E-learning based on Internet of Things

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1. What is IoT?

- The Internet of Things is the network of physical objects or things embedded with sensors and network connectivity which enables these objects to exchange data (defined by ITU).

⇒ These embedded computing devices are interconnected uniquely in the existing Internet infrastructure.

⇒ Objects make themselves recognizable and obtain intelligence by making or enabling context decisions.
The Internet of Things (IoT) is the network of physical objects or “things” embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. (Wikipedia).

The IoT will provide constant contact with our clothing and wearables, cars, offices and our homes.
① Sensors & Actuators
Location data using GPS sensors. Eyes and ears using cameras and microphones, along with sensory organs that can measure everything from temperature to pressure changes.

② Connectivity
The inputs are digitized and placed onto networks.

③ People & Process
These networked inputs can then be combined into bi-directional systems that integrate data, people, processes and systems for better decision making.

④ The interactions between these entities (sensors + connectivity + people + process) are creating new types of smart applications and services.
IOT Based Computer
We’re creating and deploying Internet of Things learning recipes modeled after smart city use cases and making them available to students to build functioning sensors that generate data.
The layers are Client/external communications (Web/Portal, Dashboard, APIs), Event processing and analytics (including data storage), Aggregation/bus layer (ESB and message broker), Relevant transports (MQTT/HTTP/XMPP/CoAP/AMQP, etc.), Devices,
IoT and smart environments creation

• The Internet of Things refers to systems that interconnect devices embedded with sensors to the Internet.

• This includes many different systems, including **Internet connected cars**, **wearable devices** including **health and fitness monitoring devices**, **watches**, and even **human implanted devices**, **smart meters**, **smart objects**, **home automation systems and lighting controls**, **smartphones**
3. Learning model based on IoT

IoT on campus and Learning relationship

This model consists of three layers which are the device layers, service layer, and application layers.
"Education brings sustainability to all the development goals, and literacy is the foundation of all learning. It provides individuals with the skills to understand the world and shape it, to participate in democratic processes and have a voice, and also to strengthen their cultural identity." - Irina Bokova
4. Education environment by IoT

IoT leads to higher education reform, this changes as follows;

- Educational technology
- Education reform
- Teaching & learning paradigm
- Management method
- Experimental and practical method
- Campus
Changing educational technology

• IoT has key technologies
  ✓ RFID label materials and label things
  ✓ Things and events of sensor network technology
  ✓ Thinking about things and events of smart technology
  ✓ Nano miniature things and events technology
Education Reform

- IoT impacts on higher education
  
  ✓ Embedding physical world digital technology, RFID technology, and nano-technology in all kinds of objects facilities
  
  ✓ Connecting all things(like people, objects, etc.) into Internet.
    
    • A variety of educational things which are integrated into the educational resource pool.
    
    • It will be helpful to personal growth education to be used anytime, anywhere, and place.
Changing educational technology

- IoT changes educational technologies
  - Information technology
  - Experimental simulation technology
  - 3D real teaching and learning remote experimental training
  - Virtual technology to optimize the theoretical training paradigm
  - Objective world of digital
  - Intelligent technology
Changing the teaching & learning paradigm

- Changing a teaching method
  - Teacher’s initiative, students under teacher’s guidance
  - Student’s initiative, Teaching by teacher becomes a “learning guidance”

• Ubiquitous teaching and ubiquitous learning; not limited in time, physical place.
• Changing a learning method

✓ Independent learning selected by students (choosing teacher’s video, self-directed learning, etc.)
✓ Freely accessing and sharing knowledge and information
✓ Basic learning tools with RFID enabled card, card, phone and a laptop computer within WiFi network coverage, etc…
Changing management

- Changing management
  - Changing managements’ way of thinking, people (including faculty structure and students), financial, material, means of organization
  - Producing innovation by divergent thinking, self-organization

Changing the experimental and practical method

- Entities virtualization; possible to perceive the experimental data of the virtual into the real numbers
  - Embedding RFID tags in the experimental equipment for installing the automatic recording system
  - Measuring physical quantities by sensors to achieve “virtual entity” or “digital entities”
  - Building up smart lab. for experimental form of organization.
► **Changing campus**

- Reducing the size of the physical school (or disappearing school)
- No specific school campus
- Virtual school campus or virtual school for virtual education

*Source:* [http://www.cm.is.ritsumei.ac.jp/~r_nishide/dcampus/intro/intro.html](http://www.cm.is.ritsumei.ac.jp/~r_nishide/dcampus/intro/intro.html)
Conclusion

• The Internet of Things refers to systems that interconnect devices embedded with sensors to the Internet.

• Learning & education based on IoT changes the learning and teaching environment.
  – More smarter of learning pattern
  – Centralize learning activities, and scheduling
  – Not limit of place, time, and space.

• More
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• Thank you for your attention!!