

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: A self-learning statistical platform for students of linguistics and humanities****Principal supervisor and unit: Prof. Zhenguang Cai (Department of Linguistics and Modern Languages)****Project objectives**

The objective of the micro-modules is to facilitate statistical learning for students of linguistics and humanities. I have designed recorded tutorials for students to practice statistics using R. These micro-modules can further consolidate students' statistical knowledge and skills learned from relevant lectures.

Activities, process and outcomes

We have recorded 24 tutorial topics in video format. These tutorials cover a range of common statistics used in language sciences (e.g., descriptive statistics, t-tests, anova, regression). These tutorials were uploaded onto Blackboard, where students of Quantitative Methods for Linguistics (LING3403) could access as an off-class activity to consolidate statistical skills. Students also discussed with the lecturer (the PI) and TAs regarding the practices offered in the tutorials.

Deliverables and evaluation

The project resulted in 24 video tutorials (https://blackboard.cuhk.edu.hk/ultra/courses/_152159_1/cl/outline). These can be re-used for students to practice statistical skills.

Dissemination, diffusion and sharing of good practices

The tutorial videos have been showed with students outside LING3403 and also outside CUHK.

Impact on teaching and learning

Students have benefited from extra practice from the tutorial videos. As a lecturer, I have also learned about difficulties students have with statistics from students' feedback on the tutorials.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Essential Language and Critical Skills for World History Micro-Modules****Principal supervisor and unit: Prof. Stuart McManus (Department of History)****Project objectives**

Produce three MM focused on academic English for the new World History (WH) curriculum in order to contribute to internationalization at home and improve transferable skills.

Activities, process and outcomes

The three micromodules are as follows:

1. History-Specific Academic English
This MM focuses on key skills required to communicate in accurate and appropriate academic English for the study of history, in particular the courses in the WH curriculum.
2. Academic Writing Skills for the World History (WH) Curriculum
This MM will focus on various stages of the composition process of the specific types of assessment typical of the WH curriculum, including essays, presentations, source analysis and final projects.
3. Essential Research Skills and Digital Literacy
This MM will focus on teaching students important WH research skills that will be directly applicable in the various assessments in the courses. Here, the advice will be modeled on that given as part of the Departmental Teaching Fellow Program in Harvard's Department of History with relevant adjustments for the particular nature of the WH curriculum. Topics will include a) how to find relevant sources b) how to use online and other digital history resources, c) how to present bibliographical information in their work.

Deliverables and evaluation

- The MM were used in three WH courses over the 2021-22 academic year
- Students read the handbooks, watched the YouTube videos and completed informal assessments of their progress
- Student rating of 4.14/5 overall, with positive comments and areas for improvement
- The YouTube analytics show student engagement with the material.

Dissemination, diffusion and sharing of good practices

- YouTube channel publicly available
- Informal sharing with colleagues in department.
- When the new World History curriculum is up and running next year, the MM will be included in all of its classes.

Impact on teaching and learning

- In general, the students were grateful for the additional resources, as it seems that their English classes do not cover history-specific writing.
- In grading student work, we were able to refer directly to the handbooks and videos of the MM when directing students to other resources, and pointing out particular errors.
- We will keep an eye out for comments about the MM in the end-of-term evaluations.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Interactive Speaking Platform (ISP)****Principal supervisor and unit: Ms. Lui Yin Ling Carly (English Language Teaching Unit)****Project Summary**

The JIM starts with an introductory video followed by three micro-modules (MM). The “Teaching” MM gives instructional input in the form of videos and supplementary notes on four key question job interview types (i.e. self-introduction, common questions, behavioral-based questions and challenging questions) and the recommended response strategies. The “Demonstration” MM shows the modelling with four material sets corresponding to the question types covered in the first MM. Each set includes a candidate’s interview documents, one unsatisfactory performance video, one improved performance video and supplementary notes. Finally, the “Practice” MM offers students opportunities to practise interview skills individually and with a peer tutor by booking a practice slot via the Peer Tutoring Scheme run by ELTU.

Because of the makeover, the ISM has been similarly laid out. It begins with a welcoming video followed by three MMs, “Teaching”, “Demonstration” and “Practice”.

The ISP houses two modules to enhance students’ interview skills and impromptu speaking skills. The learning platform can also serve as a resource for the entire university community by providing readily made materials for English courses covering similar skills, supporting a wider range of teaching practices, and offering learners self-access materials.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Audio-Visual Flipped Classroom Materials for Elementary Putonghua Listening & Speaking I

Principal supervisor and unit: Ms. Liu Zhenxia (Yale-China Chinese Language Centre)

Project objectives

This project aimed to create 10 micro-modules (MMs) for CLCP1123. Included in the MMs are voiceover PPTs, animations, and quizzes, all of which serve as reference materials for students to prepare for lecture, but can also function as review materials as well. Ultimately, the goal was for students taking CLCP1123 to have an enhanced learning experience.

Activities, process and outcomes

The project team used Animaker to create the animations for the textbook dialogues, Microsoft PPT to create the voiceover PPTs, and Panopto to create the quizzes. Blackboard and YouTube were used as platforms for students to access the materials. Feedback was collected from students in the Spring 2021 semester and adjustments were made accordingly.

Deliverables and evaluation

The MMs in this project were created so that students can study the basics of each lesson before lecture so that more class time can be devoted to practicing and applying the knowledge (active learning) rather than the teacher lecturing (passive learning). A total of 28 animations and 32 voiceover PPTs were produced.

Dissemination, diffusion and sharing of good practices

The project was presented at the CU Expo 2021 and won the commendation award for pedagogical innovation. Furthermore, the project outcomes were shared in CLC's newsletter, Language Matters.

Impact on teaching and learning

As students can better prepare for lecture by going through the MMs first, more lecture time can be dedicated to active learning (application), improving the overall structure of the course.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Appreciation of Western Classical Music through Flipped-classroom and Listen-based Learning**

Principal supervisor and unit: **Prof. Wong Cheong Wai Ling (Department of Music)**

Project objectives

The project aims to enabling students of UGED 2080 Appreciation of Western Classical Music course to learn through a flipped-classroom setting with recourse to a set of micro-modules, the narratives of which is in Cantonese, that cater for the varied musical backgrounds of our students. This enables students to learn through their mother tongue and focus on the key learning outcome of achieving well-informed aural perception of Western classical music.

Activities, process and outcomes

Six micro-modules—each of them lasts for approximately 10 minutes—were created in the form of videos that include PowerPoint slides, Cantonese voice-over, and musical excerpts. To provide students with enriching listening experiences, the musical examples are live music recordings of performances by CUHK students and graduates instead of computer-generated music. In addition, four to six reviewing questions are provided alongside with each micro-module for students to gauge their understanding of the contents.

Deliverables and evaluation

The micro-modules were shared with students enrolled in a MA in Music course offered in September 2021. After viewing the micro-modules, they were invited to voluntarily fill in an online questionnaire, which includes questions that evaluate aspects including the micro-modules' clarity, level of stimulation, and effectiveness on enhancing viewers' knowledge in the subject.

Dissemination, diffusion and sharing of good practices

These micro-modules are planned to upload to YouTube as unlisted videos for easy viewing. There is also potential for using the micro-modules as supplementary learning materials for students enrolled in music courses and for secondary students who take DSE Music as electives.

Impact on teaching and learning

The micro-modules with enriching visual and auditory experiences provide an alternative pathway for students to acquire knowledge apart than reading. Students are also motivated to develop a self-learning routine during the process of viewing the micro-modules as lecture preparation. In addition, lecture-time are released for more in-class interaction.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Instrument Demonstrations: Micro-modules on Extended Techniques for Music Composition Courses**

Principal supervisor and unit: **Prof. Lee Wan Ki Wendy (Department of Music)**

Project objectives

This project aims to produce micro-modules on contemporary extended techniques for use in undergraduate and postgraduate music composition courses. Such online videos have proven to be important especially under the impact of COVID-19, which has restricted the possibility of live demonstrations in classes.

Activities, process and outcomes

Five professional performers who are experts on contemporary extended techniques will provide demonstrations and insights. Each micro-module will offer quick and practical information on: a) the sound of each technique, b) how to notate each technique on the musical score, and c) the limitations of each technique.

Deliverables and evaluation

A total of 59 videos have been produced. Surveys were conducted in Fall 2021. Students were also encouraged to provide written reflections over e-mail personally or on Blackboard. It was found that for both undergraduate and postgraduate levels, most students highly recommend the videos.

Dissemination, diffusion and sharing of good practices

All the micro-modules produced in this project are uploaded onto YouTube. As of now, this YouTube channel has 35,520 views and 683 subscribers from all over the world.

The micro-modules produced in this project can be used in future offerings of the same course and/or of different music composition courses.

Impact on teaching and learning

The micro-modules produced in this project would greatly enhance students' knowledge of the current global trends in the field of contemporary classical music. Students will not only have a solid foundation of the extended techniques used on the specific instruments that are being featured, but they will understand how such techniques can be applied to other instruments that belong to the same family as well.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Micro-Modules for Sign Language in Education****Principal supervisor and unit: Prof. Tang Wai Lan Gladys (Department of Linguistics and Modern Languages)****Project objectives**

This TDLEG project aims at providing students of Bimodal Bilingual Studies (“BMBL3001 Sign Language in Education”) with visual learning resources that enhance their understanding of different approaches in deaf education and the benefits of sign language in educating students with diverse abilities, including deafness. The project objectives include the following:

- to facilitate the Flipped Classroom Teaching of the course
- to enhance students’ understanding on the related topics and support their learning in the course

Activities, process and outcomes

After reviewing the existing teaching resources, 4 themes of micro-modules were identified. 10 Presentation videos and interview-based video in total were produced to facilitate teaching and enrich visual learning materials for the BMBL courses. The micro-modules were adopted in the course “BMBL3001 Sign Language in Education” during the first semester of 2021-22. A questionnaire survey and focus group interview were conducted to evaluate the effectiveness and students’ satisfaction on the micro-modules.

Deliverables and evaluation

10 short videos including 9 presentation videos and 1 extracted interview video were produced under 4 sets of micro-modules: (1) History of deaf education; (2) Educational placement of the deaf (3) Sign language for atypical population; (4) The effects of sign language on language, cognitive and psychological development.

According to the result of the questionnaire survey and focus group interview, most of the students agreed the micro-module videos were good online learning resources to support their learning and enhance their understanding of the topics. The idea of producing more micro-modules in a similar way was highly welcomed by the students. From the results of the evaluation, the objectives of the project have been achieved.

Dissemination, diffusion and sharing of good practices

The micro-modules were adopted to support the teaching in the BMBL 3001 Sign Language in Education course in the first semester 2021-22 as a trial. Despite BMBL 3001, the micro-modules can also be used in other courses of Bilingual Bimodal Studies, Linguistics, Minor in HKSL, General Education, training in special education under the School of Education, as well as the public seminars to professionals and general public on the use of sign language and SEN support in education.

Impact on teaching and learning

The development of the micro-modules can promoted active learning and encouraged students to have pre-class preparation instead of attending the lesson without any understanding of the topics. Both teaching and learning became more effective as the instructor spent more time on expanding ideas and discussing related issues in depth.

Since the micro-modules are related to the use of sign language in educating students with different disabilities, the project can nurture a sense of inclusiveness and diversity in the educational context among students, which echoes one of the goals of the University.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Video Lecturers for a First-Year Music Foundation Course****Principal supervisor and unit: Dr. Poon Kiu Tung (Department of Music)****Project objectives**

COVID-19 pandemic has accelerated the change from physical classrooms to online learning. To students, real-time lectures are no different from any lecture videos available online. To teachers, students' participation dropped, and it is hard to tell if students are catching up and being engaged in traditional lectures. The project aimed to turn knowledge-based lectures into flipped classrooms by providing students video lectures prior to classroom learning and engaging them with in-class active learning activities.

Activities, process and outcomes

18 Videos lectures with audio musical examples were produced as micro-modules and the flipped class approach was implemented in Fall 2021. Students went through micro-modules prior to class sessions while real-time classes focused on problem solving, case studies, and class discussions. Less-prepared students were able to go through the class materials at their own pace prior to class meetings while well-prepared students had a thorough revision and be challenged by active learning activities during real-time sessions.

Deliverables and evaluation

18 Videos lectures with audio musical examples were produced. A comparative study on the same course delivered without micro-modules was conducted based on instructor's reflections and evaluation on students' work samples. Students seemed to be more engaged during the class sessions and the learning outcome were achieved with less contact time.

Dissemination, diffusion and sharing of good practices

Experience gained from the implementation of the project and its evaluation will be disseminated together with other e-learning initiatives at the annual CUHK Teaching and Learning Expo and other experience sharing sessions.

Impact on teaching and learning

Flipped classroom is relatively new to Hong Kong students and teachers. The curriculum design, implementation, and evaluation gain from the experience is going to be instrumental for further e-learning development in music education and help moving forward to further blended learning.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Spicing Up the Old Tunes: A Flipped Classroom Approach to Reharmonization Pedagogy in Materials and Structures of Music**

Principal supervisor and unit: **Prof. Chan Kai Young (Department of Music)**

Project objectives

This project aims to produce self-learning materials with copyright-free music examples of high audio quality, to enhance students' learning experience. The videos focus on consolidating students' understanding of reharmonization techniques, which lay the foundation for music creativity and analytical techniques for numerous higher-level courses. With these self-study videos, more class time on Zoom can be reserved for interactions and feedback on their learning progress.

Activities, process and outcomes

Students are required to complete assignments of creative work based on knowledge covered in the videos. Their work will then be discussed in class and reviewed by peers and the instructor/teaching assistants.

Deliverables and evaluation

Eight micromodules, totaling 72 minutes, are produced and uploaded to YouTube for public access. Student feedback on the flipped classroom approach was collected both formally and informally: (1) through end-of-term course evaluation, and (2) through regular exchanges of views between the instructor and the students.

Dissemination, diffusion and sharing of good practices

Putting videos on YouTube is proved to be popular due to easy access, lowering the barrier to learning these advanced concepts.

Impact on teaching and learning

With these non-synchronous materials, I am able to devote more class time to interactive activities by using pre-recorded materials. students in my program enjoy receiving personal attention and feedback as well as small group critiques of their peers' work. In their view, the sound quality of music courses is crucial, and videos are helpful in consolidating their understanding of the topic.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Micro-modules for promoting language acquisition across contexts****Principal supervisor Dr. Ma Yuk Yi Anna (Department of Linguistics and Modern Languages)
and unit:****Project objectives**

Micro-modules for promoting language acquisition across contexts aim to introduce and explore some theoretical and empirical issues in child language acquisition across linguistically diverse bilingual and multilingual contexts. The language development in monolingual, bilingual and heritage children will be compared. A strong emphasis is placed on the interface between theoretical analysis of linguistic phenomena and central research questions in language acquisition. Students will be guided during lessons to conduct a research project using the CHILDES database after completing the micromodules. The three micro-modules intentionally shift learning to a learner-centered model in which time in class can be used effectively to explore topics in greater depth and create meaningful learning opportunities while students are initially introduced to the topics outside of class.

Activities, process and outcomes

In this project, 3 micromodules were developed which presented the learning points of key topics regarding language acquisition across contexts. In addition, various videos and clips were incorporated for students to better understand the concepts and theories. The project was completed satisfactorily and will be used by students in the coming academic year 2022-2023.

Deliverables and evaluation

The nature of the deliverables has been kept similar to what were intended to create. More updated videos and evaluations will be added in due course. Overall, the project has been successfully completed by May 15, 2022. The micro-modules were made available on the course platform for student helpers, TAs and research assistants to test out. Upon completion in the first term, surveys to students taking the courses for evaluation of the project will be delivered.

Dissemination, diffusion and sharing of good practices

We aim to present the findings and this project after the launch of the micromodules in the academic year 2022-2023 and present in one of the flipped classroom conferences and ITSC organized expos in the coming academic year.

Impact on teaching and learning

Although the micromodules are set to be launched in September 2022, feedback from our former students who had taken the course, TAs who are working and/or have worked closely with the course and pilot student helpers have been invited to test the micromodules. Positive feedback from interactive and creative content to highly innovative pedagogies have been received.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Facilitating Game-based Learning in Business Education

Principal supervisor and unit: Dr. Ku Kei Tat Fred (Department of Decision Sciences and Managerial Economics)

Project objectives

The objective of the proposed project is three-fold:

1. To raise student's motivation and engagement in class via game-based learning;
2. To enhance student's understanding on the subject and the ability to apply their knowledge by providing first-hand experience in games;
3. To facilitate more effectively e-learning and/or flipped classroom strategy for introductory microeconomics and managerial economics in CUHK Business School.

Activities, process and outcomes

Collaborating with an educational technology firm, 3 multi-players, interaction online games have been developed. They covered key concepts / topics in game theory, namely strategic dependency and consideration and prisoners' dilemma. A classic normal form game has also been developed which can be used for further customization. The backend system of the games has also been developed. As a pilot run, the games have been tested by business students in CUHK Business School.

Deliverables and evaluation

The deliverables include 3 micro-modules and 2 presentations in workshop. Student evaluation of the learning experience and outcomes has been excellent and it suggests that the project has successfully achieved its objectives.

Dissemination, diffusion and sharing of good practices

The project experience and deliverables have been shared in various workshops.

Impact on teaching and learning

In general, we have received good feedback from students via focus group interviews after the pilot run. By embedding interactive games in classes, students reported to have a deeper understanding of relevant concepts, enhanced class engagement and motivation.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Developing an eLearning course with experiential learning, interactive online learning and business cases

Principal supervisor and unit: Dr. Tsui Po Yung Anna (Department of Management)
Prof. David Ahlstrom (Department of Management)

Project objectives

This project aims to launch an eLearning course, MGNT2512, for business students through experiential learning, interactive online learning and business cases. After completion of the online course, students should be able to understand global environments and acquire global competencies through real life experiences.

Activities, process and outcomes

Several innovative developments are designed, such as online lectures, short videos on exchanges and internships, interactive Google map + uReply GO questions, and online business cases.

Students are also required to submit reports on their learning activities or online business case analysis.

Deliverables and evaluation

A total of 8 micro-modules of average length of 30 min. and 2 cases have been produced. More than 500 students completed/will complete the course by the end of the 2021/2022 year.

