Wastewater treatment in Myanmar

A Multidisciplinary Learning Experience for Engineering and Science Students from Two Countries

The reported pilot project was started in September 2016. Including the following two institutes:

Faculty of Engineering
THE UNIVERSITY OF HONG KONG

Dagon University
Yangon Myanmar

The **engineering faculty**
(16 students, F:6 M:10)

- **Civil engineering**
- **Biomedical engineering**
- **Computer engineering**, **computer science**
- **Mechanical engineering**
- **Electrical engineering**
- **Environmental engineering**

The **science faculty**
(40 students, F:29 M:11)

- **Chemistry**
- **Botany**
- **Zoology**
- **Industrial chemistry**
- **Computer science**

- **Stage 1. Pre-trip preparations -** Students in both universities spent 3 months to prepare for the trip.

- **Stage 2.** In January 2017, **the engineering team travelled to Myanmar** for a weeklong programme where they worked with the science team to study wastewater quality in Yangon, Myanmar.

  - **Student-led knowledge exchange workshops (Engineering workshops, science workshops)**

  - **Project based learning in a multidisciplinary team**

Forming a team of engineers from CS, EE, CE, CIVIL, ME, Env.E in HKU

DAGON U — SCIENCE
HKU — ENGINEERING

7-DAY OVERSEAS EXPERIENTIAL LEARNING

IN MYANMAR-YANGON
2 JAN - 9 JAN 2017

Understanding the issues in my country

- **To arouse students' awareness of those issues, students from both universities started with initial explorations and prepared a quality review on the following inter-related topics prior to the trip.**

- Water usage and water quality.

- Water pollution, water contaminants and its related impacts.

- Wastewater management policies.

- Wastewater treatment methods, and technologies applied.

- **Wastewater monitoring mechanisms and technologies used**.

