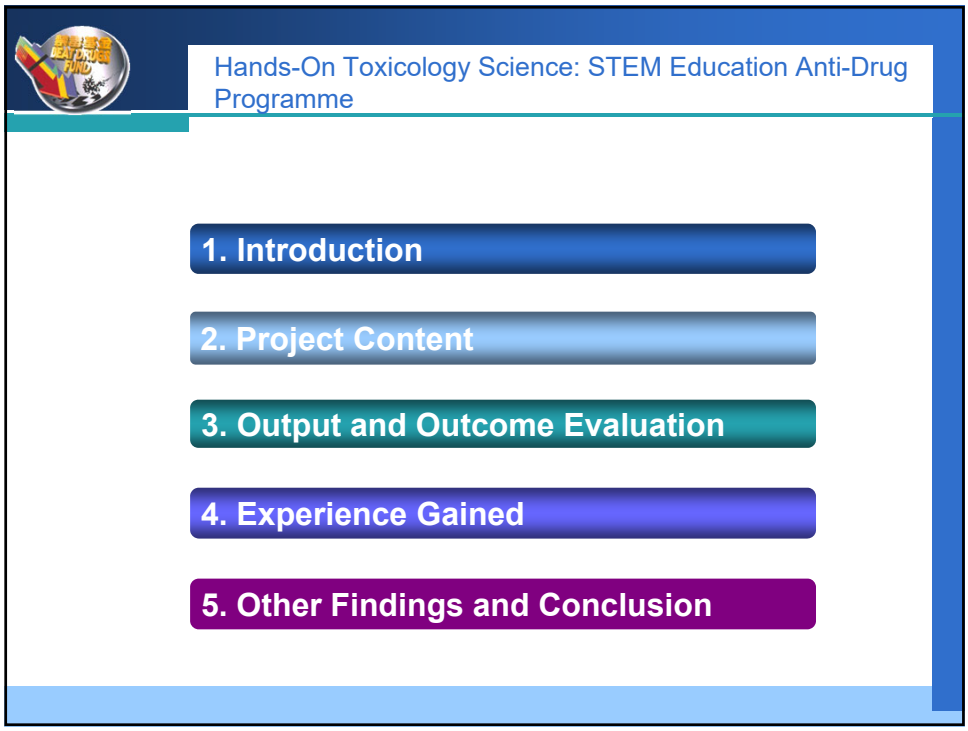

1st July, 2021 to 30th June 2023
Hands-On Toxicology Science: STEM Education
Anti-Drug Programme
BDF 200003
The Hong Kong Federation of Youth Groups


Hands-On Toxicology Science: STEM Education Anti-Drug Programme
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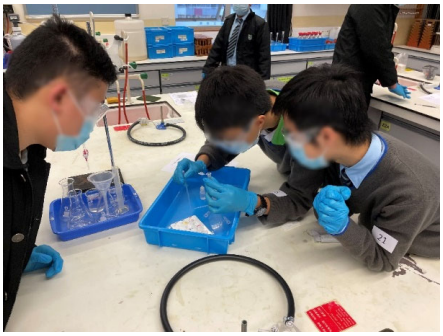
Introduction

- Hands-on Toxicology Science: STEM Education Anti-drug Programme is a territory-wide, preventive drug education project that aims to educate youth about the adverse effect of recreational drugs with STEM exposure, in order to increase their anti-drug awareness.
- The programme was the first to integrate the latest trend in education— STEM education approach, in anti-drug education sector. STEM education is an interdisciplinary and applied learning approach in Science, Technology, Engineering and Mathematics. STEM effectively cultivates the critical and analytical mindset for student, which are crucial in rejecting drugs.
- The programme developed 4 curricula, namely, forensic toxicology, data science, neuroscience and design thinking. With extensive hands-on activities, the students learned about the harmful effect of drug abuse in different scientific aspects, therefore to increase their anti-drug awareness.
- Aside from anti-drug workshops for secondary school students, the project also conducted teachers trainings, STEM anti-drug ambassador trainings for tertiary students. The project also conducted announcement conference and delivered anti-drug STEM kits to all secondary schools to further extend the impact to more youngsters.

Project Content

- **A1 Anti-drug STEM Workshops for Secondary Schools and Community Centres**
- Anti-drug STEM workshops in toxicology, neuroscience, data science or design thinking were carried out to secondary school students. The students had participated in hands-on activities to learn about the knowledge and rectify the misconception about drugs.

Students observed brain neurons under microscope to learn about the detrimental effect of ketamine to brain.



Students conducted spot test, a preliminary test to identify chemical from unknown samples.