Regarding evaluations, students CTE comments and a focus group discussion were/are to be conducted. While positive comments were received, areas for improvement were identified.

Dissemination, diffusion and sharing of good practices

The videos and online cases have been hosted on the Blackboard. The cases developed are used in MGNT2512 and other courses.

Our department organized a teaching sharing session in September 2021. We will also send our completed cases to external case centres in 2022.

Impact on teaching and learning

We reckon the benefits of eLearning for teaching and learning. The student-focused approach allows the students to learn at their pace. Teachers can also have pedagogical innovations and continuous improvements. Our combination of global experiential activity and online learning also enables students to tap into this realm of real-world learning.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Enhancing Project-based Learning through Micro-Modules

Principal supervisor and unit: Dr. Ku Kei Tat Fred (Department of Decision Sciences & Managerial Economics)
Dr. Yuen Chi Lok Andrew (Department of Decision Sciences & Managerial Economics)

Project objectives

As a student-centered pedagogy, project-based learning (PBL) “integrates knowing and doing. Students learn knowledge and elements of the core curriculum, but also apply what they know to solve authentic problems and produce results that matter” (Markham, 2011). In business education, PBL bridges the gap between classroom and real business world and provide students with first-hand experience on real business problems. This project is to facilitate and support PBL in the CUHK Business School by producing high quality micro-modules.

Activities, process and outcomes

A total of 10 micro-modules and assessment items covering major topics of project-based learning have been produced under the project. The modules have used by students in 5 courses CUHK Business School and are made available on social media platforms.

Deliverables and evaluation

A total of 10 micro-modules have been developed under this project, promoting project-based learning and introducing various essential skills needed in PBL. Assessments that focus on the videos have also been developed to evaluate the understanding of concepts.

Dissemination, diffusion and sharing of good practices

A presentation has been carried out in Advancement of Teaching and Learning Committee (ATLC) Online Workshop organized by Hong Kong Shue Yan University to share with colleagues how micro-modules can be used to enhance student’s learning experience in an online setting.

Impact on teaching and learning

We have received good feedback from students via focus group interviews after the pilot run. By watching the videos and engaged in class activities, students reported to have a deeper understanding of project-based learning and how they can better master the critical and analytical skills in approaching a business problem.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Understanding careers in financial industry****Principal supervisor and unit: Dr. Mok Ka Ming (Department of Finance)****Project objectives**

The project has three objectives:

1. To build the bridge between classroom knowledge and application.
2. To enrich student knowledge about jobs in the financial markets.
3. To make students alert on the impact of FinTech.

Activities, process and outcomes

The activity and process for the project

1. Collecting background information
2. Modifying the materials and checking the source
3. Giving time for student helpers to learn
4. Making PPT and animations
5. Designing the storyboard and scripts
6. Acting in the videos
7. Clipping the videos

Outcomes

1. For students, these videos not only help them to have a better understanding of how financial markets work in the real world but also, more importantly, help them to better prepare for career planning.
2. For me, I did learn a great lesson learning how to produce online materials and incorporate them to improve learning outcomes.

Deliverables and evaluation

Five sets of videos are produced.

1. Each set of videos (Average of 10 minutes) is produced in both Chinese and English versions.
2. Four sets of videos discuss a career in the financial industry, and the remaining one discusses the public exams that students can consider.

Evaluation

1. Pre-survey
2. Post-survey
3. Open-end in-class discussion
4. The video view count and length on YouTube
5. Assignment performance

Dissemination, diffusion and sharing of good practices

No dissemination has been conducted yet

Impact on teaching and learning

The videos help improve the curriculum design and teaching effectiveness, It makes students understand the relationship between class materials and the real world. It also helps them to better prepare for their career planning.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Learning Technologies Beyond Textbook: Service Robots in the Hospitality and Tourism Industry

Principal supervisor and unit: Prof. Wan Chun Ying Lisa (School of Hotel and Tourism Management)

Project objectives

This project is to design interactive field trips in a game setting using location-based technology. Game-based and location-based learning are two main pedagogical goals. In order to integrate game elements into trip design, some enhanced functions of uReply GO such as peer competition and learning badge collection are added. While Geography emphasizes on locations, location-based approach becomes an effective tool in linking teaching contents to locations. It is hoped to facilitate course teacher to better arrange big-class field teaching and track the learning progress of students.

Activities, process and outcomes

Field trips in GRMD 1001 are conducted in May and December. By using this courseware, students become active participants through peer competition rather than passive receivers of knowledge.

Deliverables and evaluation

There are three major deliverables, namely four interactive trials, improvement on the functions and user-interface of uReply GO and a user guide. E-survey has shown that the courseware is useful in field teaching. Students are very satisfied with the learning experiences. About 97% of the respondents recommended continued use of uReply GO in field studies.

Dissemination, diffusion and sharing of good practices

The project team is applying a QEF project for sharing of good practices with secondary schools.

Impact on teaching and learning

Traditional fieldwork approach is enhanced by integrating game elements and location-based technology into trip design. It enables student access to a variety of spatial data in the field quickly and effectively. This teaching approach can facilitate big-class field teaching and better monitoring of the learning progress by accessing to real-time information on students' location and answers.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Data Visualization with Tableau on Microsoft Stream****Principal supervisor and unit: Dr. Wong Wai Ting Jacqueline (Department of Decision Sciences and Managerial Economics)****Project objectives**

- The project's underlying philosophy - "learn for fun and learn for life" means that this project not only aims to teach students in a fun and innovative way, but also to equip students with data visualization skills that they can use for life.
- To achieve this, flipped learning will be applied by utilizing cloud-based interactive platforms such that students can learn before class time. Short but informative videos will be provided on Microsoft Stream and University Library's YouTube Channel. These topics ranging from why data visualization is important, what data visualization tools there are and how data visualizations are created with Tableau, a data visualization software.
- While the videos offer knowledge and hands-on experience, the other part of Virtual Teaching and Learning VTL comes from online interactions in between the students and the teacher via MS Teams.
- Moreover, this project is collaborated with CUHK Library to maximize each micromodule's value in the form of Digital Scholarship and Research Data Workshops.

Activities, process and outcomes

- Course Activity with MS Stream and [YouTube](#)
- Digital Scholarship service with [YouTube](#) (University library, CUHK)

Deliverables and evaluation

- 9 MMs ready to use, for pilot testing with DSME 2051
- Student feedback: to be continued (2022-23)

Dissemination, diffusion and sharing of good practices

This project is the best alternative for students and researchers without any background and would need a basic understanding on how Tableau can help with their research and presentation. University Library will help giving ideas and evaluating the modules, as well as utilizing by all means after production, including introducing in different related workshops, putting in the Library LibGuides on Data Visualization and Digital Scholarship Research and Text-mining and Analysis in Digital Scholarship Research, and Library's YouTube Channel for self-study.

Impact on teaching and learning

Selected popular topic and turn it into Micro Modules, can support not only online learning, but also blended learning and virtual learning. Especially suitable for the fundamental course of each programme. For example: DSME 2051 for IBBA program, DSME 5210 for MSc ITM programme.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Environmental, social and corporate governance (ESG) in Hong Kong****Principal supervisor and unit: Dr. Mok Ka Ming (Department of Finance)****Project objectives**

ESG investing is popular in U.S., and is now getting more attention in Hong Kong market. Thus, we would like to prepare students with knowledge about ESG investing, to better equip them for the job market, and more importantly, build up their social responsibility mindset.

Activities, process and outcomes

Our proposal is to make three video clips (an English and a Cantonese versions) to elaborate 1) what is ESG, 2) why is ESG important to a company, and 3) what is ESG investing. The video clips will last for about 10 minutes. To make the video more interesting to students, we will invite management executives from the industry in Hong Kong to share their views on ESG and how ESG is conducting in their companies. We will also include graphs, table, data, animations, and story to enhance the learning effectiveness.

Deliverables and evaluation

The final work will be used in our Investment Analysis and Portfolio Management course (FINA 3080 for undergraduates and FINA 6040 for postgraduates) and Financial Markets (FINA 3010) as an in-class activity for further discussion in class.

1. A question for discussion about ESG investing will be given to students.
2. An in-class discussion will be conducted among students to evaluate their learning outcomes.

Dissemination, diffusion and sharing of good practices

Right now, there is no plan for conference submission has been made but will consider sharing the experience in some sharing sessions.

Impact on teaching and learning

Online video watching will help us to provide supplementary information about the current financial market development to students, without squeezing the teaching schedule for the other topics. It also make the class more up-to-date and link the class materials with the real world.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Learning R Programming and Data Analysis with Fun****Principal supervisor and unit: Dr. Wong Wai Ting Jacqueline (Department of Decision Sciences and Managerial Economics)****Project objectives**

- a. The project's underlying philosophy - "learn for fun and learn for life" means that this project not only aims to teach students in a fun and innovative way, but also to equip students with programming skills that they can use for life.
- b. To achieve this, flipped learning will be applied by utilizing cloud-based interactive platforms such that students can learn before class time. Short but informative videos will be provided on Microsoft Stream and University Library's YouTube Channel. These videos will cover topics ranging from Part 1 "Insights into power of R" to Part 2 "Data Visualization with R"
- c. While the videos offer knowledge and hands-on experience, the other part of Virtual Teaching and Learning comes from online interactions in between the students and the teacher.

Activities, process and outcomes

- Course Activity with MS Stream
- Digital Scholarship service with YouTube (University library, CUHK)

Deliverables and evaluation

- 20 MMs ready to use, for pilot testing with DSME 2051, 5210
- Student feedback: to be continued (2022-23)

Dissemination, diffusion and sharing of good practices

This project is the best alternative for students and researchers without any background and would need a basic understanding on how R programming can help with their research. University Library will help giving ideas and evaluating the modules, as well as utilizing by all means after production, including introducing in different related workshops, putting in the Library LibGuides on Data Visualization and Digital Scholarship Research and Text-mining and Analysis in Digital Scholarship Research, and Library's YouTube Channel for self-study.

Impact on teaching and learning

Selected popular topic and turn it into Micro Modules, can support not only online learning, but also blended learning and virtual learning. Especially suitable for the fundamental course of each programme. For example: DSME 2051 for IBBA program, DSME 5210 for MSc ITM programme.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: A flipped Classroom Approach for Enhancing Putonghua language competencies and Chinese Language teaching abilities in Teacher Education

Principal supervisor and unit: Dr. Kou Zhihui Christy (Department of Curriculum and Instruction)
Prof. Jong Siu Yung Morris (Department of Curriculum and Instruction)

Project objectives

This project aims to develop eight micro-modules with learning videos, discussion topics, and assessment exercises for a flipped classroom. The target is our students who enroll in the BA (Chinese Language Studies) and BEd (Chinese Language Education) co-terminal double degree programmes (CLED) offered by the Faculty of Education, CUHK. The students are pre-service Chinese language teachers who need to use Putonghua as a medium of instruction (PMI) when teaching both the Chinese language and the Putonghua language. The eight micro-modules focus on PMI teaching methods, Putonghua language teaching methods, and language proficiency training.

Activities, processes, and outcomes

The project includes the shooting of eight pre-class videos, flipping classroom teaching and discussion, and collecting feedback from students after the learning. As planned, the pre-class video was uploaded to the CUHK blackboard Panopto before class. After watching the video, students completed some reflection questions before class. The results of the flipped classroom have really saved the classroom teaching time for lectures. Group discussions in class were enthusiastic and efficient. Furthermore, the use of pre-class reflection questions allowed students space and time to think deeply. They also allowed the lecturer to discover some unexpected and insightful student responses.

Delivery and evaluation

The 8 micro-modules were implemented by two classes of CLED students from September 2021 to March 2022, focusing on different topics: Subject Curriculum and Teaching (Putonghua), and Curriculum and instruction design for using Putonghua as a medium in Chinese Language Teaching (PMI). A student questionnaire survey was conducted after the implementation of the MM. The content of the questionnaire focuses on students' perceptions of the flipped classroom teaching design, learning engagement, satisfaction, effectiveness, etc. The students responded enthusiastically to the questionnaire survey. They gave many positive responses and practical suggestions.

Good practices should be disseminated, diffused, and shared

In the future, the project team intends to present their findings at local or international conferences. Based on the eight pre-class videos produced by this project, the project staff hope that they can apply for new funds in the future to shoot videos in local primary schools.

Impact on teaching and learning

Students' perception of this teaching practice is positive. They believe that a flipped classroom encourages students to participate actively, improves learning efficiency, and gives students enough time to think deeply through rehearsal so that they can conduct more effective and in-depth learning in the classroom. Class discussions and summaries allow students to understand the thoughts of other classmates from multiple perspectives. To continuously improve teaching effectiveness, we will continue to optimize the teaching design of pre-class preparation, classroom exercises, etc

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Micro-Modules on Physical and Motor Development of Young Children for Pre-Service Teachers of Early Childhood Education and Primary Education

Principal supervisor and unit: Dr. Cheung Sin Ting Juanita (Department of Sports Science and Physical Education)

Project objectives

The project objectives aim to develop micro-module videos to convey some key concepts and knowledge on the developmental process and characteristics of the physical and motor skills of young children aged from 2 to 6 years old to equip student-teachers in planning and teaching physical activities for young children.

Activities, process and outcomes

The micro-module videos will be illustrated in the courses to facilitate students' discussions and course works for developing effective programmes and physical activities to foster the gross and fine motor skills of young children. It is beneficial to programme and curriculum designs and teaching approaches like designing modules in elementary, intermediate and advanced levels to improve young children's gross and fine motor skills.

Deliverables and evaluation

The micro-modules videos will be used in related programme courses. It fosters interactive environment and atmosphere for students' learning among peers as a learning group to generate new ideas for their teaching. Students' performance in the teaching activities and course works can reflect the learning outcomes. Students interviews and surveys are to be conducted for evaluations.

Dissemination, diffusion and sharing of good practices

The micro-modules are mainly used in programme courses and some sports programmes. More colleagues can be invited to join as a team to apply for the Courseware Development Grant to advance our teaching strategies and approaches for the teaching and learning process.

Impact on teaching and learning

It provides the support and resources to advance the thinking and teaching practice of teachers to diversify the teaching strategies and approaches. In particular, those multiple and complicated concepts can be elaborated in various micro-modules videos for facilitating students' learning.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Development and improvement of micro-modules for teaching bioinformatics**

Principal supervisor and unit: **Prof. Yip Yuk Lap Kevin (Department of Computer Science and Engineering)**

Project objectives

The objective of the project is to develop micro-modules for teaching bioinformatics topics, both for use in CUHK courses and for public education by freely providing the modules online. Specifically, the original plan was to produce 7 micro-modules on two main topics, namely short-read sequence alignment and hidden Markov models. The total length of these modules was planned to be 70 minutes. Besides, this project also aimed at adding manually curated, highly accurate English captions to 14 previously produced micro-modules for the same bioinformatics series.

Activities, process and outcomes

As of the time that this report is submitted, the captions of the 14 previously produced micro-modules have been added to them. In addition, all the modules for two new have been produced. However, instead of producing 7 micro-modules for these topic, 13 micro-modules with a total duration of around 180 minutes have been produced due to a change of plan, with substantially more contents included in these modules. All these 14+9=23 micro-modules, with a total duration of around 340 minutes, have been made publicly accessible on a YouTube channel (<https://www.youtube.com/KevinBioinformatics>). They will be immediately used as reference materials in the course CSCI3220, “Algorithms for Bioinformatics”, to be offered in Fall 2021.

Deliverables and evaluation

We have produced all the planned outcomes and deliverables that should have been produced in the whole project. We have more than doubled the number of micro-modules (and their total time duration) for the short-read sequence alignment topic because we have found that explaining the concepts in more detail with step-by-step illustrative examples would make the materials much easier to understand and thus benefit both our own students and other audience of the modules. The 13 new modules produced are as follows:

- Module 15: Short-read alignment
- Module 16: Suffix trie
- Module 17: Suffix tree
- Module 18: Constructing a suffix tree in super-linear time
- Module 19: Constructing a suffix tree in linear time
- Module 20: Demonstration of the Ukkonen’s algorithm
- Module 21: Suffix array and Burrows-Wheeler transform
- Module 22: Properties of Burrows-Wheeler transform
- Module 23: Performing text search using Burrows-Wheeler transform
- Module 24: Markov models and hidden Markov models
- Module 25: Three problems related to hidden Markov models
- Module 26: The forward and backward algorithms
- Module 27: The Viterbi algorithm

In our original proposal, we planned to evaluate our work by three means:

- a) In the midterm and final course evaluations of CUHK courses that use the micro-modules, the students will be asked specifically to provide feedback regarding the quality of the micro-modules and their effectiveness as reference materials.
- b) Meetings between teaching staff in FoE and FoM will be held to discuss the suitability of using the micro-modules in teaching bioinformatics, especially on their adaptation for use in teaching FoM students.

- c) The access statistics of the micro-modules on the YouTube channel and the user comments left there will be examined, as quantitative and qualitative evaluation measures, respectively.

Since the new micro-modules have just been produced, they have not been evaluated by these means yet. However, for the 14 previously produced micro-modules, some students taking CSCI3220, BMEG3102 and CSCI5050 have expressed in the respective course evaluations that the micro-modules provided useful supplements to lecture materials. These micro-modules have been viewed for a total of around 136,000 times on the YouTube channel and it has got around 1,200 subscribers. Most comments about the videos received on YouTube are positive.

Dissemination, diffusion and sharing of good practices

Technically, we have explored different ways to produce the micro-modules, including the preparation of contents and creation of animations and captions. We plan to share our experiences in the final project report.

Impact on teaching and learning

The micro-modules have served three important functions:

- a) They have provided an easy way for students taking the relevant CUHK courses to do revisions of what they have learned during lectures.
- b) They have provided additional contents, such as harder algorithms and extra examples, for students taking the relevant CUHK courses to study the topics in greater depth.
- c) They have allowed audience outside CUHK to study the bioinformatics topics.