Preliminary study and design

Prototyping
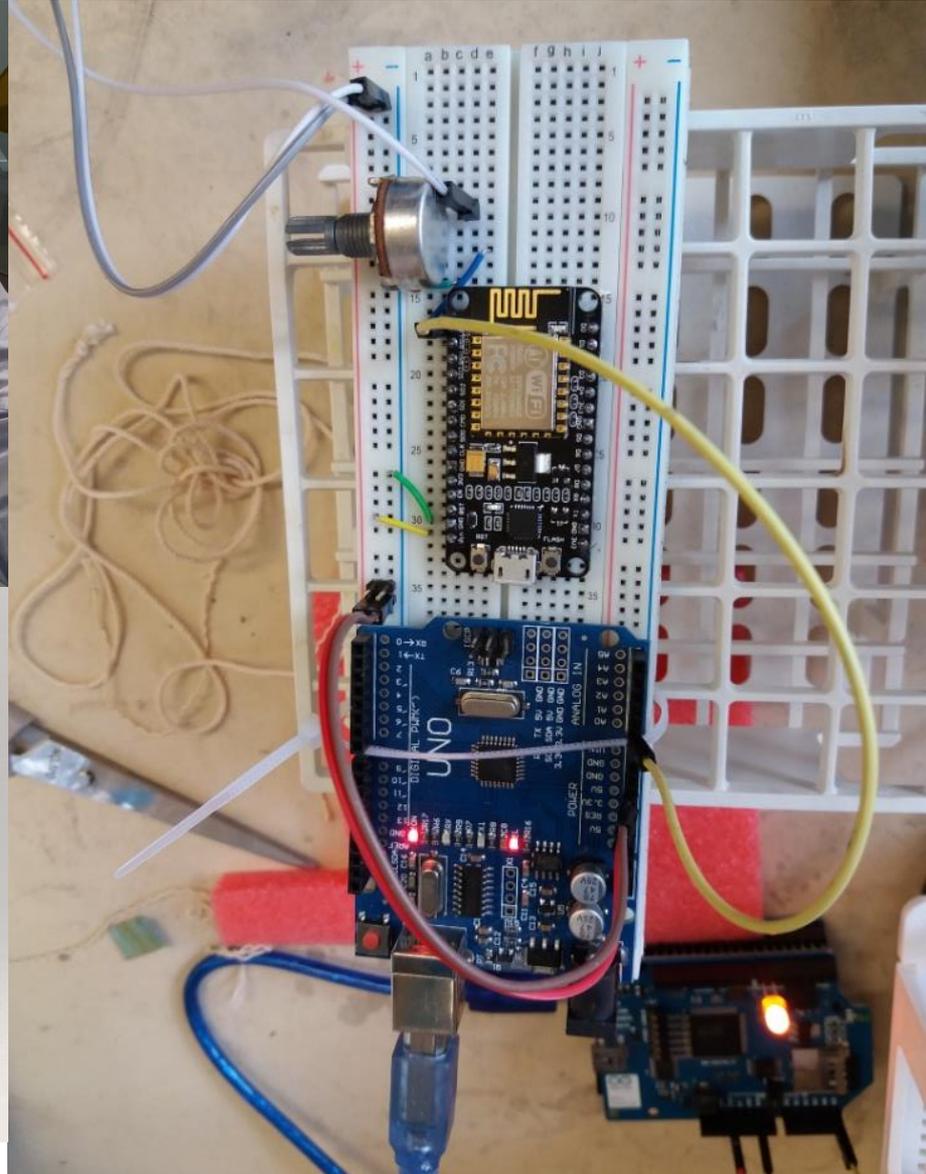
Testing
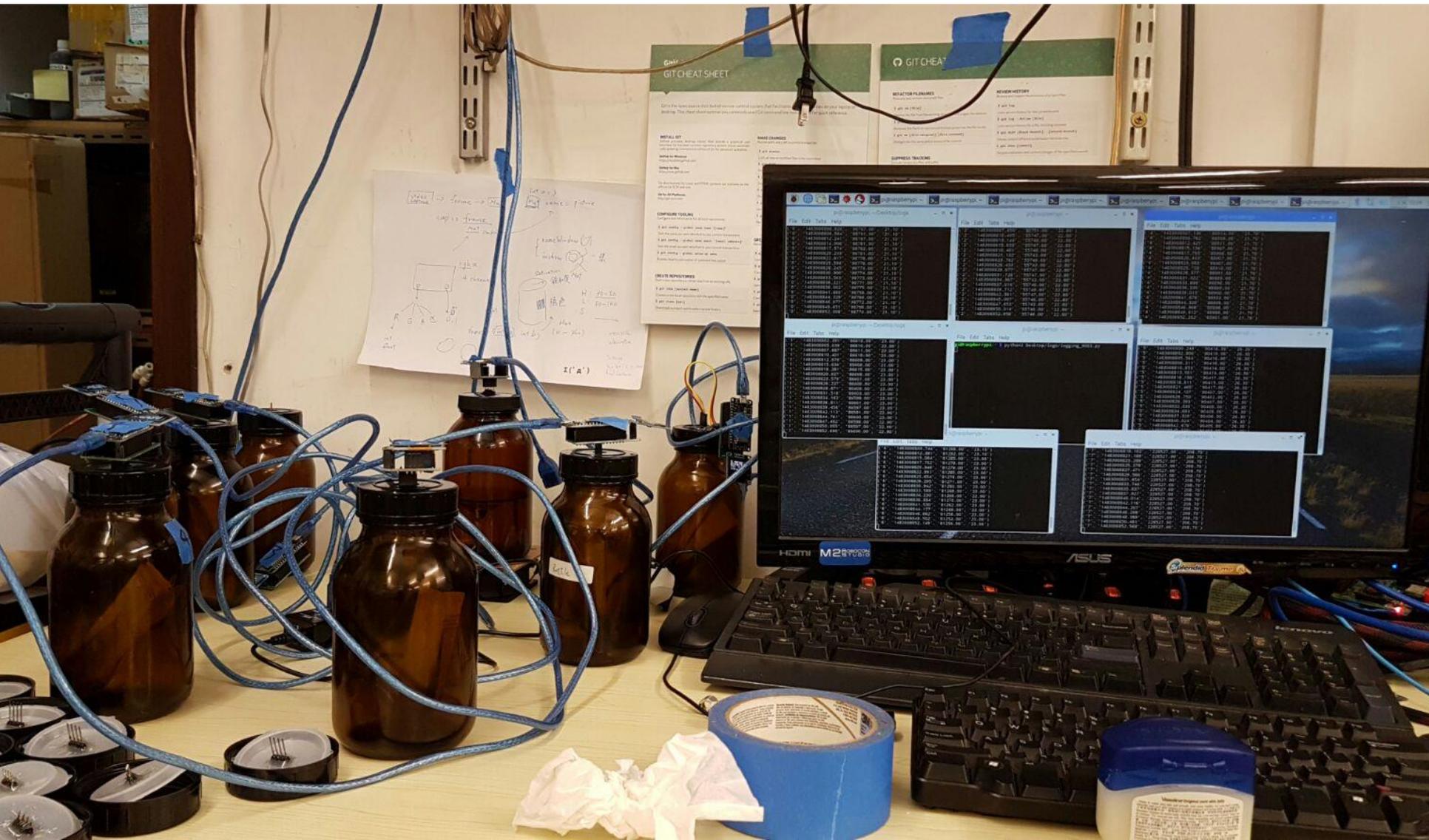
Student-led pre-trip workshops - Knowledge exchange within Engineering team
