

Smart Water Detectives: Use of IT and Internet of Things (IoT) technologies to enhance awareness of water sustainability issues

識水偵探計劃：用資訊科技及物聯網技術涵育環境素養

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Department of Electrical and Electronic Engineering

(Project No.: KE-SI-2022-23-37)

Strategic Theme(s):

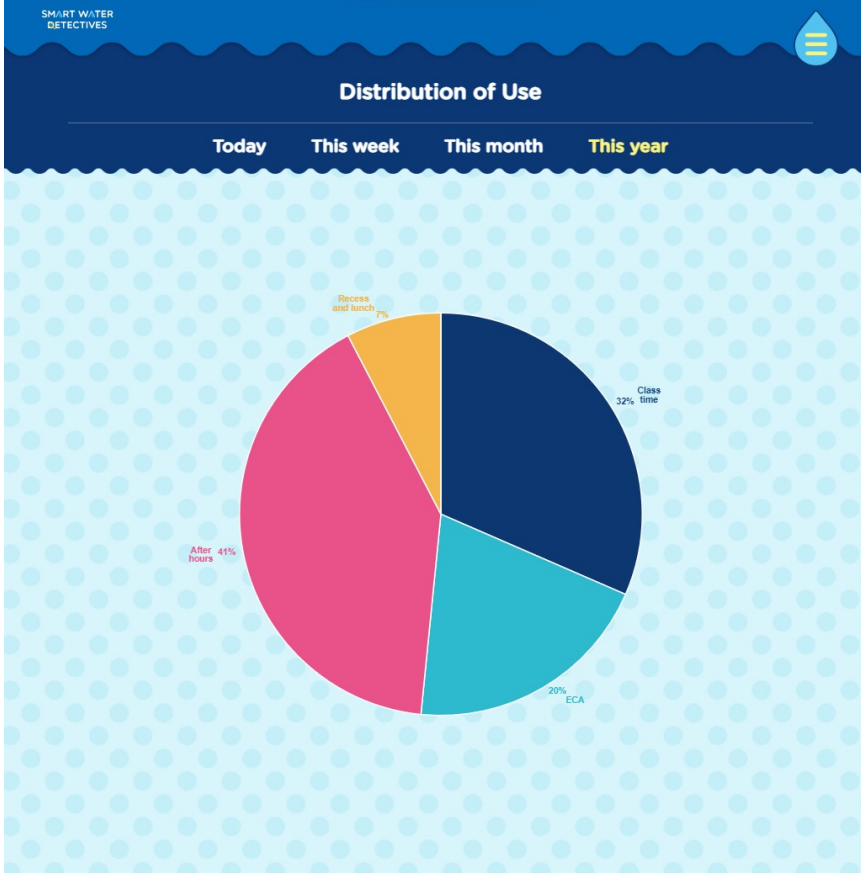
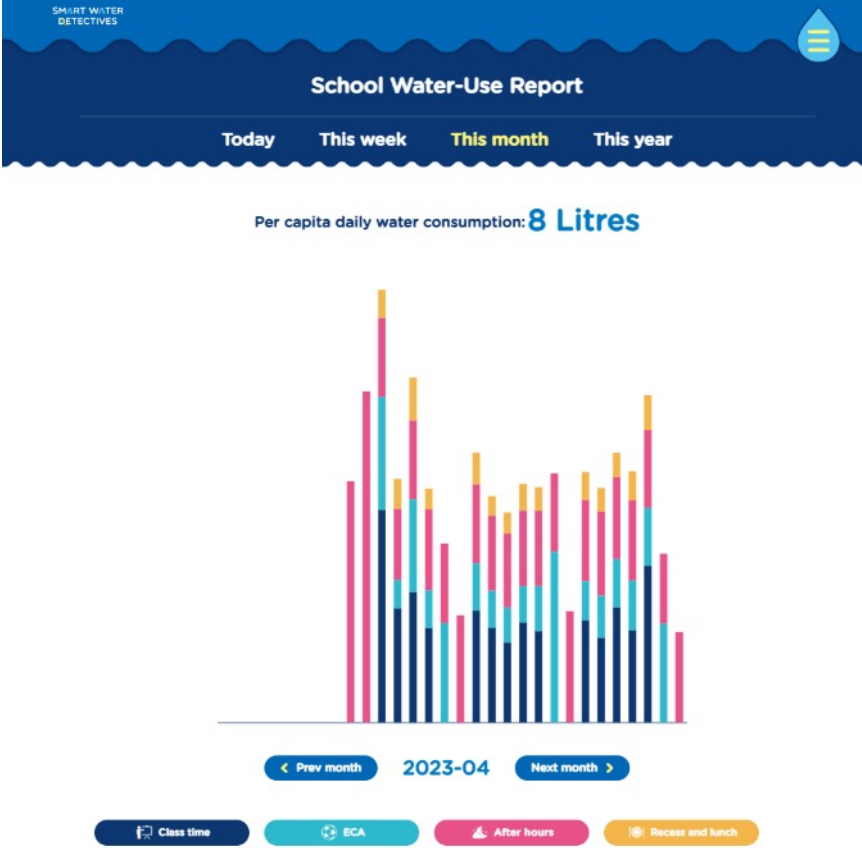
(d) Smart Cities