We have also proposed to the CSE Curriculum Committee the creation of an ELITE version of CSCI3220, based on these micro-modules together with some additional materials, which is planned to be first offered in Fall 2022.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Micro-Modules Development and Peer-to-Peer Learning for Improving Students' Presentation Skills in General Education**

Principal supervisor and unit: **Dr. Han Dongkun (Department of Mechanical and Automation Engineering)**

Project objectives

The basic objectives of this project include: 1) Develop a group of micro-modules to improve students' presentation skills in a systematic way, which covers the topics of *presentation pitfalls*, *passion and enthusiasm of a good presenter*, *tips in making beautiful presentation slides*, *no-slide presentation skills*, *implementation of storytelling*, and *Data visualization*. 2) Implement the flipped peer-to-peer learning pedagogy into general education, and construct an environment that students can collaborate, compete, evaluate and learn from their peers in proactive cooperation. In specific, a website is expected to be built where students could learn the developed micro-modules together, discuss their group presentation strategy online, upload their presentation videos, evaluate and learn the videos from their peers.

Activities, process and outcomes

The whole process of the project development can be roughly divided into three parts: 1) micro-modules development; 2) website development; 3) evaluation and feedback collections. The details of project plan could be found in the following table:

No. of week	Carried out activities
1-4	Communicate and plan with video production team; Generate the shooting plan of 6 micro-modules.
5-8	Preparation of presentation slides for 6 micro-modules, script writing
9-13	Video shooting
13-16	Post-production with footage, music, sound effect, color grading, graphics, animation, and CGI compositing
16-17	First-round student feedback collection (UGEB2303 and GENA1113)
18-20	1 st round video amendment
21- 29	Website development with descriptions and uploading of videos
30-35	Website development with peer-to-peer reviewing and comment functions
36-40	Video review by CLEAR
41-44	2 nd round video amendments
45-49	Forum establishment on the website
50-52	Second-round student feedback collection (UGEB1307)

Deliverables and evaluation

Deliverables of this project are summarized as follows:

- a) 6 micro-modules for improving students' presentation skills in general education are developed, i.e., Speak to win: Passion and enthusiasm in public speaking; Outline your presentation: Thoughts encoding and audience analysis; Making beautiful presentation slides; Your body tells everything: No-slide presentation skills; The power of storytelling; Data visualization in professional and academic

presentations;

- b) 1 website for peer-to-peer elearning is developed;

The results of feedback from students are given as follows:

- a) Rate of positive feedback is 93.3% in the Survey on the flipped classroom elearning experience towards the end of the courses UGEB2303.
- b) Rate of positive feedback is 86.7% in the survey on the micro-modules and eLearning materials towards the end of the courses UGEB2303.
- c) Rate of positive feedback is 83.3% in focus group interview with a small group of volunteer students of the courses UGEB2303.
- d) Rate of positive feedback is 80% in the Survey on the the flipped classroom elearning experience towards the end of the courses GENA1113.
- e) Rate of positive feedback is 100% in the survey on the micro-modules and eLearning materials towards the end of the courses GENA1113.
- f) Rate of positive feedback is 80% in focus group interview with a small group of volunteer students of the courses GENA1113.
- g) Rate of positive feedback is 90.9% on the course website and small group forum.

Dissemination, diffusion and sharing of good practices

To disseminate this project, the following activities have taken place for the sharing of good practices:

- a) 6 micro-modules for improving students' presentation skills in general education are developed.
- b) 1 website for peer-to-peer elearning is developed.
- c) 1 workshop with 30 students enrolled. Participate as a speaker in Flipped Learning in the Age of COVID-19 on Dec. 17, 2020.
- d) 1 seminar at department level. Participate as a speaker in GE Online Lunch Seminar: Online Teaching and Learning: Challenges and Opportunities during COVID-19 on Apr. 27, 2021.
- e) 1 leaflet and 1 project DVD for publicity of this project.

Impact on teaching and learning

We received many questions and enquiries from interested students in the seminar "GE Online Lunch Seminar: Online Teaching and Learning: Challenges and Opportunities during COVID-19". Some statistics of feedback on the deliverables, especially on the micro-modules are shown here:

- a) Rate of positive feedback is 86.7% in the survey on the micro-modules and eLearning materials towards the end of the courses UGEB2303.
- b) Rate of positive feedback is 100% in the survey on the micro-modules and eLearning materials towards the end of the courses GENA1113.
- c) Rate of positive feedback is 90.9% on the course website and small group forum.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Micro-Modules Development on Safety Training for Undergraduate Students in the Faculty of Engineering

Principal supervisor and unit: Dr. Han Dongkun (Department of Mechanical and Automation Engineering)

Project objectives

- a. Develop a series of micro-modules to prevent injury and illness, and to improve undergraduate students' awareness of safety issues and potential dangers in a systematic way.
- b. Implement the peer-to-peer learning pedagogy into Faculty safety training, and construct an environment that students can collaborate, compete, evaluate and learn from their peers in proactive cooperation.

Activities, process and outcomes

- a. The whole process of the project development can be roughly divided into three parts: 1) micro-modules development; 2) website development; 3) evaluation and feedback collections.
- b. Outcomes: 1) 5 micro-modules of safety training for undergraduate students. 2) 1 website for peer-to-peer elearning; 3) 1 online course of engineering lab training on KEEP Open edX

Deliverables and evaluation

- a. The project deliverables are given as follows: 1) 1 workshop. 2) 1 local seminar at department level. 3) 1 website for peer-to-peer elearning. 4) 5 micro-modules. 5) 1 leaflet and 1 project DVD.
- b. The results of feedback: Rate of positive feedback on the elearning, rate of positive feedback on the developed micro-modules, rate of positive feedback on the course website and small group forum are all above 80%.

Dissemination, diffusion and sharing of good practices

The disseminations: 1) 5 micro-modules. 2) 1 workshop. 3) 1 seminar at the department level.

Impact on teaching and learning

An online safety training course is proposed to undergraduate students in a systemic way. Distinct advantages include: 1) Students can pre-study the course materials before each lecture, and more time and teaching resource could be devoted to problem solving and practices during the lectures. 2) This method provides a possible way to implement the flipped peer-to-peer learning pedagogy into general education, and construct an environment that students can collaborate, compete, evaluate and learn from their peers in proactive cooperation.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: 'Humanizing' LGBT Rights Cases in Hong Kong

Principal supervisor and unit: Prof. Stuart Hargreaves (Faculty of Law)

Project objectives

To improve student understanding of equality rights jurisprudence in Hong Kong by hearing the lived experience of applicants in a series of key LGBT rights cases.

Activities, process and outcomes

Parties to 5 key cases were interviewed. Those interviews were edited into thematic chunks, and transcripts were created in order to improve student understanding. The edited videos were uploaded to the course website on Blackboard alongside a text summary of the relevant case written by the PI and Co-I. Links to relevant legislation, other jurisprudence, and media commentary (in both English and Chinese) were included in each micromodule.

Deliverables and evaluation

5 micromodules were developed and provided to students in two different constitutional law courses. Students were asked to complete a survey detailing their experience of the micromodules.

Dissemination, diffusion and sharing of good practices

Presentation at the 2022 "Directions in Legal Education" conference.

Impact on teaching and learning

There are two core lessons that can be drawn from the project. First, that students appreciate and benefit from different methods of instruction in learning jurisprudence beyond "reading the case". Second, for micromodules such as these to have the most impact, they need to be tightly integrated into the pedagogy of the course rather than simply made available as a resource. This latter lesson is likely applicable across fields rather than relevant only to the teaching of law.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Micromodules for Conflict of Laws, Contract Law and Commercial law**

Principal supervisor and unit: **Mr. Gibb Alan (Faculty of Law)**

Project objectives

The project involved the production of five micromodules; each of approximately 10 minutes in duration to be professionally produced by CUAV to supplement the 20 micromodules I have produced in previous years. The principal aims of the micromodules are to complement traditional teaching methods by focusing on areas where students traditionally have difficulty (making the same mistakes year in year out) by over-viewing complex topics highlighting the key issues and also by emphasising the connections between different areas of law that are traditionally taught in a linear way. The micromodules are to be used in four courses on which I teach. The students then self-test their understanding of each module by attempting an on-line Power Point quiz. The project would best be described as blended learning. Each of the five topics are to be introduced in the normal way in a face-to-face lecture backed up by small group session. The video will then be released providing the students with a useful revision aid, that they can replay at their convenience, giving an overview of the topic and highlighting common mistakes that students make. It is vital for the project the videos must look as professional as possible to maximize interest, hence the involvement of the CUAV unit

Activities, process and outcomes

All 5 Ms were produced by October 2021

Deliverables and evaluation

#	Topic	MM Name	Language	Duration (in minutes)	Styles	Used in Courses
1	Marriage	Recognition of a Foreign Marriage in Hong Kong	English	12	Video (Studio Room) + PPT + Voiceover	Conflict of Laws and Private International Law
2	Enforcement of Foreign judgments	Conditions required for enforcement of foreign judgment in Hong Kong with particular reference to mainland judgments	English	13	Video (Studio Room) + PPT + Voiceover	Conflict of Laws and Private International law
3	Assessment of Sale of Goods Damages	How are sale of goods damages assessed in the case of non-delivery, late defective, defective delivery	English	19	Video (Studio Room) + PPT + Voiceover	Commercial law
4	Duress and Unconscionability	The conditions required to make a contract voidable on the grounds of duress and unconscionability.	English	17	Video (Studio Room) + PPT + Voiceover	Contract II
5	Assessment of	Fundamental rules	English	15	Video	Contract II

	damages for breach of contract.	as to the assessment of contractual damages			(Studio Room) + PPT + Voiceover	

Evaluation

Focus group of 5 students provided feedback on the MMs. The comments were entirely positive, the students emphasising that the main benefits derived from the MMs were that it enabled them to achieve better understanding of key concepts and cleared up misunderstandings, thus providing a platform for deeper learning.

Dissemination, diffusion and sharing of good practices

The MMs were made available to students via Blackboard

Impact on teaching and learning

The MMs have had a very positive effect on the students' learning experience. Typical students comments were "I super like the short video on each topic which is a nice gist of that topic."; "The videos are very helpful for revision." "The videos enable me to separate the wood from the trees."

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Using Micro-modules to Improve Group Discussion and Student Engagement for ZOOM Online Teaching**

Principal supervisor and unit: **Prof. Huang Hui Robin (Faculty of Law)**

Project objectives

This project aims to explore the way of using ZOOM's platform of group discussion and micro-module videos to enhance student engagement and interaction for online teaching. Due to the Covid-19 crisis, CUHK has been applying ZOOM teaching during this period. However, one of the largest difficulties with online teaching is to foster active student-peer and student-teacher interaction. The issue is particularly acute for law courses which traditionally adopt the Socratic teaching method with an emphasis on interaction. Hence, this project proposes to use ZOOM's platform of group discussion to develop an innovative teaching practice.

Activities, process and outcomes

In accordance with the project plan, micro-module videos are created on relevant cases. As the first batch, three of them were made and tested in my course. Then, the other five videos were created in light of student feedback.

Deliverables and evaluation

A total of 8 micro-module videos have been created on relevant cases and used for the teaching of my course. A survey was conducted on the use of the videos amongst students online, showing that most of them find the videos very useful.

Dissemination, diffusion and sharing of good practices

The videos have been uploaded on Blackboard and Youtube.

Impact on teaching and learning

The project has successfully achieved its purpose of facilitating class discussion and student engagement in my course.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Crowdsourcing for e-Learning Anatomy: Creating Peer-Led Video Courseware By Students For Students

Principal supervisor and unit: Dr. See Yew Hong Christopher (School of Biomedical Sciences)
Prof. Cheung Chi Kwan Vincent (School of Biomedical Sciences)

Project objectives

- To create a video series of short meaningful teaching moments centred around student-based anatomy dissections and create a unified courseware from these.
- To allow student to demonstrate key anatomical features in class, and together with tutors, co-create explanations and elaborations for their peers on video.
- To use this approach of *crowdsourcing* will create a video-based courseware by students for students

Activities, process and outcomes

- Students were highly engaged in the crowdsourcing, with 75 video contributions collected.
- After editing, 7 coursewares totalling 24 minutes covering all major topics was delivered.

Deliverables and evaluation

- A crowdsourced courseware was delivered by Panapto to MEDU3300 students (Medical Year 3) for years 2019-20 and 2020-21.
- Viewing statistics revealed over 200 views per year, and a survey of 127 respondents was highly position including questionnaire item “*These micromodules enhancing my understanding of the course*” (5.13 / 6)

Dissemination, diffusion and sharing of good practices

Presented at CUHK T&L Expo 2021 (*local*) and 16th E-Learning Forum Asia 2021 (*International*) conferences. Received 2 awards including **Gold Award for Pedagogical Innovation** at CUHK T&L Expo 2021, and **Exemplary Teaching and Learning Award (Bronze Winner)** at ELFA2021.

Impact on teaching and learning

- Demonstrated the value of having peer-led contributions to course materials via crowdsourcing to both students and teachers.
- Received international recognition and awards for this pedagogical practice.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Game-based Courseware for the Foundation Course of Health Sciences I & II – The DNA Wonderland**

Principal supervisor and unit: **Dr. Yeung Hang Mee Po (School of Biomedical Sciences)**

Project objectives

Based on our proposal, the aims of this project are focused on the understanding of DNA replication and basis of genetics for students who take foundation courses for health sciences and broaden their knowledge on the clinical diagnosis of genetic diseases in future.

Activities, process and outcomes

Our team designed three interactive games at the following:

1. Cotton candy helix
2. Roller coaster DNA express
3. Hit or miss codon cannon

This courseware is fully accessible to our students via CUHK Blackboard. The students can build up their own concept maps by this game-based learning experience and perform well in the course online quiz and final examination. These are also important to the students for broadening their knowledge on the clinical diagnosis of genetic diseases in future.

Deliverables and evaluation

Here are for key performance indicators and evaluations:

Assessment Elements	Measures	Indicators of Success
Usefulness of the courseware	<ul style="list-style-type: none"> • Online usage activities via the Blackboard 	<ul style="list-style-type: none"> • High access activities. • Positive comments to the courseware. • High confidence in independent studying.
Impact and Effectiveness of the courseware	<ul style="list-style-type: none"> • E-survey 	<ul style="list-style-type: none"> • High positive correlation between access activities and online quiz score. • High confidence in independent studying.

We collected some e-survey from our students for this project and we will keep collecting the data in 2022-23 students who will enroll in MEDF1010 Foundation course for health sciences I (for MBChB only) and MEDF1012A Foundation course for health sciences II. Overall the e-survey indicated that this project had a very positive feedback from students to learn about the knowledge of DNA replication and basic molecular genetics.

Dissemination, diffusion and sharing of good practices

Since we had very good comments from our students on this project and we expected that there is a great potential to launch those videos to other non-medical programmes with similar teaching topics covered. This project was presented at Teaching and Learning Expo 2021 CUHK.

Impact on teaching and learning

We believed that students enjoyed learning complicated concepts via this game-based courseware and our team would like to explore any opportunity to have showcase and further funding to extend additional topics into this project.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Online demonstration of Chinese Medicine clinical cases and AI patient****Principal supervisor and unit: Dr. Chan Sze Nga (School of Chinese Medicine)****Project objectives**

This project aims at providing simulated clinical practicum in online mode. For the junior students, they can observe the process of patient interview. For the senior students, besides observation, they will have opportunity to practice interrogation, analysis the etiology and pathogenesis of disease, making diagnosis of patients' problem and suggesting therapeutic treatment plan in online mode.

Activities, process and outcomes

Clinical cases in various specialties of Chinese medicine, including internal medicine, gynecology, pediatric, acupuncture and bone setting were collected from the Chinese medicine clinic of CUHK.

1. The interview and the treatment process of real patients were recorded.
2. Simulated cases provided by the clinical teachers were filmed.

For junior students, they observe the patient interview process and learn from the explanation of the teachers. For senior students, simulated patient interview process were produced (AI patient). The students can practice interrogation by typing the questions and the corresponding answers shown. After that, they need to analyze the etiology and pathogenesis of disease, make diagnosis and suggest therapeutic treatment plan in online mode. 28 clinical cases have been filmed and 10 cases of AI patient have been developed.

Deliverables and evaluation

28 clinical cases videos have been used in clinical training courses, including BCME2401, BCME2402, BCME2403, BCME2404, BCME2405. The videos are released to students of these courses through blackboard. 10 AI patient cases will be delivered to BCME2001 Methodologies of Diagnosis in Chinese Medicine.

The usage rate of the videos is high because students are required to view the videos in order to fulfil the course requirement. Selected students and teachers have been interviewed in details. Their comments help to improve the setting of the videos and AI patient.

Dissemination, diffusion and sharing of good practices

Close and timely communication with team members and users (i.e. students) is crucial. This can let the project run smoothly and the product can fit the needs of the students.

Impact on teaching and learning

Clinical training is an important part of the Chinese medicine teaching. However, in the past 2 years, on-site clinical training is greatly affected by the COVID-19 pandemic and has been suspended for several times. The clinical case videos serve as a substitute method so that the students can undergo clinical training despite of the pandemic situation.

AI patient self-learning platform is a new method in Chinese medicine education. Unlike the traditional way of doing exercise, students can practice diagnosis methods through AI patient platform in a more interactive way which can raise the learning interest of the students.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: A Blended and Interactive Online Learning Courseware for Bridging Art, Bioethics and Medicine

Principal supervisor and unit: Dr. Wong Pui Man Molly (School of Biomedical Sciences)

Project objectives

1) To enhance students' interests in bioethics and related medical advancement research and technology, and to enrich their learning in arts, bioethics and medicine; 2) To enable students to express bioethics through arts, to enhance their understanding of the basic principles of bioethics, and to critically analyze and debate scientific and ethical issues pertinent to modern-day scientific and clinical research; and 3) To enable students to recognize and appreciate the policies and regulation of medical advancement research applied in Hong Kong.

Activities, process and outcomes

Our interactive Courseware (CU-MED_IBIOETHICS) consists of 5 micro-modules: 1) The Four Principles of Bioethics (also known as Health Care Ethics or Medical Ethics); 2) Embryo Ethics; 3) Reproductive Technology; 4) Adolescent Informed Consent; and 5) End-of-life – Advance Directives. These micromodules were implemented and conducted as pre-class, in-class or post-class activities using a blended learning and flipped classroom approach.