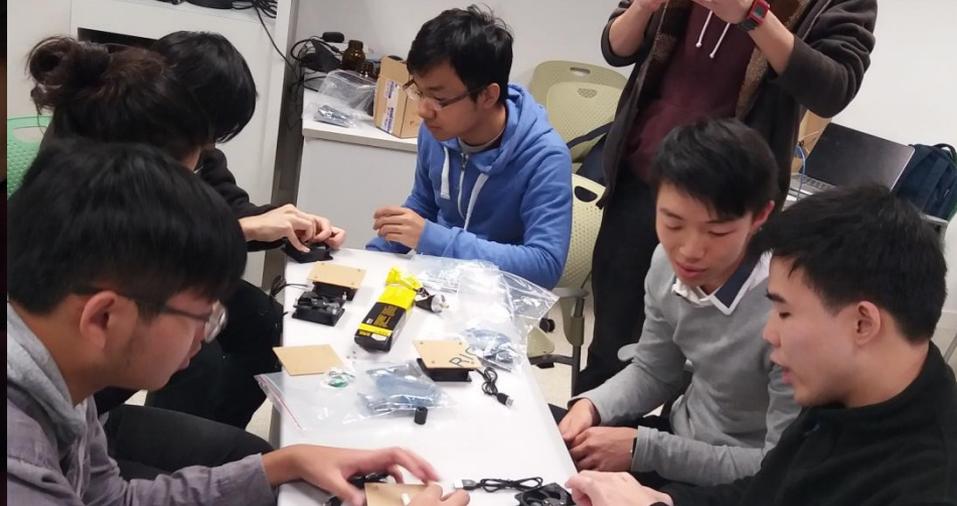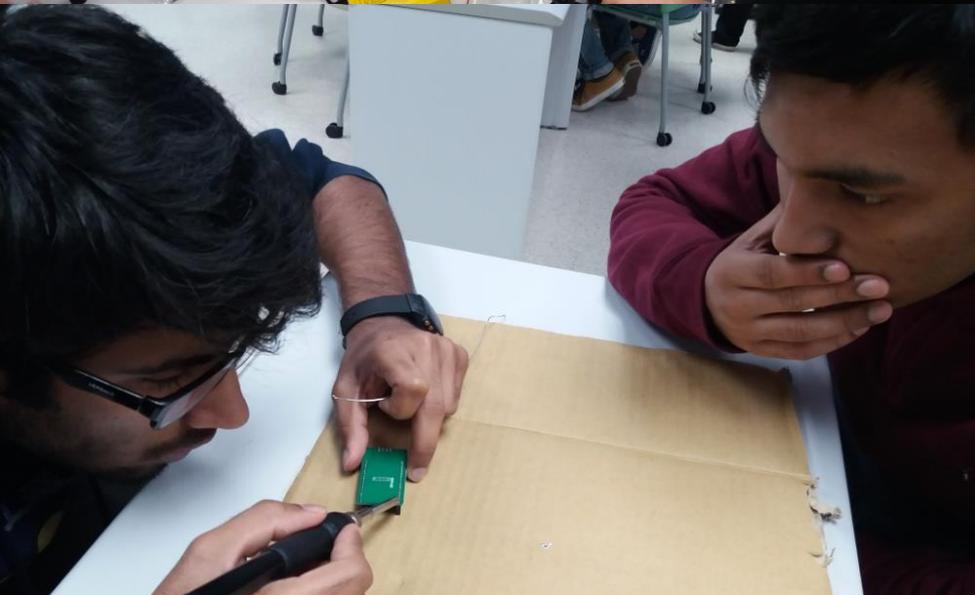
KE workshops hosted by science students
wastewater treatment process in Yangon

