CASE STUDY

LITTLE INVENTORS INSPIRED BY DESIGN THINKING TO ADDRESS SOCIAL NEEDS

Many studies highlight that, instead of focusing on specialised knowledge, high intelligence, discipline and the ability to work independently, talent development in the 21st century should focus on these attributes: creativity and imagination, critical thinking and problem solving, as well as communication, collaboration, character education and having a sense of global citizenship. Therefore, the education sector also needs to change with the times change, redesigning its system and curriculums to nurture the next generation for the society.

As such, King's College Old Boys' Association Primary School No.2 (KCOBAPS2) introduced design thinking into its interdisciplinary project studies for Primary 5 and 6 students in 2017/18.The initiative encourages students to use their empathy to observe their surroundings and create small inventions to answer those needs, through which students can acquire the suitable skills to survive the 21st century. "Conventional education system focuses on textbook learning, offering students little room to solve problems with creativity or through collaboration. Therefore, starting from 2017, we have decided to use class hours flexibly and design year-round interdisciplinary study activities for students in order to create some changes," said Mr. Wu Kwok Chu, Assistant Principal of KCOBAPS2.

Mr. Wu believed that the workshops organised by the school could help teachers understand design thinking and practice it in the classroom.

Helping students to grow empathy

Mr. Wu believed that it is important to help teachers understand the essence of design thinking in order to promote it at the school successfully. Thus, with the support from the Quality Education Fund, the school organised an "Applying Design Thinking by Teachers" workshop for staff. Mr. Chan King Hong, who heads the school's computer department, is one of the participants.

Mr. Chan said, "In the past, teaching plans were developed by teachers themselves and students could not participate in it. But design thinking starts with empathy, and reminds us to understand and respond to the needs of students from their perspective, such as observing their performance and responses in the classroom, and then trying to figure out why some students underperform." While this approach echoes the ancient Confucius adage of "teaching students according to their aptitude", the interdisciplinary project programme marked a key exploration of the student-centred teaching.

Under the programme, students are divided into groups of 10 and each led by a teacher. "Each group comprises students from different classes and with different abilities and strengths. We would encourage them to divide their tasks according to their interests and strengths, and as they work together, they can learn about teamwork and communication skills," Mr. Chan explained.

He added that the programme included 10 modules that would introduce students to the concept and application of design thinking through everyday examples. "Then the teachers would ask the students to explore the community and the issues within, try to understand others' needs with empathy, and propose solutions accordingly."

Teachers guided students to apply design thinking in the project, observe and discover social problems, and develop the solutions.

Among the projects explored by the students, Mr. Wu was impressed by how students proposed to design an app "Easy Check In" for teachers to take attendance easily, which is otherwise often time-consuming especially during school events. The app makes use of the QR code technology. "Teachers were only facilitators, offering them guidance on how to revise and improve their solutions during the process. The app reflects students' empathy and self-learning ability, and we have been using it during major school events since 2017," said Mr. Wu.

Some students invented the "Smart Massaging Backpack" to alleviate the back pain experienced by the elderly. They shared the R&D process in the interdisciplinary project presentation.

Smart toilet to combat pandemic

Mr. Wu said their school has been participating in Hong Kong Jockey Club's CoolThink@JC programme, and is one of its resource schools that further promote the integration of design thinking and computational thinking education with an aim to encourage students to solve problems with technologies and empathy. For example, in light of the recent global pandemic and the hidden risks associated with public toilets, students Ma Hong Yiu, Wong Tze Hin and Ng Wai Cheung used a popular software Scratch, Lego building blocks, electronic sensors and AI technology to invent a AI smart toilet prototype. "It simulates a toilet seat that opens and closes automatically and can perform touchless flushing. It also allows the user to adjust the self-cleaning schedule according to the frequency of use," noted Wong.

Led by Chan King Hong, head of computer department, (from left) Ma Hong Yiu, Wong Tze Hin and Ng Wai Cheung joined the CoolThink@JC Competition and won the championship (Scratch).

During the R&D process, they interviewed their family members about their perceptions of public toilets and user experience so as to identify their needs and find inspiration. Ng noted, "When making the prototype, we kept consulting our families, and realised that public toilets have a higher number of visitors during weekends, and thus need to be cleansed more frequently. So we use AI technology to enhance the design as it helps determine the cleaning frequency based on the number of visitors on the previous day. We also developed an interface for holidays to allow the user to customise the cleaning frequency."

Mr. Wu was pleased to see that the students gained a better understanding of the human-centred principle of design thinking through these inventions. They also learnt to collaborate as a team, solve problems and learn independently. "These are the essential skills to be mastered by the young generation, and therefore we will continue to incorporate design thinking into other disciplines and strengthen students' capabilities," Mr. Wu said.

Presented by:

Hong Kong Design Centre (HKDC) is a non-governmental organisation founded in 2001, and a strategic partner of the HKSAR Government in establishing Hong Kong as a centre of design excellence in Asia. HKDC continues its public mission in using design and innovation to drive value creation of business development and improve the well-being of society, through the provision of diverse innovation-oriented knowledge sharing and exchange platforms, anchored by five major work directions: CONNECT, CELEBRATE, NURTURE, ADVANCE and ENGAGE.

Unit 602, 6/F, Mill S., The Mills,
45 Pak Tin Par Street, Tsuen Wan, Hong Kong
Telephone: (852) 29229688
Fax: (852) 28922621
Email: info@hkdesigncentre.org