Deliverables and evaluation

Focus group interviews and online survey questionnaires were conducted. Positive comments and feedback on the pedagogical experiences regarding the e-learning Courseware and related activities were received, demonstrating that our Courseware and related activities enabled students to engage in the learning of bioethics and strengthen students' critical thinking and creativity.

Dissemination, diffusion and sharing of good practices

Our Courseware was implemented into the Blackboard course learning platform. This project, the results and its impact on teaching and learning of bioethics and medicine have been presented in both local and international conferences. In addition, the data and results were published in an international conference paper. Furthermore, "Best Presentation Award" was received among one of the international conferences.

Impact on teaching and learning

Taken together, our project significantly benefited education in art, bioethics and medicine, and, more importantly, provided a valuable and useful learning tool in bioethics and medical education.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Micromodules for Flipping and Gaming up Dosage Form Science courses: Application of pharmaceutical science concepts by Pharmacy students**

Principal supervisor and unit: **Dr. Chatterjee Lipika Alok (School of Pharmacy)**

Project objectives

The objective of the project is to use micromodules, gaming and flipped classroom to make the learning experience of dosage form science course engaging and fun. To provide students opportunity to practice application of dosage form science knowledge to answer questions similar to the ones they will encounter in their end of term examination.

Activities, process and outcomes

Our team has prepared

- Six micromodules for drug delivery via various routes along with self-assessment questions in each micromodule
- About 3 to 5 game based practice cases questions related to pharmaceutical products have been prepared for the micro-module. Each case has about 8 to 10 multiple choice questions with detailed rationale for the correct option as feedback.
- Flipped classroom worksheet questions have also been developed which will allow students opportunity to practice identifying opportunity and challenge for a given drug to be delivered via a given route of delivery. Students will be able to work with group members and discuss with teacher during the session.
- The project content will be used by students starting in the coming school year 2022-2023.

Deliverables and evaluation

- Micromodules with self-assessment questions, Game based case-study questions and flipped classroom worksheets for use at the end of PHAR2211 and PHAR2212 have been prepared.
- A prelaunch and focus group interview will be conducted in early August 2022. Further survey questionnaires will be used for evaluation at the end of Dosage Form Science courses.

Dissemination, diffusion and sharing of good practices

The project will be incorporated into the Blackboard course website and available for students enrolled in PHAR2211 (term 1) and PHAR2212 (term 2). The outcome of the focus group

interview and survey questionnaire and learnings from this project will be shared with interested colleagues from the faculty of medicine.

Impact on teaching and learning

Short narrated lectures with self-assessment questions is expected to make the learning of drug delivery via various routes fun. The game based case study questions are expected to engage the students into deeper learning process and hopefully initiate some self-directed learning to gather more information about few of the drug delivery cases. The flipped classroom session organized at the last week of the course is aimed at giving students opportunity to practice answering questions similar to those they may encounter in the end of term exam and encourage classroom discussions.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Blended learning: implementing flipped classroom and online technology for community pharmacy practice

Principal supervisor and unit: Dr. Sun Wai Yan Kiwi (School of Pharmacy)

Project objectives

This project aims to enhance students' self-learning, collaborative and critical thinking skills via blended online learning activities.

Activities, process and outcomes

Three micro-module videos about parasites, colic and head lice in pediatrics were produced for students who enrolled PHAR3330 Community Pharmacy Practice to view. These are new topics that were not covered in the course previously. Some clinical cases and test questions were available online for students to discuss after viewing the videos.

Deliverables and evaluation

Each video was only up to 3 minutes to capture the main points of symptoms, simple diagnosis and management strategies. Students were encouraged to repeatedly attempt the test questions and case discussion. Evaluation in the aspects of student's participation, satisfaction, self-evaluation on learning the new topics and collaborative skills with peers was done by a survey in UReply in the end of the course.

Dissemination, diffusion and sharing of good practices

Students' comments were positive for the mode of online learning. Short videos are likely to retain their attention and interest to view again over time. Online case discussion was useful to implement the knowledge into practice and the students could learn from peers. However, the amount of workload has to be reasonable.

Impact on teaching and learning

This type of online learning can apply to many courses in the pharmacy programme, so students can learn at their own time and then participate in case discussion as a part of their assessment. Instead of didactic lectures, students can spend more time on case-based discussion and then receive feedback in a timely manner.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title:	Resuscitation for Time Critical Emergencies – Sepsis management in clinical practice
Principal supervisor and unit:	Prof. Hung Kei Ching Kevin (Accident and Emergency Medicine Academic Unit)

Project objectives

The objective was to develop case-based interactive material on the topic sepsis, a leading cause of in-hospital mortality.

Activities, process and outcomes

We have successfully developed a case-based interactive micromodule that guides students through a clinical scenario, setting tasks for student to work through whilst challenging their knowledge and analytical ability in an e-learning environment. Learning objectives, the case, and the story board has been designed to provide the final year medical students in the Medicine (MBChB) Programme with the basic knowledge on sepsis management.

Deliverables and evaluation

Apart from sepsis being a serious complication for COVID-19 patients, and this micromodule contributes to the effort to educate our final year medical students to prepare for COVID pandemic response. This micromodule has also been an important asset in complimenting clinical teaching during the COVID-19 pandemic with the reduction in clinical attachments available to students.

Dissemination, diffusion and sharing of good practices

The successes included the short bite sized information, with the principle based, clinical decision making teaching with clinical case vignette. These can be applied to other similar courses in the future. On the other hand, some micromodule technical specifications, such as the availability of progress bar and transcript, and the navigation between different parts of the course are likely to be important for future courses also.

Impact on teaching and learning

This micromodule has also been an important asset in complimenting clinical teaching during the COVID-19 pandemic with the reduction in clinical attachments available to students.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **An interactive journey to the human nephron (Phase 4): how to assess kidney function and its hemodynamics?**

Principal supervisor and unit: **Prof. Ko Wing Hung (School of Biomedical Sciences)**
Dr. Hwang Shui Shan Isabel (School of Biomedical Sciences)

Project objectives

This is a small-scale micro-module project that aims to complete the entire e-learning series previously developed by the same team members on the functions of the human kidneys. This project aligns with the common aim to provide a friendly e-learning environment for year 2 medical students (and some non-medical students) following the courses listed in the application proposal. A total of 3 micro-modules were created as a result of this project.

Activities, process and outcomes

The three micro-modules were accessible by medicine year 2 students on Blackboard from Jan 2022 to May 2022.

- MM 1:** Major factors affecting glomerular filtration rate (GFR)
- MM 2:** Effects of afferent & efferent arteriolar resistance on renal plasma flow and GFR
- MM 3:** Drugs that influence afferent and efferent arteriolar resistance

	MM1	MM2	MM3
Number of students who used the MM	148	122	104
% of usage (class size=268)	55.22%	45.52%	38.81%

Deliverables and evaluation

#	Topic	MM Name	Language	Duration (in minutes)	Styles	Used in Courses
1	How to assess kidney function and its hemodynamics?	Major factors affecting glomerular filtration rate (GFR)	English	6	Animated videos with narrations	MEDU2400
2		Effects of afferent & efferent arteriolar resistance on renal plasma flow and GFR		5		
3		Drugs that influence afferent and efferent arteriolar resistance		3.5		

Total: 3_MMs; 14.5 minutes; Average length of each MM: 4 minutes

Evaluation questions	Adjusted mean score of MM 1 (number of Students who responded to the question)	Adjusted mean score MM2 (number of Students who responded to the question)	Adjusted mean score MM3 (number of Students who responded to the question)
The micro-module approach has facilitated me on active and independent learning.	5.44 (9)	5.48 (9)	5.56 (9)
The micro-modules have facilitated me to understand the topic in a simple and interesting way.	5.40 (20)	5.36 (20)	5.48 (20)
I enjoy using these pre-class assignments (Micro-modules) for this course.	5.46 (24)	5.45 (24)	5.52 (24)
The micro-module approach has helped me have better understanding of topics in this course.	5.35 (20)	5.36 (20)	5.40 (20)
The micro-module approach is useful as pre-engagement BEFORE class teaching.	5.48 (20)	5.50 (20)	5.55 (20)
The micro-module approach is useful as topic review AFTER class teaching.	5.50 (22)	5.47 (22)	5.55 (22)

Impact on teaching and learning

The micro-modules serve as an important supplementary e-learning materials that help reinforce important concepts taught in the lectures.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Video Ambassador for Dissection: Student-led co-creation of Micro-modules on Dissection.

Principal supervisor and unit: Dr. Lau Wing Sze Josephine (School of Biomedical Sciences)
Dr. Wai Sen Mun Maria (School of Biomedical Sciences)

Project objectives

This project aims to co-create 6 micro-modules (MM) entitled Video Ambassador for Dissection (VAD) videos with senior year medical students to stimulate the hands-on experience and enhance spatial awareness in the study of anatomical structures.

Activities, process and outcomes

Recruited video ambassadors were in charge of the storyboard writing, video editing and some voice-over under teachers' supervision. The finalized products as pre-lab videos were then uploaded to blackboard course site and students were required to watch them before attending the real dissection practical.

Deliverables and evaluation

Three MM on "Thorax" and 3 MM on "Abdomen" were developed (total duration: 95 min). Video log data and student satisfaction survey were conducted. Majority of our students agreed that these MM as pre-lab materials can improve their pre-lab preparation, stimulate in-depth discussion among group mates during practical, and enhance spatial awareness in the study of anatomical structures.

Dissemination, diffusion and sharing of good practices

Project team shared the good practices in using video-based MM as pre-lab materials to colleagues within the school and is intended to present in the coming eLearning Forum Asia 2022.

Impact on teaching and learning

Video-based pre-lab MM can maximize students' preparedness for practical learning. It can also avail the integration of video-based teaching pedagogy in other anatomy topics in medical curriculum. Teachers can retrieve images from this sustainable co-created resource to generate formative assessment questions. This can reinforce students' learning motivation as the more MM they watch, the better students can prepare for the examination.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Prescribing in Practice in special patient populations: a case-illustrated project-based learning for medical and pharmacy students

Principal supervisor and unit: Dr. Chow Yee Kwan Elaine (Department of Medicine and Therapeutics)

Project objectives

Prescribing and recognizing safe prescribing practices are core skills. The coronavirus pandemic has reduced opportunities for bedside teaching for pharmacy and medical students. The aim of this project is to create a series of micromodules to complement bedside teaching on prescribing in special patient populations.

Activities, process and outcomes

Five modules have been created on five special populations: the elderly, renal failure, liver failure, pregnancy and the immunocompromised. Each micromodule consists of a 10 minute narrated lecture and a 10-question interactive quiz based on case scenarios. The module also features similarities to the Hospital authority electronic prescribing system. Question styles include prescribing items, review of prescriptions and multiple choice.

Deliverables and evaluation

The modules were piloted and improved with input from student helpers. Feedback was positive. We intend to continue to evaluate the impact of this e-learning resource via student performance in final exams on pharmacology and therapeutics, prescribing performance and feedback from newly qualified medical doctors and pharmacists.

Dissemination, diffusion and sharing of good practices

The e-module has been presented intra-departmentally. We intend to present our findings at the Pharmaceutical Education and Practice Conference and publish our findings in peer-reviewed clinical pharmacology journals

Impact on teaching and learning

Students have rated the modules positively as helping with their pharmacology learning during a period where bedside teaching has been suspended. Apart from improvements in knowledge, we hope the module will develop clinical reasoning and cultivate good prescribing habits in the long term.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Video Demonstrations Micro-modules for Flipped Clinical Education in Speech-Language Pathology (SLP)

Principal supervisor and unit: Prof. Law Thomas Ka Tung (Department of Otorhinolaryngology, Head and Neck Surgery)

Project objectives

This project aims to develop a series of micro-modules on Speech-Language Pathology (SLP) clinical procedure.

Activities, process and outcomes

Development of the 7 micro-modules on SLP clinical procedures and respective study guides. Engagement of students as partner in the development micro-modules. The completed micro-modules will facilitate a flipped-class room approach in teaching basic clinical skills. Students will be provided access to the micro-modules throughout their study in the programme to enhance their learning.

Deliverables and evaluation

A total of 7 micro-modules with their respective study guides have been developed. Content includes speech-language pathology assessment procedures. Students provided positive feedback regarding the content of the micro-modules and self-study guides. They believe these materials can better prepare them for clinical placements and allow them to further sharpen their clinical skills.

Dissemination, diffusion and sharing of good practices

The team expects that the micro-modules could be made for long-term use in the department and programme. Other local institutions involved in training speech language pathology students may also benefit from the micro-modules. The adoption of using pre-clinic micro-modules to serve as learning materials for clinical skills could be promoted to other institutions locally and internationally.

Impact on teaching and learning

Clinical teachers can utilize the micro-modules and self-study guides with a flipped classroom approach, therefore less time is required during in-class teaching and more time could be dedicated to higher-level clinical skills. Students will have access to these standard materials throughout their clinical training journey. They will have unlimited access to them and may learn these skills at the own pace and at the time that they require when such clinical situations arise.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Promoting bioethics teaching and learning through micro-module production

Principal supervisor and unit: Dr. Ngan Miu Yung Olivia (CUHK Centre for Bioethics)

Project objectives

Understanding the importance of history allows medical students to observe the linkages, relevance, and shared struggles between the past and present. The projective objectives are to (1) highlight landmark historical events in medical ethics and (2) recognise the evolving nature of values and social norms that inform current practice.

Activities, process and outcomes

In this project, the landmark events were developed as short video narratives that complemented conventional didactic teaching, delivered in a flipped-classroom approach. The didactic teaching reinforces historical knowledge to strengthen the ability to discern and scrutinise the similarities and differences between past and present. Bioethics educators teach students not only the analytical tools to dissect an ethical scenario, but they also act as a storyteller, recounting the evolution of today's achievements.

Deliverables and evaluation

The table below is a non-exhaustive list describing key events in ethics and how they relate to contemporary issues.

Historical Events	Related Ethical Concerns	Contemporary Issues
The "God" Committee: rationing dialysis machines (1961)	Equity, Fair Allocation Approach, Transplantation Ethics	Allocation of Scarce Resources (e.g., vaccine, ICU bed, funds)
Tuskegee Syphilis Study, (1972)	Research Ethics (e.g., Informed Consent, Exploitation of vulnerable populations)	Research Involving Vulnerable Populations (e.g., homeless, inmates)

Dissemination, diffusion and sharing of good practices

The outcome deliverables are be beneficial to students to build up their concept maps and reflect their understanding of the philosophy and application of ethical theories. The project outcome were presented at three regional and international conference and one manuscript at a peer-reviewed journal.

Impact on teaching and learning

Students expressed the advantage of incorporating multimedia in the teaching and learning. Below please some excerpts form student's reflection.

- Learning bioethics through multimedia resources is definitely a beneficial and effective way of learning. This is because bioethics itself may be assumed to be complicated and philosophical. This is why many students find this course hard to tackle. By watching summary videos like these two, I believe that students can encounter bioethics in an easy-to-understand manner. Moreover, visualizing the content is a good approach for memorization and comprehension. Although most of the content in the videos has been covered in lectures and tutorial, I find watching the videos a good way to recall the knowledge that I have learnt."
- "Using multimedia, I can better understand the structural relations. By the good illustrations or doodles or flowcharts, I also manage to better grasp the logical flow and the important points."

- “I think just the right amount of multimedia can enhance our learning. The colorful animation is eye-catching compared to other form of studies in our curriculum and can give us a break from the long notes and lecture slides”

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Flipped classroom of PSPP: A freeware for analyzing public health data at home

Principal supervisor and unit: Prof. Chong Ka Chun Marc (School of Public Health and Primary Care)

Project objectives

To develop a flipped classroom model to introduce PSPP as a freeware for students to analyze data anytime at home

Activities, process and outcomes

In this project, eight micro-modules have been developed. The micro-modules accompany different data analysis scenarios for public health applications. The quality of the production of the micro-modules was monitored by Ms Katherine Jia from the Harvard T.H. Chan School of Public Health.

Deliverables and evaluation

We have developed flipped classroom comprises 8 micro modules of short trainings that were arranged into a series of short video clips with scenario questions. The eight micro modules have been implemented in an assemble webpage. An interim evaluation has been carried out via a focus-group interview and a final evaluation was conducted via online survey. The comments in both evaluations were generally positive and we have revised the micro-modules according to the feedbacks.

Dissemination, diffusion and sharing of good practices

1. The eight micro modules have been implemented in an assemble webpage. (<https://sites.google.com/view/cuhksphpcmarc/home/flipped-classrooms>).
2. A Pre-recorded Presentation at the CUHK Community of Practice Symposium of Education Innovation and Technology 2022

Impact on teaching and learning

Our micro modules avoid the students to spend their time for staying in Pi' Chu building or CUHK libraries to complete their assignments or reports. In addition, the workload of our teaching team for guiding students using the other statistical tools is reduced on top of regular Zoom classes.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Game-based Online Learning in Respiratory Diseases and Treatments through Micro-Modules**

Principal supervisor and unit: **Dr. Sun Wai Yan Kiwi (School of Pharmacy)**

Project objectives

This project aims to provide a game-based platform for students to learn all inhalation drugs and therapeutic options for respiratory diseases in Hong Kong.

Activities, process and outcomes

An animation video that explains the differences of the common respiratory diseases and the inhalation techniques was made. After viewing the video, students can attempt the online game-based quiz. Each set of quiz consists of 4 questions based on an inhaler that the drug photos were prepared in SCORM. Unlimited attempt is allowed, and students can get instant feedback.

Deliverables and evaluation

One animation video and fifteen question banks were created. The question sets were prepared at three levels of difficulty that allow students to self-evaluate their understanding on the disease topic and management. Evaluation in the aspects of student's satisfaction and self-evaluation on learning the topics was done by a survey in UReply in the end of the course.

Dissemination, diffusion and sharing of good practices

Students' comments were positive for the platform of online exercise. The animation video is likely to get their attention and interest to view again. The majority of students had tried the game-based quiz more than once and agreed that it helped with their learning.