Onsite development & wastewater collections (Agricultural plants)

**Onsite development
& wastewater collections
(Freshwater fishponds)**

Onsite development & wastewater collections (Underground water)

Onsite development & wastewater collections (Industrial plants)

Onsite development & wastewater collections (sewage drainages around the Yangon city)
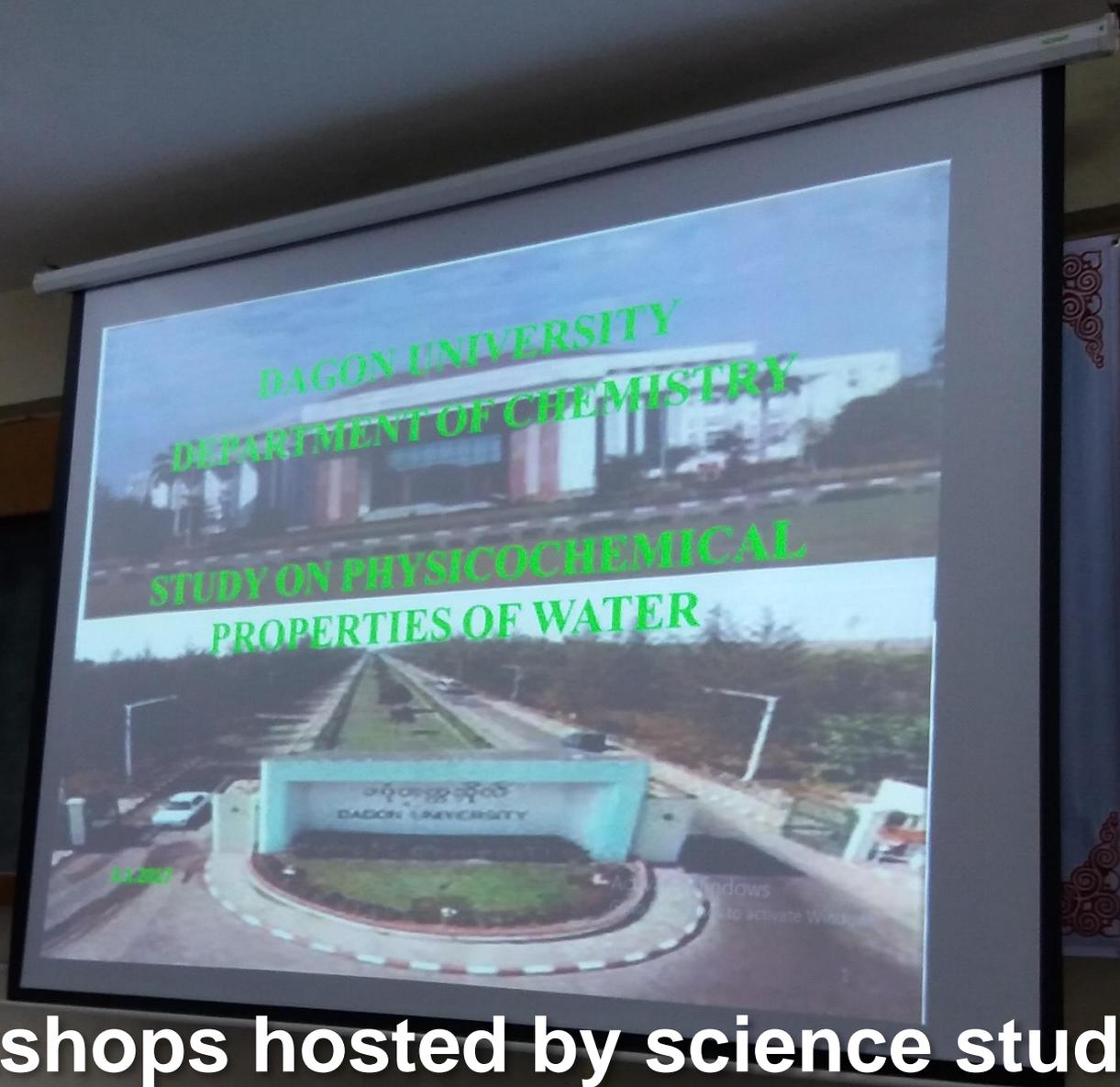
KE workshops hosted by science students wastewater treatment process in Yangon