Project Content

- **A2 Anti-drug STEM Training Workshops for Secondary School Teachers**
- The teachers learned about the adverse effect of drug in lecture and hands-on activities from the training workshops. The training also covered the experience and teaching strategies to effectively increase the anti-drug attitude for the students.

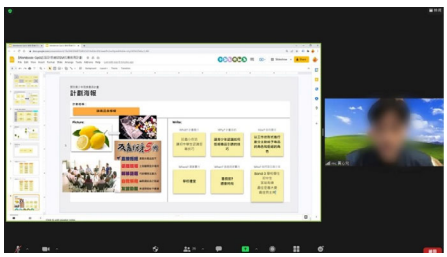
Prof. Kim Chow, course developer of neuroscience conducted teachers training on ketamine and its effects on neural system.

Mr. Henry Tam, course developer of design thinking conducted teachers training on design thinking as a teaching strategy to increase the students empathy, specifically on understanding the psychosocial effect from cannabis abuse.

Project Content

- **A3 Anti-drug Ambassadors Training Workshops for Tertiary Students**
- The training workshops were specifically designed for tertiary students who were interested in developing their career in education. The training covered not only the workshop contents, but also workshop on extended drug knowledge, curriculum development and classroom management. Therefore, the participants had increased efficacy in conducting anti-drug STEM workshops. Selected ambassadors were invited to assist in subsequent anti-drug workshops for schools. It empowers them to spread the anti-drug attitude and positive lifestyle to more youth.

Anti-drug ambassadors conducted titration experiment, a quantitative method for chemical. And strict sentence corresponded to the amount and type of drug in drug trafficking.



Anti-drug ambassador proposed innovative idea for high-risk youth in design thinking workshop.

Project Content

- **A4 Anti-drug STEM Teaching Kit Announcement Conference**
- Anti-drug STEM Teaching Kit Announcement Conference was conducted to highlight the innovative use of interactive STEM education in preventive drug. Apart from announcement of the teaching kit by the curriculum developers, teachers and Anti-drug Ambassadors who completed the training were invited to share their experiences in participating project and implementing STEM in anti-drug education.

Teachers learned about the workshop content and experienced the activities at the Conference.

Teachers and anti-drug ambassador completed the training workshops shared their experience in learning and implementing anti-drug STEM workshops at schools.

Project Content

- **A5 Anti-drug STEM Teaching Kit for Secondary Schools**
- Free Anti-drug STEM Teaching Kit was produced and dispatched to all secondary schools in Hong Kong after collecting and implementing the feedback of the 4 workshops. The kit included the teaching materials of all 8 workshops, e.g. Teaching plan, PowerPoint and worksheet.

Anti-drug STEM Teaching Kit and activities materials (i.e. chemicals, microscopic slides) were distributed to the participants at the announcement conference.

The Anti-drug STEM Teaching Kit dispatched to all secondary school. It included the teaching plan, drug knowledge and a QR code to download all course materials.

Project Content

Activity 1	Activity 2	Activity 3	Activity 4	Activity 5
Anti-drug STEM Workshops for Secondary Schools and Community Centres	Anti-drug STEM Training Workshops for Secondary School Teachers	Anti-drug Ambassadors Training Workshops for Tertiary Students	Anti-drug STEM Teaching Kit Announcement Conference	Anti-drug STEM Teaching Kit for Secondary Schools

Output and Outcome Evaluation

- Evaluation methods
- Output and outcome benchmarks
- Evaluation results

Output Evaluation

	Expected Result	Achieved Result	Remark
Output Indicator 1	Deliver 90 sessions to no less than 2,700 secondary students, among which 2,500 students attend at least one session	Deliver 104 sessions to no less than 3,829 secondary students, among which 3,228 students attend at least one session	N/A
Output Indicator 2	Deliver 8 sessions of training workshops to no less than 160 secondary school teachers, among which 134 teachers attend at least one session	Deliver 10 sessions of training workshops to no less than 207 secondary school teachers, among which 150 teachers attend at least one session	N/A
Output Indicator 3	Deliver no less than 12 sessions of training workshops to 60 tertiary students, among which 50 tertiary students attend at least 4 sessions	Deliver 13 sessions of training workshops to 60 tertiary students, among which 56 tertiary students attend at least 4 sessions	N/A
Output Indicator 4	Produce and deliver 1,000 sets of anti-drugs STEM teaching kit to secondary schools	Produce and deliver 1,070 sets of anti-drugs STEM teaching kit to secondary schools	N/A
Output Indicator 5	Recruit 100 secondary school teachers to attend the Announcement Conference, among which 80 teachers attend the conference	Recruit 136 secondary school teachers to attend the Announcement Conference, among which 85 teachers attend the conference	N/A