Impact on teaching and learning

This online learning exercise can apply to other pharmacy practice courses in addition to PHAR2330 contemporary pharmacy practice. Students can learn further at their own time and perform self- evaluation.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Micro-modules and Game-Based Learning for the Radiological Assessment of Nasogastric Tube Positioning

Principal supervisor and unit: Dr. So Tiffany Yuen-Tung (Department of Imaging and Interventional Radiology)

Project objectives

This project aims to create electronic teaching modules to facilitate students' interpretation of nasogastric tube (NGT) position on chest x-ray (CXR).

Activities, process and outcomes

We have developed 1 video and 3 electronic games. The games are organized into a phone app. Specifically, students are guided to first view the video, which demonstrates the approach to inspect the CXR, then the series of electronic games allow the students to practice the skills they have acquired from the video.

Deliverables and evaluation

The deliverables of this project are the courseware modules mentioned above. Comments from students were encouraging. On a 5 point Likert scale, the module was rated 4.26 for its ability to improve students' understanding of the covered topic. In the long run we will be embedding in-app evaluation element which can continuously assess students' learning outcomes and use metrics.

Dissemination, diffusion and sharing of good practices

The modules are shared across multiple disciplines and schools. The modules will also be uploaded mainstream apps store for public access. The video is available on YouTube which allows free public access. On top of that, we have created a website for any information considering the modules.

Impact on teaching and learning

The project resonates with the ongoing curriculum redevelopment and aim towards eLearning development. Optimistically, the game-based modules can initiate changes in the current conventional approach to teaching by utilizing gaming principles to motivate and engage users.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Video demonstration on fundamentals of blood bank in the field of blood transfusion

Principal supervisor and unit: Dr. So Ka Li Bridget (Department of Anatomical and Cellular Pathology)

Project objectives

Blood transfusion is an important medical procedure which blood or blood component is given to patient. This potentially life-saving procedure may be used by every doctor. Blood banking, type and screen, pre-transfusion testing procedures are the most fundamental knowledge in transfusion for medical students. Present situation of class size with 239 medical students and the busy blood bank setting render difficulty for onsite demonstration. Therefore, self e-learning videos can definitely address the difficulty and provide better learning platform and experience.

Activities, process and outcomes

Pedagogical approach:

Students need to perform e-learning on video before respective lectures and case study which they serve as an invaluable tool for understanding, integration with lecture materials. Students will prepare presentation and interacting with teachers during tutorial. This flipped classroom approach has advantage of providing active learning environment. Students can review videos until they fully understood and secure all the foundation for subsequent interactive discussion.

Cost effectiveness:

Advantages are (1) provide clear demonstration as it is onsite (2) share for all students with proven cost effectiveness for large class (3) repeatable utilization for medical students in subsequent academic years (4) As videos are related to basic knowledge of transfusion, it deemed possible to apply in medical field related programmes e.g. nursing/Chinese medicine

Deliverables and evaluation

Courseware deliverables:

Four video demonstrations on introducing blood bank, typing and screening, cross-matching and thawing plasma will be produced and uploaded. Students are able to refer to the courseware materials according to their learning pace and is irrespective to the place and time.

Outcomes, Evaluation:

We hope three satisfactory outcomes (1) Assisting students achieve thorough understanding and integration with lectures (2) Providing students with good learning experience from video demonstration in terms of flexibility in learning time, place and pace, engaging audio-visual experience than print materials solely and aiding knowledge retention (3) Arousing students' interest and initiating their further knowledge acquisition. Pilot students will be recruited to trial on videos and survey will be designed to collect feedback regarding to the three outcomes.

Dissemination, diffusion and sharing of good practices

nil

Impact on teaching and learning

Conclusion:

Transfusion and blood banking knowledge is one of the very important and fundamental knowledge for every of our future doctor. In the pre-e-learning courseware material survey, students reflected that they have

suboptimal level on cognition of blood banking knowledge themselves. Practical testing questions revealed truly that significant number of students do not have enough actual blood banking knowledge.

Through the introduction of these e-learning courseware materials, it showed various favorable outcomes:

1. Students reflected significant improvement in the level of cognition in the blood banking knowledge.
2. Practical testing questions in the post e-learning courseware material survey showed sharp improvement in the number of students responding with correct answers.
3. Regarding to learning experience, students also enjoyed with a better learning platform where they have improved flexibility in learning time, place and pace. better stimulation offered by simultaneous image and audio support in video aiding better knowledge retention.
4. Overall students show high level of satisfaction to these new e-learning courseware materials and equipped with better fundamental knowledge in this important field.

Video demonstration is not a cutting edge method in educational technology. However, it revealed promising usage in improving level of cognition and practical skills in important blood banking knowledge in transfusion and also provide good and flexible learning experience for our medical students in view of difficulties in onsite teaching for this part of important knowledge. And at the same time, it showed an equally well proven excellency in its cost effectiveness especially for large class size.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **An Immersive Cell and Molecular Biology Undergraduate Lab Experience Using First-person View Filming and 360° Virtual Lab Tours.**

Principal supervisor and unit: **Dr. Pang, Iris Kok Shuen (School of Life Sciences)**

Project objectives

The primary goal of this project is to provide an immersive laboratory experience for students studying life science and interested in cell and molecular biology research.

Activities, process and outcomes

With the pandemic disrupting on-campus academic activities, laboratory sessions with hands-on training are limited. The virtual laboratory tour and demonstration videos generated through this project enable students to familiarize themselves with the laboratory environment and learn more efficiently on campus. To illustrate the techniques demonstrated in the videos, mini lectures and online quizzes have also been produced to help students master important scientific concepts that drive research innovation.

Deliverables and evaluation

The deliverables of the projects are to:

- (1) Produce lab demonstration videos using first-person view (FPV) filming techniques to enhance audience engagement;
- (2) Assist students in mastering new knowledge underlying the demonstrated techniques through mini lectures;
- (3) Develop an explorable 360° virtual lab tour that promotes interactivity;

Dissemination, diffusion and sharing of good practices

The virtual lab tour is publicly accessible through a web link. The mini lectures explaining the scientific principles have been uploaded to the CUHK Panopto platform, which can be rapidly disseminated to interested units within the university. These resources have also been shown to prospective students during the virtual CUHK info day and the University Taster Fair to showcase the type of laboratory training Science students receive at CUHK.

Impact on teaching and learning

This project helps develop students' ability to learn independently in a self-paced manner, build up their confidence working inside a life science laboratory and enhance their understanding of and engagement in the process of scientific discovery.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: The use of VR technology for the training of high risk biochemistry and microbiology laboratory skills

Principal supervisor and unit: Dr. Lo Fai Hang (School of Life Sciences)

Project objectives

Virtual Reality (VR) is a technology allowing the users to enter an artificial environment that cannot be reached in the real world easily. It allows users to acquire and practice skills in an immersive learning environment. Thus the VR technology has been widely used for professional training in the medical, aviation and education sectors. For the training of biochemical analysis and medical microbiology, students are often required to deal with infectious microbes in a higher-level biosafety laboratory. Due to the limitation of laboratory facility and the implementation of online teaching amid the COVID-19 pandemic, VR technology can be employed to provide the training of these technical skills. In this project, we aim at applying VR to create a virtual laboratory, such that our students are able to conduct some high risk biochemical experiments related to medical microbiology, which is not normally available to them. In this virtual laboratory, students shall practice some representative microbiological procedures to confirm the presence of infectious pathogens in the specimens.

Activities, process and outcomes

A virtual laboratory workshop was held on 27 September from 1:30 to 4:15 pm. In the workshop, 32 students were divided into three groups to experience the virtual reality (VR) courseware. The students were then surveyed and the findings were analyzed; it was observed that our VR courseware did not only lead to changes in approaches to teaching, but also resulted in enhanced education practices and student satisfaction. The findings were published in an overseas education conference.

Deliverables and evaluation

This project applied VR technology to create a virtual laboratory, which offered the experiential learning environment, for the practice of a series of high risk biochemical tests. Through some virtual lab workshop and activities, our students were expected to understand some technical knowledge as well as some standard procedures of the experiments concerned; any misunderstanding could be identified during the activities for some immediate feedback throughout the learning process. The group of students shared their learning experience and they were guided to have some reflection on their learning experience. The experience of the students was also surveyed for the evaluation of the deliverables.

Dissemination, diffusion and sharing of good practices

The dissemination of the virtual lab activity is mainly carried out by face-to-face workshops; the workshops are generally well perceived by the participants. For better practice of the workshop, the virtual lab activity can be conducted online via metaverse, provided the hardware and software platform are made available in the near future.

Impact on teaching and learning

Our findings suggested that there was some impact of our project and the pedagogical effectiveness was significantly improved (as shown above). Based on personal reflection, unlike other traditional laboratory, there was a lot of laughter during the virtual lab activities. The students were having fun. Owing to the promising results, we would continue our effort to expand the sample size to quantitatively analyze the overall impact of virtual lab with the technology of VR.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Self-Learning Toolkit for the Advanced Techniques in Cryo-Electron Microscopy/Tomography Sample Preparation and Analysis

Principal supervisor and unit: Prof. Jiang Liwen (School of Life Sciences)

Project objectives

Prof. Jiang has been awarded a new RGC-CRF-Equipment grant to set up the first integrated state-of-the-art sample preparation system for Cryo-Electron Microscopy/Tomography (Cryo-EM/ET) analysis to promote advanced cellular and structural biology research in Hong Kong. In view of the uniqueness and comprehensiveness of this new platform, our project aims to establish a Self-Learning Toolkit for the advanced techniques in Cryo-EM/ET sample preparation and analysis. The project follows its original objectives.

Activities, process and outcomes

During the project period, Prof. Jiang and the RPGs or postdoc collaboratively have produced 1) Six Principle Videos to explain the principles, applications and research publications related to the new system; and 2) Four Experimental Videos to display the proper procedures of Cryo-EM/ET and Cryo-FIB/CLEM.

Deliverables and evaluation

In the proposal, we planned to produce six Principle Videos and four Experimental Videos in the project period. We have finished all the video production according to the schedule. The project completed on time with fruitful outcomes.

Dissemination, diffusion and sharing of good practices

The micro-modules produced in this project have been uploaded to KEEP Platforms of the courses that have been well-established and have been put into use for more than 3 years.

Impact on teaching and learning

This Self-Learning Toolkit will be crucial for the learning of both undergraduate senior students and postgraduate students studying the related courses, as well as for providing the needed training to all the potential users for fully utilize our most advanced research platforms at SLS-CUHK and beyond.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Topics in MATLAB****Principal supervisor Dr. Li Chun Che Charles (Department of Mathematics)
and unit:**

Project objectives The aim of our project is to produce several micro-modules on using Matlab in image processing, machine learning, statistics, finance, finite field and coding theory. The learning modules serve as a continuation of MATH2221 (An introductory course on MATLAB for math major) and as an introduction on how MATLAB can be used in frontier research.

Activities, process and outcomes

There are four main topics: Image processing, coding theory, Machine learning and math finance. Each topic contains lectures written in Matlab live scripts and several videos. The total length of all the videos is about 400 mins. We also develop a database of over 60 questions using Matlab graders, a software developed by Matlab for providing interactive course assignments.

Deliverables and evaluation

Summary of Project deliverables:

- Lecture notes for the micro modules (15 sets of notes in Matlab live script format)
- Teaching videos (about 400 mins of video.)
- Assignments using Matlab grader (60 questions)

The micro modules are evaluated by students. There are three reports on the usefulness, the learning outcome, and feedbacks of the modules.

Dissemination, diffusion and sharing of good practices

The micro modules we developed cover Image processing, coding theory, Machine learning and math finance. They are useful for students of the courses Math2221 (Matlab), Math3360 (Mathematical Imaging), Math 4210 (financial mathematics), Math4260 (Coding Theory and Cryptography) Mmat, 5350 (Coding Theory), Mmat5390 (Mathematical Image Processing), Mmat5391 (Mathematical Theories of Machine Learning)

Impact on teaching and learning

The micro modules demonstrate how to apply Matlab to several fields, including mathematical imaging, math finance, coding theory and machine learnings. These are topics taught in the department of mathematics. Those courses require the students to apply programming technique to the assignments. The programming technique may not be taught during the lecture but our micro modules provide students firsthand experience on how to use Matlab. Numerous examples are given. The students can save time on learning the programming part on their own. The lecturers can also focus on teaching the theoretical part of the topics.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Demystifying Abstract Mathematics Learning via Cartoon Animations****Principal supervisor and unit: Dr. Pan Li Lily (Department of Mathematics)
Dr. Chan Kai Leung (Department of Mathematics)****Project objectives**

It is observed that students, especially non-major students, are usually frustrated with understanding formal mathematical proofs. The project team believes the situation can be improved by rebuilding the connection between mathematical ideas and logical formalism using cartoon animated learning materials.

Activities, process and outcomes

In this project, series of interactive cartoon animated learning videos were produced and delivered to all students in Term 1 of academic year 2021/22 (course code: MATH3215 – Operations Research) as supplementary online self-learning materials to facilitate students online learning in abstract concepts in this course, and improve their mathematical abilities.

Deliverables and evaluation

In total, six modules with eleven interactive cartoon animated learning videos for “MATH3215” were made. Each micro-module is for one important topic, while in each module there are 1 to 3 videos targeting on one knowledge unit of this topic respectively. These videos are made using Doodly and Toonly animation commercial software. Pre/post-quizzes are added to let students practice the concepts.

In order to assess the effectiveness of these micro-modules and to provide recommendations for further development and improvement, we conducted several evaluations in term 1, 2021-22, including measuring students’ performance in the in-video pre/post-quizzes to measure the knowledge gained from these videos, and collecting students’ demographic information and feedback via detailed surveys.

Dissemination, diffusion and sharing of good practices

The micro-modules will be used repeatedly to all students taking “MATH3215 Operations Research” in the following academic years via the medium of Blackboard. Some micro-modules, like the simplex method will also be used in “MATH4250 Game Theory” in the following academic years.

The project team showed some animations to colleagues and received positive feedback. The project team will explore how the experience gained from this project can be extended to other mathematics major courses, particularly using cartoons and animation can help to explain abstract mathematics concepts beyond this pilot course.

Impact on teaching and learning

The results of feedback collected from students indicated that the developed courseware achieves its objective and can help convey mathematical language in a more visualized and joyful way. It can invoke students’ interest, reduce their mathematical anxiety, and support their mathematical knowledge construction. This pilot project is a good opportunity to explore teaching mathematics using cartoon animations and the implementation of blended learning in mathematics courses.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Development of higher-level problem-solving skills among first-year science and engineering students through online tutorial videos

Principal supervisor and unit: Dr. Leung Hoi Tik Alvin (Department of Physics)

Project objectives

Our first-year science and engineering student body has been drawn from an increasingly diverse pool of high schools adopting various high school curricula. It is very common to find students with significant different levels of science knowledge and problem-solving skills in the same class or tutorial group. In this project, we produced a series of online tutorial videos which aim at improving students' ability in solving physics problems and bringing the background knowledge of this diverse student body to roughly the same level. In addition, students can watch these short supplementary materials outside class at their own pace and gradually develop self-learning skills.

Activities, process and outcomes

A total of 134 sets of tutorial videos (134 in English and 134 in Cantonese) was produced in this project between September 2020 and December 2020.

Deliverables and evaluation

The e-learning website of PHYS1110 was successfully launched in the first semester of the academic year 2020/21. The effectiveness of these tutorial videos in enhancing physics learning was evaluated by the following methods:

- I. Student survey
- II. Number of Views of the Tutorial Videos
- III. Teachers' feedback
- IV. Comparison of the Average Score of Students

Dissemination, diffusion and sharing of good practices

The results of the project will be presented in the in Teaching and Learning Innovation Expo 2022.

Impact on teaching and learning

The e-learning website contains many tutorial videos to promote the problem-solving skills of first-year engineering students. Many participants in the survey found the resources very useful in their studies and would like to see further development of e-learning resources in the future.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Towards Higher Mathematics**

Principal supervisor **Dr. Fong Wing Chung (Department of Mathematics)**
and unit: **Dr. Cheng Man Chuen (Department of Mathematics)**

Project objectives

Our objective is to produce micromodules to help students of various disciplines in the transitioning from school mathematics to university mathematics, with an emphasis in helping students:

- a) develop the symbolic manipulation, problem solving and reasoning skills,
- b) build a deeper understanding of the topics at their own pace, based on their backgrounds, and
- c) develop their interest and appreciation in mathematics.

Activities, process and outcomes

Micromodules consisting of videos and exercises on 8 topics have been produced.

The micromodules are open to enrolment for students of several MATH courses in 2021/22.

Deliverables and evaluation

15 videos, covering 8 topics, have been produced. Piloting on the micromodules was done in August 2021. A survey was conducted. Feedback from 31 pilot users is very positive. The effect of the micromodules was also studied in the course MATH1020 in Term 1, 2021/22. 118 out of the 333 students enrolled in the project. It is found that enrolling students outperformed other students by 13.4% (67.25 vs 59.53/100) in overall course total.

Dissemination, diffusion and sharing of good practices

Some colleagues have expressed interest in developing micromodules on mathematical topics not covered in this project. We plan to share our experience with them to produce more micro-modules on topics beyond the scope of this project.

Impact on teaching and learning

The micro-modules helped our students to learn the background materials in our courses. Students can learn them before lecture so that they can catch up with the progress of the class. For teachers, that means we can focus more on the actual course content instead of reviewing background materials. This improves teaching efficiency.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Re-development of the KEEP course “Three Case Studies in Biochemical and Biomedical Sciences”

Principal supervisor and unit: Prof. Shaw Pang Chui (School of Life Sciences)

Project objectives

Our aim of this project is to further enhance the KEEP course by (1) re-develop the animations no longer depending on Adobe Flash; (2) add more MCQs; (3) update the contents; (4) provide a Certificate of Achievement automatically upon passing on online exercises.

Activities, process and outcomes

The project activities include: (1) Recruitment of student helpers to assist in content development, (2) collaborate with ITSC and KEEP for re-development of course components. (3) Focus group evaluation upon its completion and (4) Announcement for launch.