(f) Use of IT in Education

Visual Demonstration & Outreach

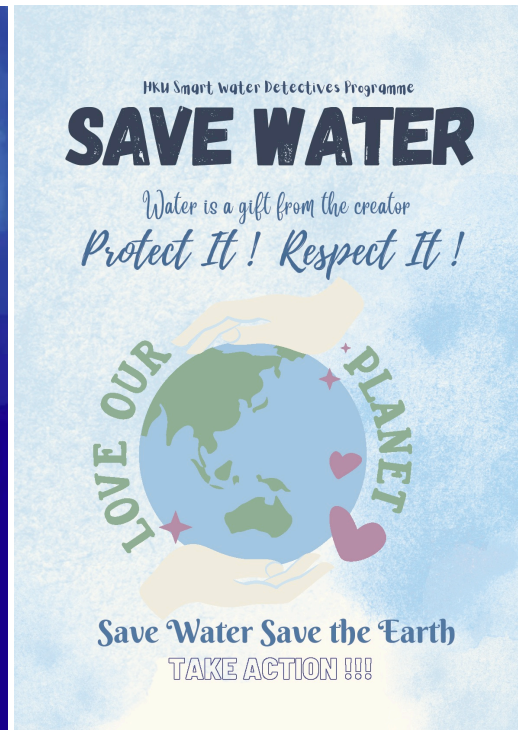
Website

- Water use data platform for 37 student ambassadors and 5 teachers from 5 schools, who shared the results with their respective school community



Posters

- Produced by student ambassadors to promote water conservation in schools
- Reached 5000 students and 320 staff from 5 schools



Posters

HKU-Smart water Detective

Do you know?
Only 0.5% of water on Earth is available for people to use
our school use more water
in CLASS TIME

**SIMPLE ACTIONS
CAN MAKE BIG SAVINGS**

In Hong Kong,
1 person use
153L/day in average

Let's save water together!

Save water

BBQ 慳住「洗」碗法

- 1 把餐具放入第一個盆，沖走表面的醬汁
- 2 把餐具放入第二個盆，用洗碗刷或百潔布刷去污跡
- 3 把餐具放在第三個盆，沖走洗潔精和污跡

BBQ 洗地小貼士

SAVE OUR PLANET!

將要洗的椅凳放埋一齊一次過洗!

請勿玩水

慳住洗!!

用完後記得關水喉!