Outcome Evaluation

	Expected Result	Achieved Result	Remark
Outcome Indicator 1	Participants gain knowledge about the harmful effect of drugs (70% of participants gain knowledge about the harmful effect of drugs or statistical significant gain in knowledge about the harmful effect of drugs as indicated by paired t-test)	500 sets of questionnaires collected. 79.2% of participants gained knowledge about the harmful effect of drugs	N/A
Outcome Indicator 2	Participants show improvement in self-efficacy to refuse drugs (70% of participants show improvement in self-efficacy to refuse drugs or statistical significant improvement in self-efficacy to refuse drugs as indicated by paired t-test)	500 sets of questionnaires collected. 77.4% of participants showed improvement in self-efficacy to refuse drugs	N/A
Outcome Indicator 3	Participants gain practical skills to conduct anti-drug STEM workshop activities (70% of participants gain practical skills to conduct workshop activities)	150 sets of questionnaires collected. 97.3% of participants gained practical skills conducting anti-drug STEM workshop activities	N/A
Outcome Indicator 4	Participants gain practical skills to conduct anti-drug STEM workshop activities (70% of participants gain practical skills to conduct workshop activities)	56 sets of questionnaires collected. 98.2% of participants gained practical skills conducting anti-drug STEM workshop activities	N/A
Outcome Indicator 5	Teacher agree to introduce anti-drug STEM teaching material to other teachers (70% of teachers agree to introduce anti-drug STEM teaching material to other teachers)	150 sets of questionnaires collected.. 90% of participants agreed to introduce anti-drug STEM teaching material to other teachers	N/A

Experience Gained

- Reason behind success
- Lesson learnt

Experience Gained

Experience Gained

Online workshop readily available during COVID	Partnership with educational institutions	Applied learning with hands-on activities	Extended impact with teachers trainings and support
During COVID-19, the government had set up a series of social distancing measures. School-based programme activities were greatly affected by school suspension. The programme had developed online workshops for all 4 themes. All project activities were able to be conducted online so that the output target could be met during the period of pandemic.	The workshops were collaboratively developed by educational institutions and HKFYG. Their domain knowledge had enriched the content of the curricula and provided innovative and unique learning experience for the participants. HKFYG adjusted the curricula based on feedbacks and actual needs of the participants.	The anti-drug STEM workshop covered different STEM domains and it effectively engaged the students' active participation with unique hands-on activities. The students developed collaborative skill, empathy and analytical mindsets in the workshop which were crucial in learning the danger of drug abuse and increasing the efficacy to reject drugs.	The project brought innovative approach to anti-drug education for students. It is equally important to encourage educators to learn and apply this anti-drug education approach, in order to extend anti-drug attitude to more youth. Teachers training workshops and anti-drug ambassador trainings were organized to inspire the educators. It is observed that some schools are adapting to STEM anti-drug education to their teaching.

Conclusion

- Hands-on Toxicology Science: STEM Education Anti-drug Programme renovated the preventive anti-drug education by integrating the STEM teaching approach. 4 themed anti-drug workshops were developed to bring engaging and active learning experience for students. The project had conducted 104 sessions of workshops to over 3200 secondary students. Students does not only gain knowledge about the harmful effects of drugs, but also develop a set of future skills, namely, self-efficacy, critical thinking, collaborative skills, analytical mindsets which were important to maintain positive lifestyle and help them excel in the future.
- Aside from workshops, the project aims to extend the impact by teachers training and supports. 10 sessions of teachers training, 13 anti-drug ambassador trainings, announcement conference had organized and STEM kits were dispatched to inspire and encourage more educators to implement the anti-drug workshops at their school. The participants had increased practical skills and teachers had agreed to share the content to other teachers.
- The overwhelming support and positive feedbacks from teachers and students had shown that the project effectively matched the need for interactive and innovative anti-drug education for youth. It is suggested the project to be continued in a larger scale. In policy address 2022, the Chief Executive put forward STEAM education in primary and secondary schools. It is suggested that the project could be extended to primary schoolers to build a solid foundation in drug knowledge.
- Beside, in the process from STEM to STEAM, new elements emerge such as AI, coding, art, and technologies. New curricula could be developed to join the latest direction in education. For instance, AI chatbot workshop, UX/UI design workshop, etc. The workshops not only increase their knowledge about drug, but also empower them to apply the learnt into new anti-drug service ideas. As a result, the students adopt the anti-drug attitude and spread the awareness to more youth.