Deliverables and evaluation

Deliverables: (1) reading materials were updated. (2) Eight animated videos were re-developed with over 30 interactive components added. (3) revision exercises were updated and quizzes were added. (4) Certificate of Achievement is automatically generated for the participant upon passing the online quizzes. Course evaluation was carried out to collect feedback via open recruitment of participants from CUHK and selected secondary schools. Overall results showed their satisfaction level of the course is high and overall experience is good.

Dissemination, diffusion and sharing of good practices

Poster presentation and Q&A session were conducted in CUHK Expo 2021.

Impact on teaching and learning

Re-developed content updated on KEEP provides higher level of engagement for the public to understand biosciences topics. It is also useful for junior biochemistry and life science students as additional materials for self-study and internalization of what they have learnt in foundation courses of biochemistry.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Flipped teaching of cell and tissue culture techniques and their applications in biotechnology**

Principal supervisor and unit: **Dr. Siow Lam Nina (School of Life Sciences)**

Project objectives

The project aims to facilitate students in learning basic concepts and laboratory techniques of molecular biotechnology by flipped teaching in MBTE4034 (Methods in Molecular Biotechnology Laboratory II).

- To introduce theories and principles addressed in the laboratory procedure by flipped classroom teaching.
- To demonstrate equipment or experimental techniques.

Activities, process and outcomes

- Total of 17 micro-modules were developed covering the required knowledge and techniques of the laboratory experiments, in which 13 of them are mini-lectures introducing the experiment background and 4 of them are practical experiment demonstrations.
- Students can be well-prepared for performing the experimental techniques and understand the relating rationale of the experiments.

Deliverables and evaluation

Students could view the micro-modules in Panopto Videos/ Blackboard. Lab reports and lab examination were evaluated in MBTE4034. Positive feedback in a survey indicated that the project outcomes have met our objectives. The micro-modules are useful for the study.

Dissemination, diffusion, impact and sharing of good practices

The materials developed under the project were disseminated in Term 2, 2021-21 in MBTE4034 as part of the laboratory teaching. The information conveyed in the mini-lectures are useful for students in writing the lab report and preparing for the examination. The experiment videos were important since the students could not have the hands-on experience during the online teaching period. The micro-modules will be used along with the course in the future. They are useful in the pre-lab preparation for the students.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Establishment of a Refined and Coordinated Website as an Integrated Platform for our Existing and Future e-Learning Resources for their timely Promotion and Application in Education at CUHK and beyond**

Principal supervisor and unit: **Prof. Jiang Liwen (School of Life Sciences)**

Project objectives

In this project we aim to revamp and establish a refined and coordinated website as an integrated platform for sharing our existing and future e-Learning resources so as to promote and use them more effectively and efficiently for education in CUHK and beyond. In addition to the current e-Learning resources, we aim to further produce 10 new teaching videos in the project period.

Activities, process and outcomes

In the project, we have generated 1) Publication Videos that were derived from the recent research findings published in prestigious international journals; and 2) Experimental Videos that demonstrated the proper experimental procedures of the advanced techniques with biological samples. We have also designed and built an integrated website for teaching and education.

Deliverables and evaluation

5 Principle Videos and 5 Experimental Videos have been produced by Prof. Jiang and the RPGs or postdoc collaboratively. We have also come up with a final design of the website and have input the research and e-Learning resources onto the website. We have distributed surveys to the students taking the related courses and received positive feedbacks.

Dissemination, diffusion and sharing of good practices

The micro-modules produced in this project have been uploaded to KEEP Platforms of the courses. We have also created a refined and coordinated website for teaching and education.

Impact on teaching and learning

While developing the micro-modules, the responsible senior RPG students have reinforced the background knowledge and explained the knowledge in a way that junior students can understand easily. It has served as a valuable experience in teaching and will be useful in their further career.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Basic laboratory techniques in studying biology: species identification, dissection, field collection, molecular biology, and genetics**

Principal supervisor and unit: **Prof. Hui Ho Lam Jerome (School of Life Sciences)**

Project objectives

We intend to construct both 1) a website holding the 4 micro-modules (MMs) including basic information and principle of different laboratory techniques used to study biology, as well as 2) developing animations showing how some of the techniques can be carried out. The MM(s) can be used as flipped materials for further discussion, or as additional reference materials that are only distantly related to the course (especially for those in the second semester), or as a prerequisite for more advanced courses.

Activities, process and outcomes

Students and co-supervisors who have designed the project has tried out the whole module and have provided comments on the overall module. A group of students were recruited to try on the micromodules.

We have surveyed the students who have tried the MMs and they replied that the module provides new concepts and interactive learning experience in the common topics that they encounter during the study of Biology.

Deliverables and evaluation

Total 4 MMs with topics on Species Identification, Field Collection, Molecular Biology, and Genetics are successfully produced. They cover all basic concepts of Biology and they are integrated with each other. Information included in the four modules could further consolidate the basic knowledge what students learnt before by attending the level 2 courses.

A questionnaire has been designed to evaluate the project and the designed MMs. Short discussion with students has also been carried out.

Dissemination, diffusion and sharing of good practices

A website has been created to store the 4 MMs (<https://www.sls.cuhk.edu.hk/index.php/elearning-activities/resources>). In addition, the micromodules are launched to Blackboard for student to access in designated courses.

Impact on teaching and learning

The general responses from the students showed that they like the designed MMs and the interactive learning tools is useful for their undergraduate studies. Especially the species identification tools introduced in MM 2, students found that they are very useful when they go to the field for species collection.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title:** "Did René Descartes invent the coordinates system?" An animated story**Principal supervisor and unit:** Dr. Cheung Leung Fu (Department of Mathematics)**Project objectives**

The original objectives were to produce 3 chapters/modules. We have accomplished 2 out of 3. Nevertheless, the story is complete and fulfills the goal of (i) bringing to attention the historical facts behind the invention of coordinates system, (ii) conveying message to students that Linear Algebra is related to Simultaneous Equations Solving (learned in secondary schools) and this relationship was first made possible by Descartes' groundbreaking ideas of setting up a dictionary between Algebra and Geometry. This insight enabled mathematicians to extend geometry beyond the three dimensions and has led to the subject known as Linear Algebra, which is a core subject in our departments' curriculum.

Activities, process and outcomes

Broadcasting the video to an audience of 200 on 26 April 2022. Feedback rate: very low

Sending the link of the video to the class MATH2550 (30 students). Feedback rate: slightly low

Sending the link of the video to a focus group of undergrads, CUHK alumni, colleagues. Feedback: very high and with quality comments.

Deliverables and evaluation

Two chapters/modules of the animation accomplished. In general, very well received.

Dissemination, diffusion and sharing of good practices

Drafts of the video have been shown to colleagues for comments during the course of the production. Comments were mostly positive.

Impact on teaching and learning

Judging from the comments of the Focus Group, the topic seems to be new to the audience, and the linkage between Algebra and Geometry useful for future students.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **3D Laser Scanning for Remote Learning**

Principal supervisor and unit: **Prof. Fingrut Adam (School of Architecture)**

Project objectives

1. A series of three workshops on technology integration and 3d scanning will be run throughout the funding period.
2. Consultations with participating staff and students on fine tuning module complexity, challenge, and relevance.
3. Students will post their experiences in 2 formats:
 - a. Participation in a survey relating to the module.
 - b. Production of a final archive of work for knowledge transfer.
4. Production of a report discussing the successes, challenges, benefits, and drawbacks of the modules as pertaining to critical and design thinking and enhanced communication development in students.
5. Dissemination of knowledge gained within CUHK via CLEAR.

Activities, process and outcomes

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Deliverables and evaluation

1. General Reflection
 - a. This CDGS has been a major success within the SOA. Although many students and instructors were initially apprehensive about adoption and exploration of new equipment, once those realized how useful it could become for exploring materials, digitization, and archiving, it has become a regularly used avenue.
 - b. The equipment has successfully (as intended) been signed out by students to conduct their digitization and scanning experiments from home (under socially distanced conditions). Their digital materials were then shared online.
 - c. The capacity to conduct high resolution 3d scanning and digitization of materials has unlocked an entirely new definition of ‘observation’ and data collection within the context of design. Students can now conduct analysis, create diagrams, simulations based on real-world material conditions, as part of their evidence-based design and creative works.
 - d. Graduate level students have also integrated the equipment as part of their broader design life cycle of scanning, designing, and building.
 - e. The CDGS is meeting expected timelines in terms of production of materials and evidence for its successful integration. Future for the remainder of the timeline include expanded deployment of the MM materials into a web-format or HUB to contain more technology driven design tools. This will also be made available to a wider audience between departments or faculties.
2. Equipment Purchase

- a. A total of six 3D Scanners were purchased and arrived in a timely manner. These were checked for working order, integrated into the SOA inventory list and then placed into testing mode for MM and workshop development.
 - b. The number of six units was arrived upon based on a balance of quality and price – allowing for multiple users to access the equipment in parallel, making it possible for entire cohorts of students (1 year within the architecture school) to conduct activities within a weekly assignment.
 - c. The equipment is lightweight and simple enough to use in a variety of ways relevant to scanning both within the SOA and remotely. It is also proven to be of reasonably high quality in its scanning capacity – producing digital models of extremely high density and accuracy (sufficient for our purposes).
3. Micromodule and Workshop Production
- a. Materials were developed for courseware deployment to encompass major aspects of using the equipment in two ways:
 - i. Workshop demonstrations and presentation materials for dissemination to students including pdf reference materials.
 - ii. 3 Micromodules were developed into video format also shown to participants.
4. Integration into Curriculum
- a. An initial rollout of the workshops and MMs were released to a small subset of the graduate programme in SOA. This group of 14 students were able to assist in testing of equipment in a more comprehensive manner – discovering newer and more efficient methods to use the equipment.
 - b. After this phase, the teaching and reference materials were revised and further

developed into their current state.

- c. Since that time – between January and March of 2021, the equipment has been accessible to all architecture students at UG and PG level and in continuous use by over 300 students.
- d. The hardware, workshops, and materials were also introduced to all the YR 2 UG ARC students and their course instructors - who have integrated ‘3D scanning’ activities into their own teaching materials.

Dissemination, diffusion and sharing of good practices

Materials have been disseminated through:

- CLEAR hosted events
- Conference Presentations (E-Learning Forum Asia 2020)
- As part of journal writing (2 articles are near submission stages + 1 being drafted)

Impact on teaching and learning

- Reflection on how teaching has been improved and how student learning outcomes have been better achieved:
 - In case where the project deliverables, e.g. instructional materials, have been tried out with students, what are the general responses?
 - What is the impact on the thinking and practicing of teachers?
 - Any analysis of changes in the satisfaction or learning experience of students?

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Developing micromodules for soil science laboratory practicals to support flipped classroom learning

Principal supervisor and unit: Prof. Lai Yuk Fo Derrick (Department of Geography and Resource Management)

Project objectives

This project aims to produce at least seven micromodules on the measurement methods of different soil parameters, including (i) soil texture, (ii) organic carbon; (iii) mineral nitrogen; (iv) available phosphorus; (v) total Kjeldahl nitrogen; (vi) exchangeable cations; and (vii) microbial biomass carbon.

Activities, process and outcomes

The micromodules were prepared by video-taping the laboratory experiments demonstrated by the laboratory technician. Post-production editing of the videos was carried out by professionals. The micromodules introduced the laboratory procedures of, and basic principles behind, the analysis of selected properties of soils. A flipped classroom approach in delivering the micromodules was adopted, and students were asked to watch the videos before attending the laboratory classes.

Deliverables and evaluation

A total of seven micromodules were produced on the measurement methods of seven different soil parameters. The micromodules were well received by students in the course. In the student evaluation, students opined that the videos gave them better ideas about the tasks that they were going to complete in the coming lab sessions (5.36/6.00), the videos were useful in demonstrating the various procedures involved in soil analysis (5.39/6.00), the presentation in the videos was clear (5.48/6.00), the resolution and quality of videos were high (5.67/6.00), and the videos were relevant to course learning (5.45/6.00). Overall, students were satisfied with the delivery of lab videos (5.33/6.00) and they would recommend these videos to be used in the teaching of lab classes in future (5.24/6.00).

Dissemination, diffusion and sharing of good practices

The good practices developed in this project would be documented in the final report, which would then be shared on the CUHK CDGS website.

Impact on teaching and learning

Based on the evaluation results, the micromodules were effective in enhancing the teaching effectiveness and learning experience of students. The use of micromodules allowed students to be familiar with the logistics of soil analysis before attending the practical classes and improved the learning experience by enabling students to have more time on the hands-on laboratory work without the need of providing detailed introductions at the beginning of lab sessions. These micromodules were particularly useful during times of pandemic outbreak. Owing to social distancing measures, we could only allow half of the class to attend each laboratory session. For those who could not come to the laboratory physically, they could still learn about the principles and key procedures of soil analysis by viewing the micromodules.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Working with Diversity: Mental Health of the Hearing-Impaired Community in Hong Kong

Principal supervisor and unit: Prof. Ho Yan Yee Fiona (Department of Psychology)

Project objectives

The local healthcare welfare of the hearing disability minorities has long been untouched. Furthermore, the association between hearing disability and mental health has not been emphasised in the current curriculum. This project aims to disseminate knowledge to students, facilitate the establishment of guidelines, and deliver better care to the deaf minorities.

Activities, process and outcomes

The team implemented a variety of activities to facilitate the programme, including reviewing literature, exploring ideas, designing interview questions, scriptwriting, inviting and interviewing guests (sign language interpreters, clinical psychologists, service users, etc.), editing videos, disseminating the videos, and conducting an evaluation. The 4 micro-modules were created not only to enrich the course curriculum through innovative and evidence-based pedagogy, but also to assist students in targeted courses in recognizing the barriers and flaws in real-world practice for deaf community.

Deliverables and evaluation

Video 1: Challenges of the Deaf Community When Accessing Mental Health Services
Video 2: Exploring Deaf People's Mental Health from Multiple Perspectives
Video 3: The Use of Sign Language in Hong Kong and Tutorial on Basic Sign Language
Video 4: Notes to Mental Health Professionals

A short, multiple-choice-styled quiz was employed at the end of the module to directly evaluate the learning outcomes. Questions revolve around the main theme of the 4 modules. Student satisfaction and suggestions towards the videos are examined as well.

Dissemination, diffusion and sharing of good practices

The team has published the 4 micro-modules on YouTube channel (unlisted), allowing students to review the videos after classes. The 4 micro-modules will also be uploaded to the Public Mental Health Laboratory Facebook/Instagram page and website to gain more publicity in the future. The micro-modules will also be disseminated in other mental health-related undergraduate and postgraduate courses.

Impact on teaching and learning

The 4 micro-modules provided a valuable opportunity for students to gain an understanding of the limitations of the existing local mental health service delivery and cultural competence in the deaf community, and most importantly, they equipped students with the ability to improve the current welfare of the deaf minority. Using videos as a knowledge transfer medium is innovative in teaching because it offers high flexibility and a personalised learning environment for students to study.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Law and Social Work: Use of VR and eLearning in Protecting the Vulnerable

Principal supervisor and unit: Prof. Chan Chi Ho Wallace (Department of Social Work)

Project objectives

The project aims at strengthening social work students' ability of protecting the vulnerable through proper assessment in relation to their knowledge of law and social work, with the focus on basic legal principles and major statutory protection to the vulnerable

Activities, process and outcomes

With the production of micro-modules in response to students learning needs, blended learning approaches can be adopted in the course, where students may acquire factual legal knowledge, as well as the philosophy and principles behind these laws. The contact hours of the course can therefore be dedicated to critical evaluations of various legal approaches, current utilization of legal means by social workers in various vulnerable population as well as comparison over the approach of law to social problem across nations.

Deliverables and evaluation

Three micro-modules with mini-quizzes.

Dissemination, diffusion and sharing of good practices

Not applicable.

Impact on teaching and learning

With the micro-modules, the focus of the course changed from introduction of legal perspective to critical evaluations of various legal approaches, current utilization of legal means by social workers in various vulnerable population as well as comparison over the approach of law to social problem across nations. The existing teaching approach could enhance the quality of teaching and learning as the curriculum design now facilitates high-order thinking and critical ability of students in problem solving in social work contexts.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Gender in the City**

Principal supervisor and unit: **Dr. Wong Yuk Ying Sonia (Gender Studies Programme)**

Project Summary

This MM project, entitled “Gender in the City”, is a series of 7 original videos aimed at introducing the audience to the different faces of Hong Kong’s gender and sexual landscapes, and promoting diversity and inclusion. The MMs include videos of 3 main categories, namely narrated walking tours of historical sites, documentaries with interviews, and interactive demonstrations. Aiming to connect the past with the present, this series is dedicated to the often-forgotten chapters of the city’s history and hidden figures, linking gender and sexuality to wider discussions of education, social organization, alternative farming, innovation, change, and empowerment.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Micro Modules for Architectural Design Thinking

Principal supervisor and unit: Mr. Chow Chi Wai Kelly (School of Architecture)

Project objectives

The project's objective is to introduce key concepts related to architecture, design thinking, environments, culture, community, and technology. For secondary school students and non-architecture undergraduate students, this is a suitable course to experience what the study of architecture would be like and learn useful fundamental concepts. This module is part of ARCH1001 - Introduction to Architecture, People and Places. In this series, we set a way about viewing architecture in order to explain what we can do with architecture to build a better world as the world is a complex environment with many factors to consider.

Activities, process and outcomes

6 video clips are produced, with content including lecturing, animations, motion graphics and on site shooting to illustrate the concepts taught about built environment and community. The topics are as follow:

1. Prologue - to provide background information of this series
2. City - to understand the city as an architectural form built up over time
3. Scale - to understand the city as a reflection of human society
4. Marking a Place - to understand the effect of technologies on the city
5. Occupying a Space - to understand the issues to consider in a sustainable city
6. Typologies - to speculate on the future of cities

The clips will be shared online for architecture and non-architecture students to study the materials anytime they want. They would be asked to complete a simple questionnaire after watching some of the clips. Based on their written comments and feedback, we further modify the content of the clips for improvement.

Deliverables and evaluation

A questionnaire targeting the Spring 2021 cohort of ARCH1001 architecture students was conducted, collecting students' feedback through survey questions on google form. Several questions have been asked and some are open-ended for comments. For the survey, we intend to check if the video content is useful and match the viewers' practical needs. We also would like to know if the duration of these clips is appropriate.