GO GREEN

SAVE WATER

A LIMITED RESOURCE

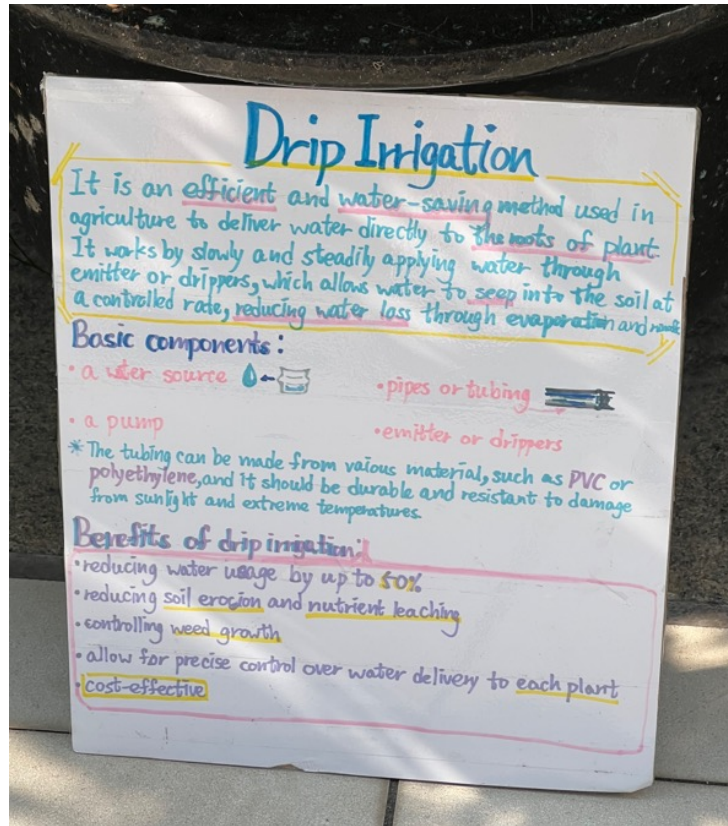
WATER DETECTIVE PROGRAMME

- TAKE SHORT SHOWERS
- REFILL RIGHT AMOUNT OF WATER
- TURN OFF THE TAP WHEN NOT IN USE

CARE FOR OUR COMMON HOME

Exhibition Boards

- Produced by student ambassadors to promote water conservation in schools
- Reached 820 students



Instagram Posts

- Open to the general public
- 33 likes & 13 likes



innowing and hkueee
Tam Wing Fan Innovation Wing, HKU E...

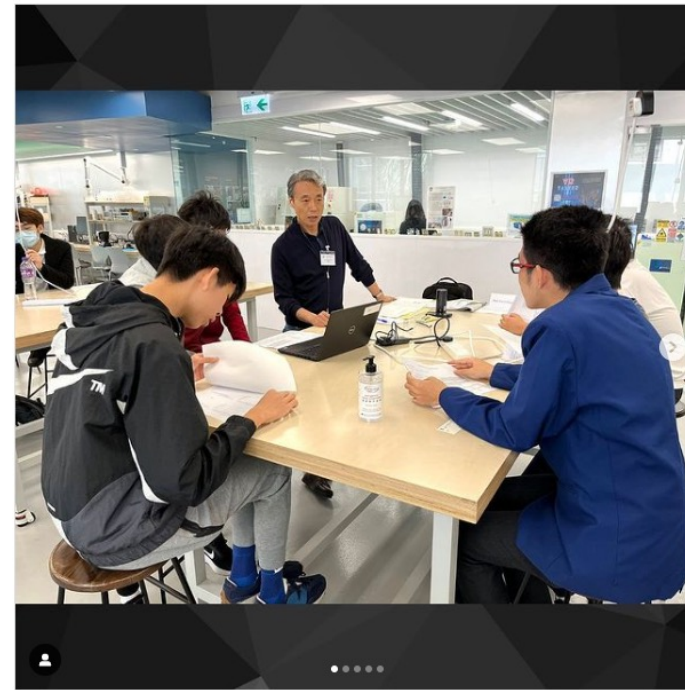
innowing 【 HKU EEE "Smart Water Detectives: A STEM Student Ambassador Programme" 】

📢 The first workshop of the "Smart Water Detectives: A STEM Student Ambassador Programme" was held successfully on Feb 11 by the HKU Department of Electrical and Electronic Engineering @hkueee and the HKU Water Center, at the Innovation Wing @innowing!

Student ambassadors learned about water literacy💧 and the basics of IoT📡.

Can't wait for the next workshop and the positive moves our ambassadors will drive in promoting water conservation among their schoolmates👍😊!

#SmartWaterDetectives
#WaterLiteracy #iot #Sustainability
#stem



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📢 We had an amazing time at our second workshop of the "Smart Water Detectives: A STEM Student Ambassador Programme" by the HKU Department of Electrical and Electronic Engineering @hkueee and the HKU Water Center, at the Innovation Wing @innowing on the 18th of March!

🛠️ Students created 3D printing models to produce signages with water conservation messages for their school. They also became Smart Water Detectives

🔍 by using school-specific water consumption data to formulate water conservation plans.