Hardware technologies (Components)
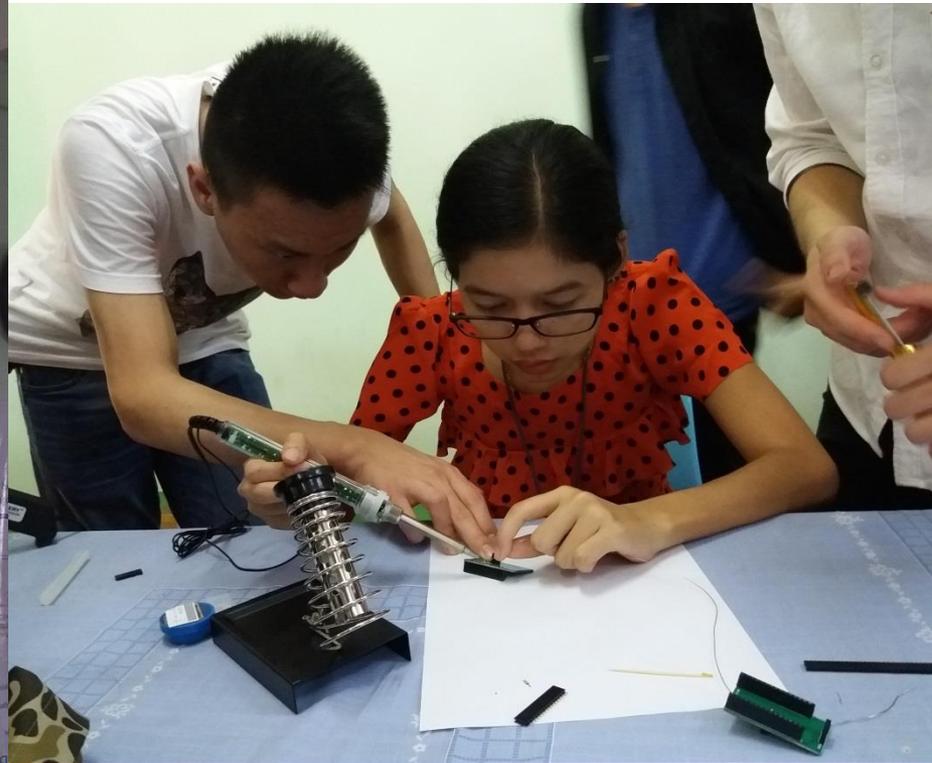
Hardware technologies (Circuit design)

Hardware technologies (Soldering skills)

Hardware
technologies
(Assembling)