The overall feedback is positive. Given a marking scale of 0 to 6, over 80% respondents give 4 to 6 marks indicating that the video clips are useful for them. The duration of the clips is also appropriate, with around 80% of respondents giving 4 to 6 marks.

Dissemination, diffusion and sharing of good practices

The 6 video clips are uploaded to the CUHK School of Architecture YouTube Channel as unlisted videos. Students of the Spring 2021 cohort of ARCH1001 received the links for viewing through school mass email. We are considering putting all the clips on online course platform if the modification is done in the near future according to the feedback we have gathered from students. Video links are as follows:

Prologue - <https://youtu.be/6gbXEURJfu4>

City - <https://youtu.be/fx5yD53Fvto>

Scale - <https://youtu.be/zdTfEPSIBZo>

Marking a Place - <https://youtu.be/vMoOI3BFfsw>

Occupying a Space - <https://youtu.be/UG99tnwwDv0>

Typologies - <https://youtu.be/IP9M7inu-dl>

The overall link of the 6 clips are as follows:

<https://www.youtube.com/playlist?list=PLYadcUWA2l-A7LY9HGg2FbBqAV3N-PRFm>

Keeping each video to less than 10 minutes is another good practice to cater for the limited attention span of young viewers. Each video focuses on one central concept, with motion graphics, animation and footage interwoven to illustrate the ideas introduced by the speaker / narrator.

Impact on teaching and learning

The original idea of making this micro module is to encourage students or amateurs who are interested in architecture to understand the subject more. Apart from its initial purpose, the lecturer of ARCH1001 also asked the students to watch the videos before class, so as to visualize abstract concepts and ideas better. The teaching process can hence be facilitated this way. Collecting students' feedback through survey afterwards serve to shape the format and content of the videos. Such a bottom-up approach encourages constant exchange in the teaching and learning process.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **3-Dimensional Printing for Remote Learning and Replication**

Principal supervisor and unit: **Prof. Adam Fingrut (School of Architecture)**

Project objectives

To continue quality enhancement of effective teaching and learning practices, this project serves to raise awareness into the benefits of technology integration and “tool-centric” learning activities both in- and out-side of the classroom environment. This is particularly critical during remote learning – as we seek to re-define the ‘new normal’ for our teaching and learning protocols. The proposal introduces high resolution 3d printing and encompasses a series of online workshops demonstrating how the technology can promote design thinking and facilitate enhanced communication of creative ideas through digital media.

Activities, process and outcomes

- Activities carried out include workshops and developed micromodule material for students toward the adoption and use of 3D printing and rapid prototyping.
- Curriculum for design studios were enhanced by the capacity to “think digitally” and develop design materials within a 3D digital environment – including standard architecture software, and others such as VR, AR, and 3D scanned material. These design developments were then synthesized with 3D printing – and further integrated into physical models.
- This process was contextualized within an iterative, design thinking framework, whereby students would develop designs, create prototypes (using 3d printing technology), test, draw critical evaluation, and restart the process again for revised and increasingly mature outcomes. This significantly changes the emphasis of teaching and learning from a strictly outcome-based activity – toward a **process driven and practice-based approach** to learning.
- Outcomes in terms of student capabilities that have been developed, student satisfaction, or staff competencies that have been enhanced by this reconsideration of technology – as an essential component in design thinking processes, as well as substrate for developing digital confidence, and competence in an increasingly digital industry beyond academia.

Deliverables and evaluation

1. Micro modules on technology integration and 3d printing were run through the SOA, throughout the funding period.
2. Consultations with participating staff and students on fine tuning module complexity, challenge, and relevance.
3. Students will post their experiences in 2 formats:
 - a. Participation in a survey relating to the modules.
 - b. Production of a final archive of work for knowledge transfer.
4. Production of a report discussing the successes, challenges, benefits, and drawbacks of the modules as pertaining to critical and design thinking and enhanced communication development in students.
5. Dissemination of knowledge gained within CUHK via CLEAR.

Upon reflection, the micro-modules have finished their testing and development phase and are currently under final production of video (mp4), and printable (pdf) materials. The materials will ultimately be hosted as part of the DT-HUB, under the ‘BUILD’ section of the website dedicated to hosting micromodules specific to Design Thinking and Digital Technology learning materials. Consultations, including testing of equipment and framing of the modules has been carried out with graduate students who were the first to access and test the limits of the equipment. These activities were necessary to develop a comprehensive document guide.

Dissemination, diffusion and sharing of good practices

Results from this project will be disseminated through teaching and learning conferences, such as the CLEAR Expo, and other faculty sharing sessions both within the department of Architecture, throughout the Faculty of Social Science, and in other cross-disciplinary presentations such as with Fine Arts, and Engineering.

Regarding collaboration, the PI has recently been added as CO-I on a GRF application based out of HK Polytechnical University specifically focused on 3D printing and rapid prototyping. Additionally, the PI has plans for collaboration with CUHK Fine Arts department.

Upon reflection, dissemination of the working content has been circulating for internal development of the final MM materials. This has resulted in positive edits and modifications of the content to be included within the materials – for both streamlining calibration, but also in avoiding potential pitfalls or errors within the system that may cause hardware failure etc.

Impact on teaching and learning

Basic instructional materials have already been deployed among students, as part of this development process. We are interested in the use of the equipment in two critically different ways: 1) how to generally use the equipment to produce models and prototypes; 2) how 3D printing can be perceived as a conduit for design exploration (not only as a final output device). In this way, students were tasked with considering how they may use their 3D printed models for something other than a final prototype. For example, how they may use the system to create formwork for casting plaster and other materials. In this way, the device is seen as an essential component in a broader framework of novel workflows and prototyping – that fit into an even broader context of design thinking methods.

While some colleague's express apprehension around the integration of technology as part of teaching professional architecture – others embrace the notion that design education is continuously in dialogue with technology. Depending on the colleague, the integration of 3D printing into our teaching practices is met with a different response. Among students however, the setup is obvious, and they are already exploring and experimenting with the equipment in new ways.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Crossing Cultural-Linguistic Boundaries: Micro-Modules to Enhance Understanding of Key Terms from Texts of Non-Chinese/Non-English Origins**

Principal supervisor and unit: **Dr. Chiu Chu Lee Julie (OGE)**
Dr. Ho Wai Ming (OGE)
Dr. Wong Yu Hin Sampson (OGE)
Dr. Yu Chi Chung Andy (OGE)

Project objectives

The GEF course *In Dialogue with Humanity* covers a wide range of classics from Western and Eastern traditions. As teachers of the course, we believe a detailed interpretation of key terms from these texts is important for a thorough, accurate understanding of the thinkers in question. Moreover, since their ideas are often embedded in a larger intellectual and cultural tradition, the terms they use/coin have much to tell about the tradition. Yet most of the classic texts come from non-English/non-Chinese origins, students have to rely on translations to read. Using translations is inevitable, but they also have limitations.

The proposed courseware is designed to offer first-hand acquaintance with the traditions in which key terms from texts of non-Chinese/non-English origins are understood, discussed and reviewed. While enhancing student understanding of the texts, the courseware will serve two further purposes. First, to inspire students to go beyond the syllabus and appreciate cultures and civilizations foreign to them. Second, to stimulate students' reflection on the constraints of translation, and to arouse their interests in learning new foreign languages. In short, the learning enhancement device will also offer an eye- and mind-opening experience for students.

Activities, process and outcomes

We have engaged a professional team to produce illustrated-videos in a format popular among young people (a recent example being the series “已讀不回” produced by the House of Hong Kong Literature to promote reading). Short online lectures are also be recorded to deepen/broaden interpretations provided by the videos. As narrators in the illustrated videos, the PIs are responsible for writing the texts. They did literature review to make sure the explanation is correct. We have engaged a professional production with much experience in producing illustrated videos with academic content. Due to, among others, the threat of the pandemic and control measures, the filming was postponed to May and June. Dr. Wong who has much experience in producing and in acting in illustrated videos, serves as main consultant in production. By the end of June, the filming and production will be completed. The making of accompanying online lectures is under good progress. The lectures will be ready by the end of June.

During the preparation for the production, the project team decided to add English subtitles to the videos to facilitate the use of the videos by non-local students. Our RA Miss Tse is responsible for the translation.

Deliverables and evaluation

Parts of the online lectures are available now. By the end of June, the production will be completed.

Dissemination, diffusion and sharing of good practices

The GE office is organizing a conference on Marx's 1844 Manuscripts. Dr. Ho will attend the conference and present a paper on Marx's key concepts. He will make good use of one of the illustrated videos in his paper. On the other hand, another former PI, Dr. Julie Chiu, who is still responsible for one of the videos on love, is going to speak on an online discussion platform on Platonic love. The development of the videos serves of foundation for further dissemination of the courseware. Apart from the adaptation of the courseware, the project team will introduce the courseware (the four videos) to all teachers of *In Dialogue with Humanity* and encourage them to make use of the videos in their teaching. Potentially the courseware is assessable to all undergraduate students because the GEF course is mandatory for all undergraduate students. In addition, the

project team plans to introduce the courseware at inhouse conference and in other conferences.

Impact on teaching and learning

For the PIs it is a new experience to act and to speak in illustrated videos. The writing of the texts has motivated them to study the relevant texts and the meaning of the key terms more closely. The participation in filming is an stimulation for PIs to re-think how to teach in innovative ways. On top of this, the courseware is an implementation of flipped classroom concept.

As mentioned, illustrated videos are popular among young people. The use of this kind of courseware is our new attempt to adapt to the learning habits of students.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Integrating Instant Messaging to Enhance Online Teaching and Learning During Covid-19 Pandemic

Principal supervisor and unit: Dr. Li Kwan Hung Leo (Divinity School of Chung Chi College)

Project objectives

This project aims to develop a pedagogy guidebook to enhance course teaching and learning by using instant messaging (IM) in e-learning and m-learning environment.

Activities, process and outcomes

IM posts from different postgraduate courses were categorized, and principles of using IM in course T&L were deduced. The use of IM was then applied to a UG faculty package course with the principles observed. A survey was delivered at the end of the course, and opinion on using IM in course teaching was collected. The use of IM in different course scenarios was evaluated. The survey shows that 90% of students using IM during course teaching agree that IM can enhance their learning and 80% find it more satisfied in course learning than those without IM.

Deliverables and evaluation

The project result will be applied to the revision of the guidebook and delivered to the faculty workshop. In addition, the project enables us to identify good practices for using IM in course teaching and understand the constraints of implementing it in different course scenarios.

Dissemination, diffusion and sharing of good practices

This project has been presented in the College General Education GECC4130 course's teacher gathering. Workshops will be held later in departmental meetings. A postgraduate student in the capacity of JTA helps to develop and implement the project.

Impact on teaching and learning

This project nurtures an m-learning mentality of student and teacher and builds lifelong learners by extending teaching and learning beyond the classroom with mobile technology.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Translational Platform for Addressing & Solving Social-problems (T-PASS)****Principal supervisor and unit: Prof. Lee Wing Yan Vivian (Centre for Learning Enhancement And Research (CLEAR))****Project objectives**

To establish students' social commitment to tackle elderlies' life challenges. It was an educational project that collaborate with evidence based real life stories from the community with the involvement and support of CUHK teachers. The project focused on the physical, psychosocial, and financial needs of elders.

Activities, process and outcomes

We have organized a Service Plan Proposal Contest, there were 41 student participants from different disciplines. 1 webinar about elderly policy making was held in July 2021, and 39 micro-modules were used in T-PASS, which 23 of them were newly developed for the project, and 12 of them were co-created by teachers and students.

Deliverables and evaluation

We carried out a sub-study of the project to evaluate the impacts of T-PASS on undergraduate students in Hong Kong. We matched a control group with students from similar background as T-PASS participants. They were asked to submit pre- and post- surveys. A study on the students' reflections was also carried out.

Dissemination, diffusion and sharing of good practices

A T-PASS subpage was created in CU CHAMPION's website. 2 abstracts of the research results were submitted to overseas conference EduLearn, and will be submitted to a local conference "Community of Practices Symposium of Education Innovation and Technology 2022", which will be held in June.

Impact on teaching and learning

According the CUHK 2025, promotion of service learning as a compulsory credit bearing service learning programme is one of the strategies under Goal 1. We believe the sub-study we carried out was significant for evaluating the impact of T-PASS' pedagogical design. The T-PASS model can serve as a reference for future student-initiated service learning projects.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **The impact of Flipped Classroom Approach in a Biomedical Sciences Technique Training Course**

Principal supervisor and unit: **Dr. Tang Mei Kuen Florence (School of Biomedical Sciences)**

Project objectives

As face-to-face teaching and learning were halted because of the fifth wave of COVID variant Omicron pandemic, virtual education became a remedial and unavoidable solution for social distancing restriction. We believe technologies can potentially support interaction between students and teachers. SBMS2105 is a laboratory techniques training course taken by Year one students of the Biomedical Sciences programme undergraduates. Based on the discussion with scientists and principal investigators, we have identified gaps in teaching and learning laboratory skills. Students are expected to improve their confidence levels in handling experiments, demonstrate independent thinking, and be able to conduct hands-on techniques independently in the laboratory. Therefore, we considered the need to redesign the course activities to improve the accuracy and competency of students in handling essential biomedical sciences lab techniques, which would be supplemented with a strong foundation of concepts, rich hands-on experience, and a rigorous skills-based assessment. We considered flipped classroom approach learning could be an option to enhance content delivery, mastery and retention. The primary objective of this project is to establish an innovative online courseware package, including a simulated mini gamified interactive technique online training platform, micro-modules, and case-based discussion for the execution of flipped classroom approach in this course for the virtual skill training educational research study under the epidemic situation in Hong Kong. Using the flipped classroom approach in the practical sessions of the compulsory course, our team also addressed the undergraduates' perceptions of self-directedness with instructional strategy in developing capability, capacity, and competency to add value to their academic outcomes.

Activities, process and outcomes

With the pedagogical design in this project, students attended Zoom teaching to transform book knowledge through interactive competency study of the various eLearning courseware, group discussion in breakout rooms, group presentations, and writing essays. Moreover, our team proposes that

- The setting of face-to-face lab sessions is more practical to assess students' holistic abilities, including attitude, competency, and accuracy in handling the various skills and techniques;
- They can be trained to relieve high-stress levels' psychological and emotional signs for future professional competence.
- Teachers need to work alongside students to direct and guide them in the active learning process with autonomous learning and independent thinking.

It is now an era to have a breakthrough for promoting the flipped-classroom approach to education in Hong Kong. From the literature review, the flipped classroom can train students the self-discipline, critical thinking, and independent problem-solving for the day one professional competence in the future as they are our future for the improvement of life quality of the society. At the early beginning of the execution, students may think such an approach may burden and increase their workload due to the traditional stereotype of passive learning. However, they can be stimulated by hindering the storing knowledge to engage and apply to the pre-home assignment; besides, they can more focus on the discussion during the class session to cognitively rebuild and memorise information.

The arrangement of breakout room discussion and group presentations enhance interaction in Zoom class. Even though there is no physical contact in the synchronous Zoom session, the teacher and students can interact based on the scenario case questions from the students' different capabilities. These activities offer the free time to rebuild the knowledge through peer collaboration, and the teacher guides the logistic flow of the

troubleshooting in the experiment. More importantly, there is sufficient space for students to receive feedback on their co-creative relatedness during the presentation.

Online exercises and essay writing enhance and foster writing proficiency correlated and consolidated with their knowledge. It is good training for students in the writing assessment, which can integrate learning, listening, doing and reading as reflection issues from understanding and organising ideas. As a result, they can also do excellent writing to measure academic achievements; besides, it is a tool for creating ideas and consolidating their sophistication of the techniques.

To conclude, the flipped-classroom approach with the in house courseware and the writing proficiency training is a positive perspective that students are capable of the whole person development to fulfil the necessities of self-discipline, competence and collaborative characters contributing to the community in the future.

Deliverables and evaluation

We modified the learning activities and incorporated instructional task-based training and assessment. Students were required to complete an instructional task by using the skills learnt in the lab sessions. As SBMS2105 is undergoing revamp, which is a part of the continuous effort in refining the programme curriculum, our team have created the following deliverables of courseware according to the course timetable as below:

- Web-based simulated mini-gamified Interactive Technique Training platform
- Micro-modules – animation with narration
- Case scenario discussions in Zoom Conferencing teaching
- Online exercise an essay writing in the Blackboard system

Concerning the key performance indicators related to student academic achievement, we have explored if they revoked students' interests in virtual learning for better engagement. The students interacted in gamified environments and completed step-by-step tasks with different interventions with simulated critical thinking quizzes from the track records analysis as indicated in Figures 1 & 2.

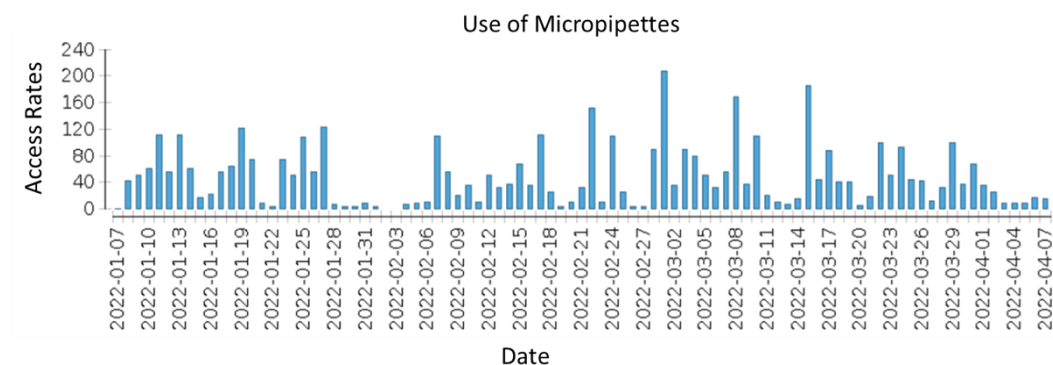


Figure 1 One of the access rates for students to view micro-module in 'Use of micropipettes'.