📌 Keep posted to see their progress from since then and their findings from their final presentation. 🙌😊

#SmartWaterDetectives
#WaterLiteracy #iot #Sustainability
#stem

Instagram Posts

- Open to the general public
- 32 likes



 innowing and hkueee
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 innowing [📍 HKU EEE "Smart Water Detectives: A STEM Student Ambassador Programme"]

📣 The "Smart Water Detectives: A STEM Student Ambassador Programme" has come to a successful conclusion with the Final Presentation and Awards Ceremony by the HKU Department of Electrical and Electronic Engineering @hkueee and the HKU Water Center, at the Innovation Wing @innowing on May 22! 🙌

We are thrilled to announce that all participating schools have successfully reduced their water consumption 💧 by implementing the water-saving plans.

Congratulations to all the winning teams, and a huge thank you to all the student ambassadors and teachers for their incredible efforts in this program!

Let us continue working together to reduce the impacts on the climate system and contribute to a more sustainable future by reducing water consumption. 🙌😊

#SmartWaterDetectives
#WaterLiteracy #iot
#waterconservation
#environmentalprotection #stem
#steam #innowing

Instagram Posts

- Produced by student ambassadors to promote water conservation in schools
- Open to the general public
- 100 likes



stmc_geog_club Hiii 🙋 ~ 大家知唔知道學校最近嘅用水狀況系點呢? 你又估唔估到平時學校用水最多嘅日子和地方係咩呢? 😊

圖二: 呢張圖就記錄咗我地學校嘅10/3嘅平均用水量

圖三: 現在學校用水嘅地方大概有日常清潔、廁所沖水、課室清潔、中藥園淋花、珊瑚換水等

圖四: 另外可以明顯見到除左嘅返學時段外, 嘅大概17:00同21:00呢兩個時間點嘅用水率突出好多, 可以去到每分鐘70幾L!!!! 📈

大家應該都估到系呢個用水量, 正係大家平時開始BBQ前洗餐具同埋BBQ結束後清潔時唔節約, 甚至冇意識地用水所造成的🙄

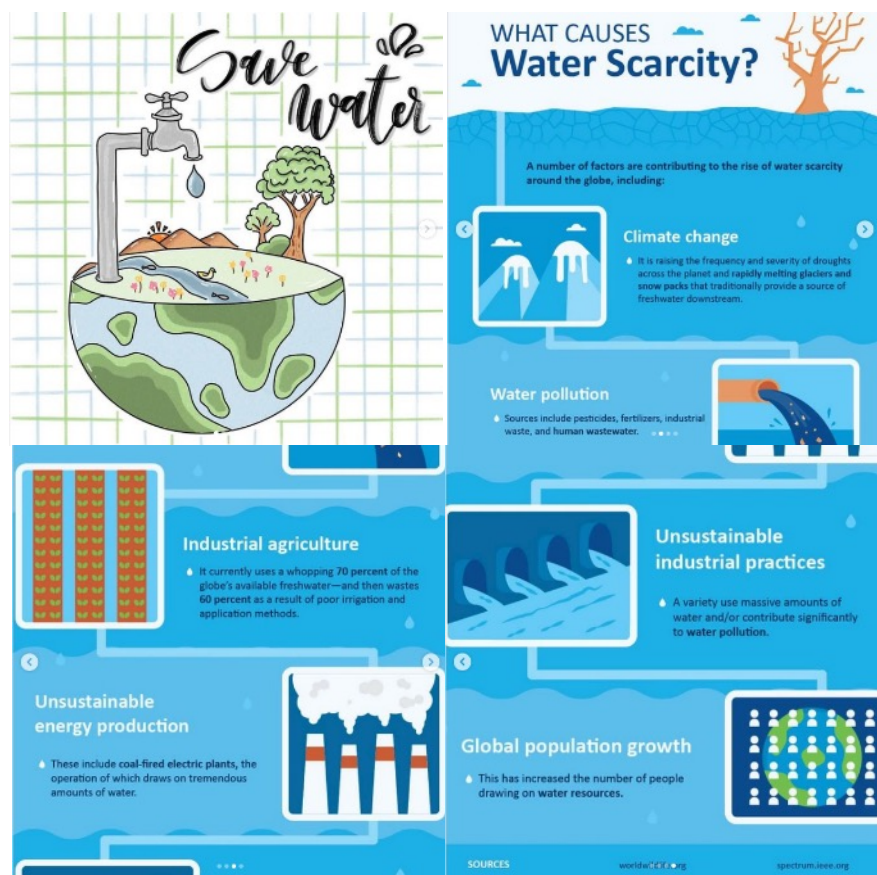
圖五: 所以希望大家下次BBQ或者用水果陣, 都要記得“慳住洗”, 適量用水 🌟👍
亦都希望大家平日用水都多注意用水量, 減少浪費, 咁先可以有效地降低總體用水量, 為環保作一份貢獻 🌍
❤️🍴

