3.36 嘉諾撒聖家書院 – Traffic Light Arduino Workshop

Teacher Name	Mr Nicolas Chan, Ms Crystal Choi, Mr Newton Wong, Mr Marcus Li
Subject	Information and Communication Technology
Subject Level	S2
Learning Objectives	- To enhance skills in applying Arduino in creating simple devices - To enhance skills in using TinkerCAD in circuit planning - To enhance skills in using input and output devices - To synthesis a basic circuit that simulates traffic lights
Applied e-Learning platform and tools	Arduino, LED lights, breadboard, push buttons, resistors, TinkerCAD

Introduction of Lesson Design

To deepen students' understanding and application of Arduino boards, this project was done for all S2 students in activity periods. There were three sessions for each class and they involve theories and planning with TinkerCAD, followed by application with breadboard and real electronic devices. Students were divided into small groups to synthesize a mini circuit which simulates traffic lights as the final product.

Learning Effectiveness Assessment

Even when it was the first time for most S2 students to use breadboard, electric wires and small gadgets, it was observed that they quickly grew used to it and was able to construct a circuit efficiently. The use of TinkerCAD in circuit planning helped students a lot in turning theory into practice. With the addition of push buttons, tasks of various levels of difficulties were able to stimulate students' problem-solving mind. It was observed that all students enjoyed the workshop and gained a sense of satisfaction after completing the challenges.

Innovativeness, Continuity and universality of design

The use of Arduino board was still very new to our junior form students. It is expected that another workshop on Arduino will be held in 2022-23 to further students' understanding and application of Arduino in making various technological products. The topic might be traffic lights for S2 but that for S3 needs to be more advanced, such as smart home devices or a device that tackle the troubles the elderly face every day.

Reflection of Teaching and Learning

The use of TinkerCAD was able to combine both theory and practice: this is a major reason why this workshop was successful to give students a sense of satisfaction and fulfilment. With a more emphasis on the application, students would be more motivated to finish the project and tackle challenges.

It was also observed that some free-riders, or students who were less involved existed when the group size was six. Therefore, it is suggested that group size can be arranged as two to four in 2022-23 to ensure sufficient participation of every group member.

It was also suggested that this workshop can be a cross-KLA activity in S2 ICT and IS lessons in the curriculum plans, in order to integrate students' learning from both subjects and foster the collaboration between the two departments.