Software technologies
(Arduino programming)
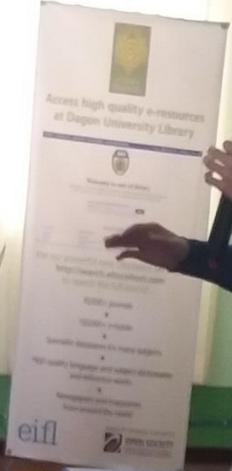
Software technologies (Database and cloud storage)
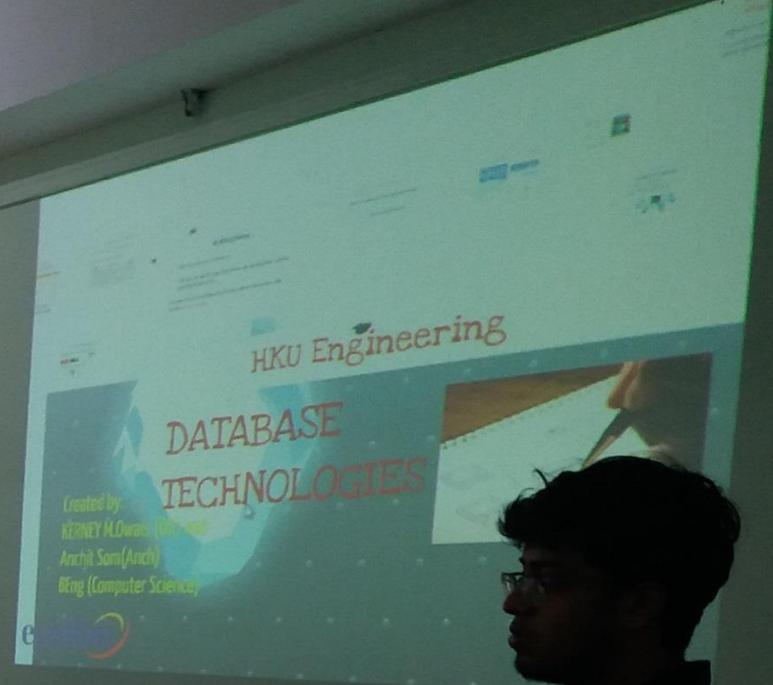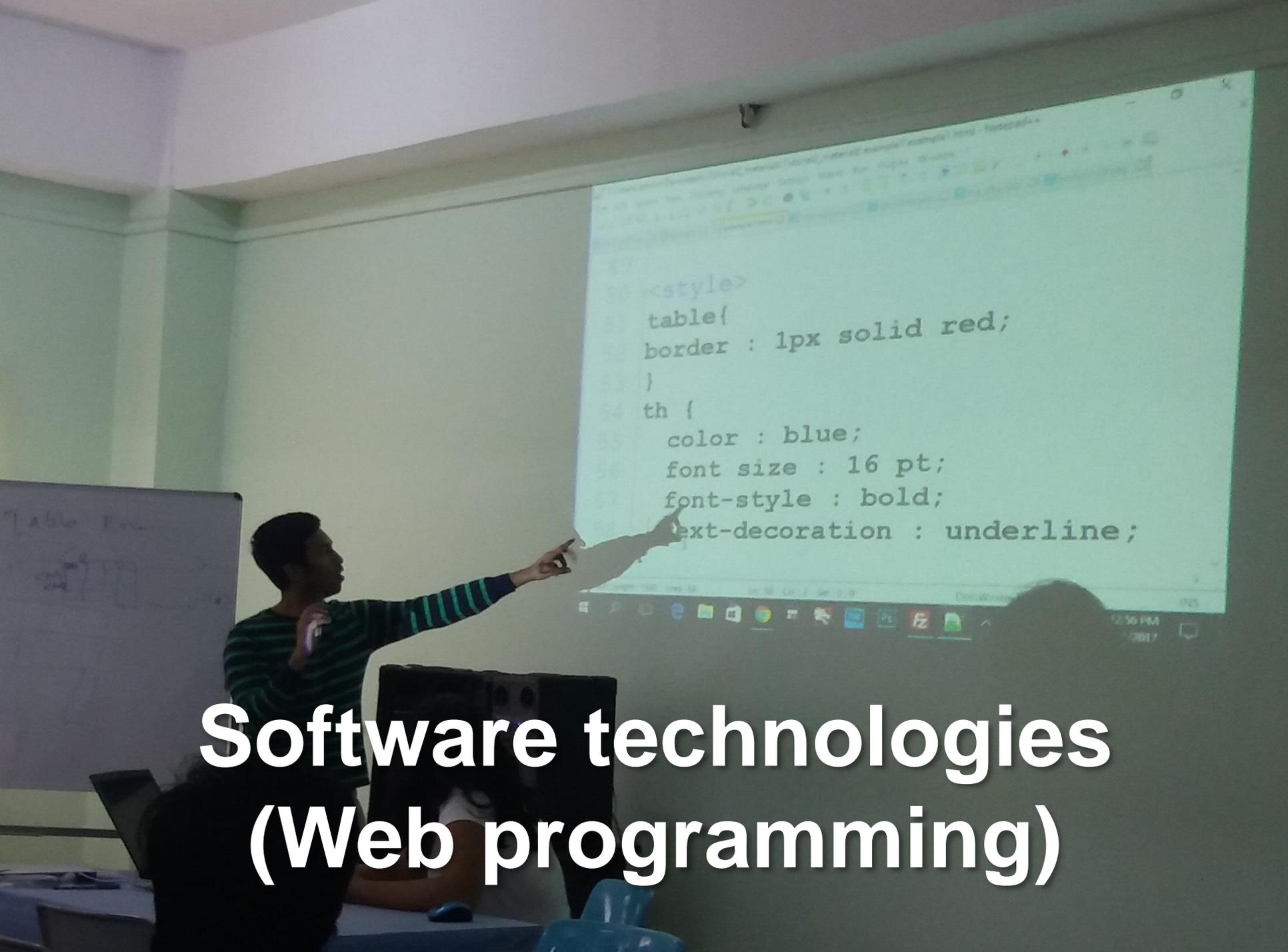
Software technologies (Web programming)