最後, 預告翻遲d我地都會出一個post 提翻節約用水嘅重要 🍃, 同埋BBQ嘅前後可以點樣比較慳水咁進行清潔 🍴🙄, 大家敬請期待~ 謝謝 🙏❤️

#smartwaterdetectives

Instagram Posts

- 54 likes



stmc_geog_club 唔知大家有幾常聽到節約用水呢樣嘢? ✨
等我同大家重溫吓節約用水嘅重要同埋現時世界各地缺乏水資源嘅情況啦~ 雖然宜家大家可能都比較少聽到關於節約用水的問題👉
但係其實缺乏水資源嘅問題一直冇改善過, 反而係更加嚴重🔴😞

其實我哋一路用開嘅水資源都係好有限的
全球只有2.5%系淡水及少於1%嘅水資源係適合人類直接使用💧

隨着人口不斷增加、缺乏清潔水源、水資源分配不均和氣候變化等的問題, 水危機問題亦都變得越嚟越嚴峻🔴
(圖:2-4)

E.g.

1.全球用水量在20世紀增加了六倍, 其增長速度是人口增速的兩倍。現時全球約五分之一人口沒有清潔的飲用水。到了2025年, 全球約有三分之二人口將會面臨中等至嚴重的缺水問題!本地收集所得的雨水只可滿足本港二至三成的用水需求, 其餘七至八成的用水, 是用來自廣東省的東江水。

2.有3億人口缺乏足夠嘅飲用水而呢啲缺水地區嘅水資源主要係來自地下水同埋降雨☔
但由於氣候變化同人口增長嘅因素, 水資源日益減少, 導致水危機嘅問題變得更加嚴重😞

所以我哋應該透過節約用水去保護我哋嘅地球🌍
我哋可以透過節約用水減少水源污染同埋地下水水位下降等問題發生
一齊幫助處於水資源短缺嘅地區以應對氣候變化所帶來的挑戰為地球貢獻出一分力👉❤️👉🌍

credi:worldwildlife.org

#smartwaterdetectives

Instagram Posts

• 98 likes



stmc_geog_club §

上個post提到原來沙循用水最多嘅時段係BBQ嘅開始同結束時候，用水量多到1分鐘就已經咁成個浴缸咁多嘅水👉

🤔
咁我哋點樣幫忙減低BBQ時段嘅用水量呢？

以下我哋就帶嚟「沙循BBQ慳水小貼士」🌟

圖二：貼士no.1— 慳住「洗」碗法👉
我哋喺地下水喉隔離增設咗一個BBQ洗碗站，嗰度有3個膠盆，2對手套，3個洗碗刷，2塊百潔布同埋1支洗潔精比同學走餐具嘅時候使用，大家見到就擺去用啦👉 用完記得放返喺原位呀！

圖三：慳住「洗」碗法步驟👉
Step 1. 把餐具放入第一個盆，沖走表面嘅醬汁
Step 2. 把餐具放入第二個盆，用洗碗刷或百潔布洗去污跡
Step 3. 把餐具放在第三個盆，沖走洗潔精和污跡

圖四：貼士no.2— *自備餐具*👉
為咗衛生同避免太多人堆埋喺地下洗餐具，請同學BBQ嗰陣時記得自備餐具亦都請每班嘅班長喺BBQ前一日寫黑板，提醒同學自己帶餐具💡

圖五：貼士no.3— *請勿玩水*👉
BBQ完之後，可以將要洗嘅枱凳搬埋喺一齊，然後先至再用水喉一次過沖乾淨，縮短洗地嘅時間，咁就可以減少浪費水👉
同埋知道同學有得BBQ都好興奮，但係請同學唔好喺洗地嘅時候擺住水喉玩水

圖六：我哋學校參加咗港大嘅慳水計劃，目的就係想解決每間學校浪費水嘅問題，嚟到去減低學校嘅用水量。港大已經喺我哋學校嘅水管入邊裝咗水錶去記錄我哋每日嘅用水量，所以各位同學記得一齊幫學校慳住「洗」👉

#smartwaterdetectives

KE Outcomes & Impact

KE outcomes and impact

The Smart Water Detectives project is an innovative, one-of-a-kind interdisciplinary collaboration with aims to enhance secondary school students' understanding of water sustainability issues, and improve understanding of how smart technologies can be used to collect water usage data in schools. Spanning from January to May 2023, Dr. Edith Ngai, Principal Investigator and Associate Professor from the Department of Electrical and Electronic Engineering, joined hands with the HKU Water Centre to engage 37 student ambassadors and 5 teachers from 5 secondary schools in formulating water conservation plans for their schools.

