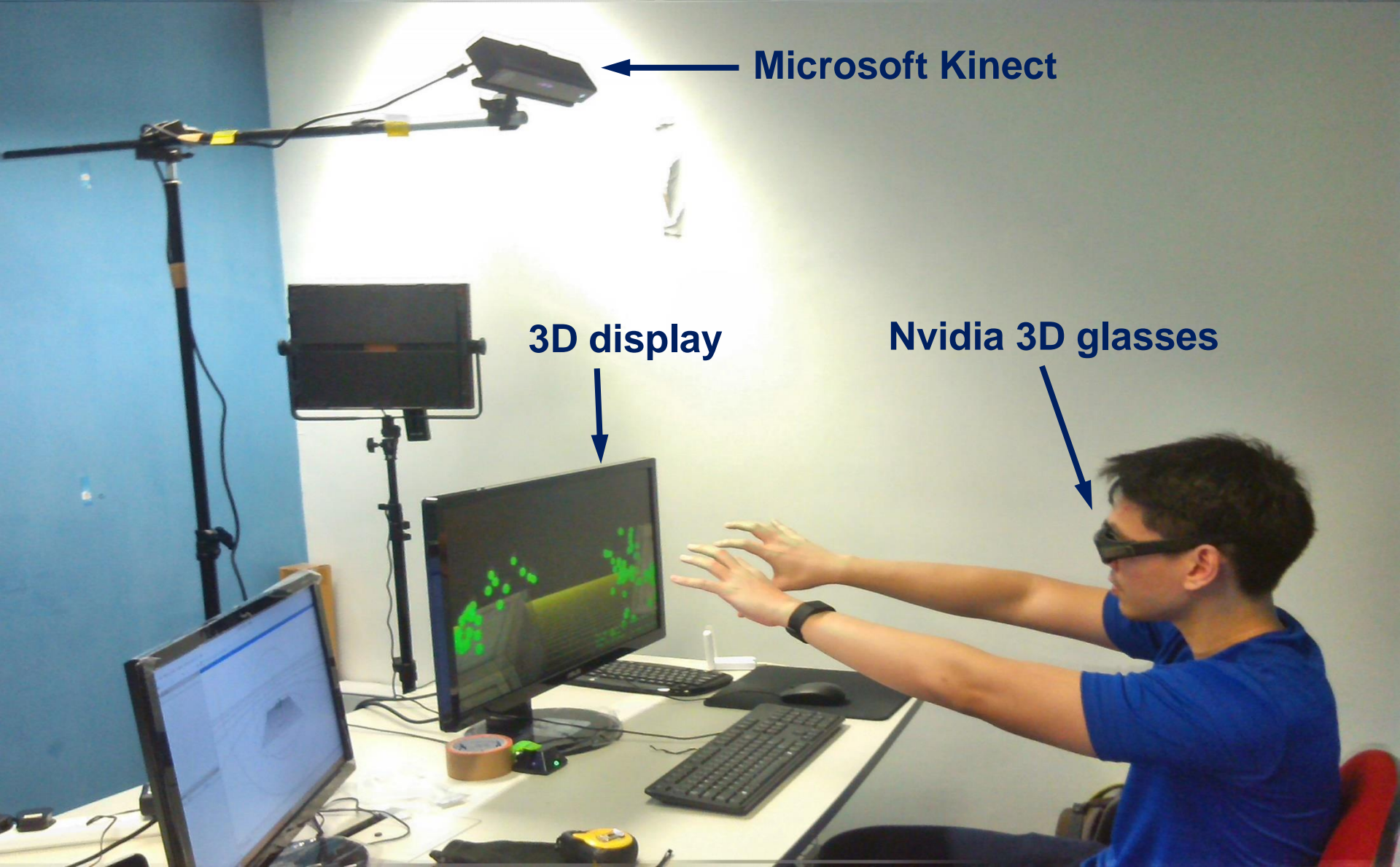
# Multimedia and VR tools for E-learning



Develop multimedia and virtual reality tools that could fit the learning style of individual learners

- The VARK model classifies learners based on the following sensory modalities:
  - **V**isual
  - **A**uditory
  - **R**eading or **wR**iting and
  - **K**inesthetic
- Systems can be developed to allow multimedia content and postings to be used according to individual's learning style

# Multimedia and VR tools for E-learning



Microsoft Kinect

3D display

Nvidia 3D glasses



**Thank you!**