Team up and development

Testing & deployment

Evaluation and redesigning the product

Learning knowledge in my discipline

- The preparation of **on-site knowledge exchange workshops** further pushes students to revise, to integrate and to **organize their disciplinary knowledge into a clear and concise presentation**.

"*The "**teach to learn**" concept is a great opportunity for me to go through every aspect I have learnt in classroom, as **my mission is to explain the concepts clearly and professionally to my friends in another field**.*"
- A student in Computer Science

Learning cross-disciplinary knowledge

- Students acquired knowledge in another field through the **knowledge exchange workshops**.

"*Due to the multidisciplinary nature of this project, we had to learn things from other engineering disciplines. The hands-on sessions allowed me to* ==**learn engineering and science concepts outside my core specialization**==*, such as* ==**HTML, CSS, water sedimentation**== *etc.*"

- a student in **civil engineering**

"*I learnt about* ==**chemistry and logistics**== *involved in wastewater treatment.*"

- a student in **computer science**

"*As an electrical engineering student, I only have a little prior knowledge of* ==**chemistry**== *and* ==**software technology**==*. Fortunately presentations by DU students introduce the required science knowledge and* ==**the situation about wastewater in Myanmar**==*.*"

- a student in **electrical engineering**

"*I learnt the basic of* ==**database**== *and* ==**web programming**== *from my schoolmates in HKU. They clearly explained the concepts and the operating principles of them.*"

- a student in **mechanical engineering**

Learning skills

- Students also became aware that **finding the right experts and asking the right questions** are essential in the learning process.

> "*I tried my best to dig deeper into the science topic and clear my concepts by **asking a number of questions during the Q/A sessions with the students from various science fields**.*"

Teamwork challenges (a)

🔵 It was **challenging to explain complex disciplinary knowledge to collaborators with diverse backgrounds.**

*"We had to **go from the very basic definition**, introducing lots of **hands on and fun elements** to help us put forward the concepts more efficiently."*

*"I have to **avoid technical jargons** when I communicate with my teammates."*

*"I learnt the importance of **being patient** when conveying new concepts to people who might not have heard of them before, and having **creative ways to explain the concepts** such that **the knowledge conveyed is the understanding of the subject rather than just a definition of it**."*

Teamwork challenges (b)

- Nearly all respondents pointed out that **language barrier is a main problem** that hinders effective communication.

*"This issue could be alleviated by **slowing down the speaking pace** and **ask questions to see if they understand**."*

Cultural diversity

- Furthermore, students found that **cultural diversity could possibly be utilized to create group synergy.**

*"I spent some great evenings with the Computer Science students from Dagon, we **discussed about the differences in technologies and the schooling system in Myanmar and Hong Kong**. To my pleasant surprise, we had some great academic and tech based conversation, I got to **know about the opportunities that the CS students there have**."*

– a Computer Science student at HKU

Global citizenships

- Most importantly, some students have **built commitment to the betterment of the world.**

*"To learn, innovate and put my technical knowledge to practical use and at the same time, **allow me to give back to the community and contribute towards sustainable development in developing countries**."*

*"To me, engineers make significant contributions to develop advanced technology to build a better world for mankind to live in. **I hope that I can be one of the students who can bring new technologies and ideas to Myanmar**, my experience can be useful in the future to keep helping those in need."*

Dagon University and University of Hong Kong
Pilot experiential learning program 2017 Jan