Through workshops, students learnt about water resources in Hong Kong, and the inextricable relations between water consumption, ecology and our climate system. They were also introduced to the Smart Meter Analyser, which was invented by the project team to collect schools' water usage data. Students then engaged in an intense and exciting competition, where they designed and executed a water conservation campaign over a three-week period to engage their school community in sustainable water use. With their interventions, a whopping total of 118,008 litres of water was saved across all schools by the end of these three weeks.

Through this project, students developed a better understanding and appreciation of our water usages, and learnt about water usage habits in their schools. Furthermore, they discovered how smart technology can create interactive ways to tackle unusually high water usage. Students and teachers responded positively to the project, and expressed a continued commitment towards sustainable water use in their schools and personal lives.

知識交流的成果和影響

「識水偵探計劃」是一項創新的跨學科合作計劃，旨在透過應用資訊科技及物聯網技術，加強中學生對水資源可持續議題的理解。在2023年上旬，香港大學電機電子工程系副教授倪卓嫻博士帶領水資源技術與政策研究中心的團隊，邀請來自5間中學，共37名學生參與計劃。

此計劃利用由團隊研發的智能水錶讀取儀收集學校的用水數據作分析，學生們親自為學校制定為期三週的節水計劃，進行比賽，總共節省了 118,008 升水。學生們體現到如何應用資訊科技來分析學校用水情況，並找出用水量偏高的用途。他們都對此計劃反應積極，表示將繼續致力於在學校和個人生活中實踐可持續用水。

KE Activities

Workshop I - Water Literacy & Internet of Things (IoT)

Date: February 11, 2023 (Saturday)

Time: 10:30 am – 12:30 pm

No. of attendees: 33



Workshop II - Hands-on Workshop & Water-Saving Plans

Date: March 18, 2023 (Saturday)

Time: 9:30 am – 12:50 pm

No. of attendees: 36



Execution of Water Saving Plans

Date: April 17 – May 5, 2023

No. of attendees: 5000 students and 320 staff from 5 schools



School Talk at Wah Yan College, Hong Kong

Date: May 11, 2023 (Thursday)

Time: 3:10 pm – 3:40 pm

No. of attendees: 240 students

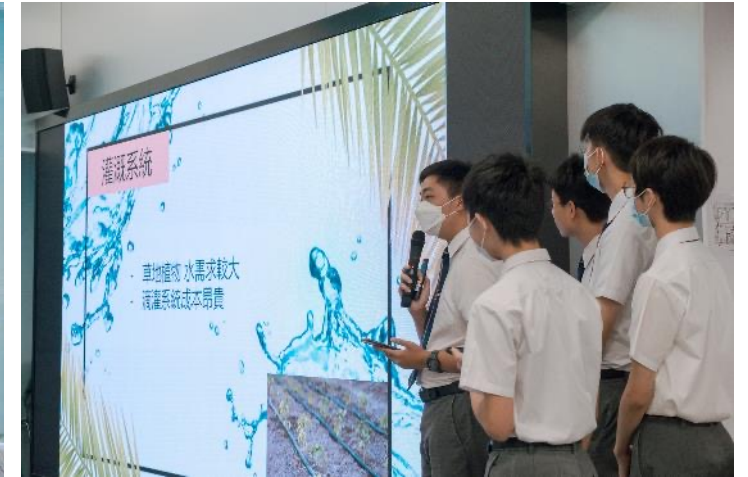


Final Presentation and Awards Presentation Ceremony

Date: May 20, 2023 (Saturday)

Time: 10:00 am – 12:30 pm

No. of attendees: 35



School Talk at N.T. Heung Yee Kuk Yuen Long District
Secondary School

Date: May 23, 2023 (Tuesday)

Time: 1:30 pm – 2:10 pm

No. of attendees: 150