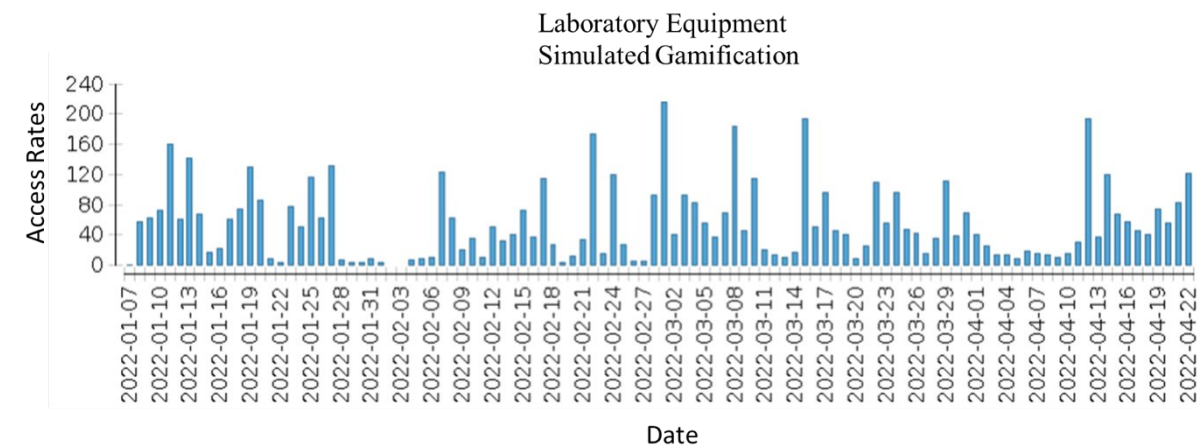


Figure 2 Students actively participated in one of the simulated gamifications with a flipped-classroom approach to self-directed learning.

eLearning in the virtual world has become a new normal and prevalent in our University during the lockdown

period for the students who can access Blackboard to acquire all the learning material, e.g. lecture notes, self-reflection study or Panoto recording of classroom capture. Moreover, students may learn according to their personalisation; besides, the content and features of the micro-module play roles in affecting students' accession. Since the courseware development was on time, our team can adapt all of them to the course teaching schedule, and at the end of the term, the trial run survey was performed. Regarding evaluating the project's effectiveness, we adopted the psychometric properties of the 5point Likert scale eSurvey to make the response, and the participants wrote their comments at the end of the survey for the fine-tuning issue, which have been shown as follows in the Table below:

Questions	Average mean of Likert Scales
Scope 1: The Development Courseware Context	
The micromodules (short videos) can provide extra information for learning the techniques.	4
The courseware facilitates me to engage in virtual hands-on activities.	3.8
The courseware motivated me to read further related to the topics.	3.4
Feedback from the online quiz gave me direction as to how I needed to improve.	4.1
I enjoy being highly competent in using digital technologies of the developed courseware for learning.	3.7
Scope 2: Knowledge and Skill Acquisition	
I was provided with the necessary resources and training to successfully gain knowledge and skill acquisition via eLearning.	3.2
I usually have a clear idea and am confident performing the lab work skills individually after training.	2.9
I am now confident in planning the logistic flow of lab work and problem-solving when I encounter.	3.1
I am fully engaged in this course to learn biomedical research techniques.	3.5
Scope 3: Teacher Guidance	
The teachers were responsive to my learning needs.	4.3
The teachers motivated me to think about how to choose the best way to do the lab work or learn the virtual techniques.	3.9
The teachers make a real effort to help with students' difficulties with their work.	4.2
The teachers are outstanding and patient in explaining theory and training to us.	3.7
Scope 4: Student Experiential Learning: Flipped Learning Approach	
The flipped learning approach provided a better learning experience than the traditional teaching approach in other courses.	3.3
I felt that I could adequately prepare to work after the flipped elearning.	3.1
I can do well in this course which stimulates my learning process from understanding the theory to applying the techniques to research.	3.2
I enjoyed participating in the group discussions.	3.2
Overall, I am satisfied with the quality of the flipped learning approach.	3.6

Dissemination, diffusion and sharing of good practices

The proposed project aims to generate the courseware package to explore the impact of the flipped classroom approach in virtual education. Regarding the project outcome, the courseware package supports the teaching activities to core course subjects for future scientists' training. It facilitates student-centred learning to deepen the cognitive memory of knowledge and promote problem-solving skills. More importantly, the courseware package, tailor-made for the in-house training, will be sustained in the freshmen curriculum education and collaborated institute.

With the flipped-classroom approach to virtual education in the course, the project provides an insight into student perception and performance. Traditionally, students learn passively and receive information with one-way delivery from remote teaching. At present, our team has addressed if they could accept the active learning format. They learned intrinsically and independently to build up their dynamic personal development—the

data analysis of the project outcome as a reference to upgrading the infrastructure for the curriculum. Our team members will disseminate the results to stakeholders to strengthen the programme's quality assurance or improve the strategic pedagogical teaching and enhance student learning motivation in the upcoming the Community of Practice Symposium of eLearning Innovation and Technology 2022.

It is a general acceptance that the learner forgets quickly when just hearing but remembers and understands better when seeing and doing. Regarding the micro-module, selecting a sub-topic of the learning content for active pedagogical teaching makes the students understand the concept more easily. The duration of each module is about 3 - 8 mins that, which facilitates students' knowledge learning with engagement and enjoyment. Of course, micromodules demonstrations help students gain virtual hands-on experience, understand the principles well, and improve memory retention. Students rely on different varieties of online courseware, such as computer-based interactive technique training, micro-modules or case scenario videos, to comprehend the technique/experiment's aim, usage, and procedures of the technique/experiment. The computer-based interactive technique training is a gamified simulation that engages students to learn with fun. The case scenario discussions are goal-based situations designed to cultivate student problem-solving skills. In contrast, the online exercises and essay writing further foster their scientific writing skills in professional competence.

Our proposal describes the construction of a novel online courseware package using a flipped-classroom approach for virtual learning to explore the effectiveness of students' learning outcomes. To conclude, the most significant effect of the study shows a novel model, together with synchronous real-time Zoom Conferencing technology, students learn soft skills of techniques, e.g. principles of the various methods, troubleshooting of the unexpected incidences and the tricks of writing skills. Indeed, we have arranged some remedial lab practicals to help students gaining experiential experiences.

Impact on teaching and learning

In response to the 5th wave of the COVID situation, we still adopted a flipping learning approach under the Zoom teaching and learning, students were proactively engaged in the cognitive knowledge prior to attending the lecture and virtual practical. The proposed project's objective is to establish an online courseware package with interactive technique training, animated micro-modules, case-based discussion, and self-paced reflective writing skill practice, which has been arranged based on the flipped classroom approach. We also investigated if such an approach can evolve into one of the mainstream teachings with the biomedical sciences programme experience. We envision this project has a long-term impact on various aspects, as indicated below:

Acceptance of the flipped classroom approach to teaching and learning

Confucian philosophy influences the stereotype of thinking and behaving in the process of learning. Students in Hong Kong were used to being 'spoon-fed' to acquire knowledge. As Biomedical Sciences is one of the leading areas in applied sciences which contributes to healthcare and public health sectors, teachers should cultivate learners' inquisitive minds and promote active learning. The first-year students positively respond to this learning environment, as reflected in the data analysis.

A good online courseware package facilitates the success of the flipped classroom approach

Even though the project significantly increased teachers' workload for the need to create a new set of learning materials, their effort can be recognised by shifting to provide support during in-class activities for more interactive learning, e.g. case-based or scenario discussion if online materials are available with explicit instruction.

The students change to a more self-directed learning behaviour

The flipped classroom approach is an alternative way to improve student engagement and facilitate a deeper understanding of the teaching content despite things going online. The online modules to be delivered as pre-class activity supports individual learning preference and progress. Studies have documented that student performance can be greatly enhanced for the knowledge transfer from the learning outcome.

Improved confidence and independent thinking concerning laboratory tasks

The courseware described here engages the students at different levels, reinforcing basic concepts, stimulating independent thinking, and analysing real-life scenarios. It is excellent practice model for skill training amidst the COVID-19 pandemic. The face-to-face teaching and learning for acquiring the experiential experiences is still a valuable momentum without any replacement. Moreover, it will impart to the students a sense of ownership of the content, improving their confidence in the face-to-face practicals in the coming academic year.

Sense of belonging

The enthusiastic and passionate teaching team is expected to motivate student learning during the in-class activity, where every student feels accepted, valued and included. Their excellent psychological health and well-being can enhance the students' academic performance with teachers' caring.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **The development and evaluation of a Remote Exchange Clerkship Programme**

Principal supervisor and unit: **Prof. Edmund Anthony Severn Nelson (Department of Paediatrics)**

Project objectives

Development and evaluation of feasibility, acceptance and sustainability of a remote exchange clerkship programme for medical students to teach skills in teleconsultation and clinical reasoning and to raise awareness of aspects of professionalism and patient confidentiality.

To collaborate with University of Sydney to explore remote clerking experiences in different settings and to potentially develop a remote clerking experience between the two universities.

Activities, process and outcomes

Patient clerking is a core component of medical student training. Students learn to undertake systematic and detailed elucidation of the patient's history and clinical examination to formulate a differential diagnosis/working diagnosis. During COVID-19 this component of clinical learning was intermittently suspended and the Department of Paediatrics offered opportunities for students to clerk patients remotely using video conferencing. The project developed a process whereby research staff linked students with families using Zoom video conferencing platform. The linking process required that personal contact details of families and students were kept confidential. Although feasible, the process was resource intensive and likely impossible to implement for larger numbers of students. Therefore a customised matching programme was developed to facilitate this linkage process for future development and use. The project highlighted some ethical concerns about remote clerking in terms of patient confidentiality that will require further consideration should this form of teaching be routinely incorporated into the paediatric curriculum. These findings provide a starting point for implementing a distance learning platform that could teach students teleconsultation skills and related aspects of professionalism and patient confidentiality.

Deliverables and evaluation

Scheduling programming and user guide developed for automated matching of families with students. Student and family evaluation of the remote exchange clerkship programme was positive.

Dissemination, diffusion and sharing of good practices

Plan for peer review publication and presentation at Teaching and Learning Innovation Expo.

Impact on teaching and learning

Limited impact at this stage, but anticipated that teleconsultation teaching will increasingly be incorporated into the medical curriculum in the future.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Blockchain for healthcare: a multi-stakeholder curriculum development approach for e-learning

Principal supervisor and unit: Dr. See Yew Hong Christopher (School of Biomedical Sciences)
Prof. Tsoi Kam Fai Kelvin (The Jockey Club School of Public Health and Primary Care)

Project objectives

This project aimed to use a very new subject, Blockchain for Healthcare, as an example to create a multi-stakeholder curriculum development system to guide micromodule development through individual interviews with students, teachers, Blockchain industry professionals and doctors. The resultant curriculum will be used to produce Blockchain for Healthcare micromodules for year 1 medical students.

Activities, process and outcomes

15 interviews were undertaken with transcription and analysis to generate input for curriculum development. Creating a new curriculum based on multistakeholder input: discussion and design around 4 identified areas: 1) Introduction to Blockchain 2) Blockchain for Healthcare 3) Blockchain examples e.g. Electronic Health Records, Contact Tracing and 4) Non-Fungible Tokens. Creation of new materials for 1st year medical students in the form of micro modules.

Deliverables and evaluation

The creation of the curricular document above was a core deliverable: from it 4 micromodules were created following the curricular areas described above, and a total of 40 minutes of material was produced.

Dissemination, diffusion and sharing of good practices

The project was accepted for presentation at the international flagship medical education conference AMEE (Association for Medical Education Europe) in August 2022. We will further submit it for the upcoming CUHK Expo 2022.

Impact on teaching and learning

In pilot testing, the general responses of students has been highly positive towards the micromodules. The addition of new course material on a new topic is a positive step to advancing our curriculum to meet the needs of future medical practitioners, and this multi-stakeholder approach could be adopted for new topics which emerge in the future.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Evaluating the effectiveness of teaching undergraduate students how to manage an in-hospital cardiac arrest by using a web-based serious game

Principal supervisor and unit: Prof. Wong Wai Tat (Department of Anaesthesia and Intensive Care)

Project objectives

We proposed to evaluate the teaching and learning effectiveness of our newly developed CPR game by assessing the differences in knowledge between students who pass and students who fail the CPR game before attending the small group face-to-face simulation teaching on in-hospital resuscitation. The correlation between the detailed performance in critical components of the game and their knowledge retention in managing patients with in-hospital cardiac arrest will also be explored.

Activities, process and outcomes

A web-based video game, which requires the students to finish all the tasks promptly, is produced. There are two scenarios in the game: 1. Management of asystole and Pulseless electrical cardiac (PEA) arrest, and 2. Management of Ventricular Fibrillation (VF) and pulseless ventricular tachycardia (VT) cardiac arrest. The game was modified to capture all the participating students' data in completing the game. The modified game is made available to the final year medical students in their acute medicine course in June 2022, and a study to evaluate the teaching effectiveness of the game is being conducted. The primary outcome of the study is the overall score in the MCQs related to in-hospital resuscitation in the final summative assessment of the acute medicine course. The secondary outcome is the assessment scores in the face-to-face simulation of in-hospital resuscitation management. The correlation between the data in completing the critical tasks in the CPR game and the outcome assessment is also assessed.

Deliverables and evaluation

Two hundred and twenty students' data in their CPR game participation and the final assessment in their acute medicine course are collected and analysed.

Dissemination, diffusion and sharing of good practices

The result of the evaluation study will be submitted to medical education journal for publication and presented in the local and regional medical education conferences.

Impact on teaching and learning

Besides cardiac arrest management, managing patients in shock, comatose state or developing anaphylaxis can be simulated in a video game learning platform. Suppose the effectiveness of teaching cardiac arrest management is proven to be effective by this study. Other video game-based training modules focusing on other acute medicine topics can be produced.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **A comprehensive evaluation of the pedagogical effectiveness of the use of virtual reality (VR) and other innovative eLearning strategies for Biochemistry laboratory courses**

Principal supervisor and unit: **Dr. Lo Fai Hang (School of Life Sciences)**
'Dr. Ngai Hung Kui Patrick (School of Life Sciences)

Project objectives

This project applies VR technology to create a virtual laboratory, which offers the experiential learning environment for the practice of a series of high risk biochemical tests, specifically, for the diagnosis for cholera. Through some virtual lab workshop and activities, our students are expected to understand some technical knowledge as well as some standard procedures of the experiments concerned; any misunderstanding can be identified during the activities for some immediate feedback throughout the learning process. The group of students shall share their learning experience and they will be guided to have some reflection on their learning experience.

This project is a pedagogical study of the teaching and learning effectiveness of VR and AR technologies for laboratory courses. The study will be conducted in 2 dimensions: quantitative analysis and qualitative analysis. The project began in November 2020 and it was completed in October 2021 as expected smoothly. The quantitative analysis, such as user experience, student performance, correlation study, expert review together with the qualitative analysis, such as student motivation and focus group, were conducted on time.

Activities, process and outcomes

This project was a pedagogical study of the teaching and learning effectiveness of VR and AR technologies for laboratory courses. The study will be conducted in 2 dimensions.

Quantitative Analysis

- i. Expert review: experienced experts of the laboratory courses were invited to review the VR/AR virtual lab courseware. The review of the experts was quantified for analysis;
- ii. User experience: students were invited to experience the VR/AR virtual lab courseware. Their experience was surveyed; quantitative data was collected for analysis;
- iii. Student performance: students were required to complete a test at the beginning and at the end of each trial of the VR/AR virtual lab courseware. Their performance of the subject knowledge of the laboratory course was quantified for analysis;
- iv. Correlation study: several groups of students with different background were recruited to experience the VR/AR virtual lab courseware. Their education background was quantitatively analyzed to evaluate if there was any correlation of their performance after using the courseware.

Qualitative Analysis

- v. Feasibility study: experienced experts from ITSC were invited to conduct some pilot projects to explore the latest pedagogical approaches and technologies for virtual lab construction online.
- vi. Student motivation: a survey was conducted at the end of each Term to study if the VR/AR virtual lab could promote the motivation of learning.
- vii. Focus group study: students who had experienced the VR/AR virtual lab courseware were personally interviewed to collect their feedbacks at the end of each Term.
- viii. Interview study: professional interview study will be conducted with proper documentation and dissemination.

Deliverables and evaluation

The first deliverable of this project mainly focused on the pedagogical study of the teaching and learning

effectiveness of Biochemistry virtual lab courses by VR. The study was divided into quantitative and qualitative aspects. Moreover, a full paper has been drafted to be submitted and the interview study was completed already based on the quantitative and qualitative analysis described above. The last deliverable of this project was the feasibility study of the utilization of innovative eLearning strategies, such as AR and gamification, for the production of an SPOC related to the practical skills of Biochemistry. The second deliverable was completed and a website was released.

Dissemination, diffusion and sharing of good practices

Some of the results and good practices derived from this project were shared in the CUHK T&L Expo and among the teaching-support colleagues in various occasions. Besides, a full paper has been drafted, with a supplementary poster submitted. A website related to the project was produced.

Impact on teaching and learning

The long-term impact of the study is to allow us to evaluate the pedagogical effectiveness of VR virtual lab courseware, as well as the feasibility of other innovative eLearning technologies for biochemistry laboratory courses, such that the courseware can further be optimized and developed to deliver a laboratory course with a distant learning mode. Based on the data we collected and analyzed, we are pleased to confirm the impact of our project and the pedagogical effectiveness using virtual reality for the education of biochemistry. Personally, the present project is a good learning experience to use data to design better education. The data also offered a lot of possibilities for our team to explore in the future, such as the production of SPOC and the application of 'metaverse'.

Learning from the project

- Key factors in determining success: to develop a standard procedure to run the project, such as the KPI;
- Difficulties encountered in implementing the plan and remedial actions taken: sophisticated technique for data analysis in education where some more preliminary findings should be presented before the submission of a full paper;
- The role of other units in providing support: clearly stated project objectives and good communication throughout the project with the collaborators;
- Impact and sustainability of project: should aim at a real problem to solve with relevant methodology and theories behind;
- future plans/way forward: should have the big picture and vision of where the project is leading to;

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Enhancing problem solving skills in the laboratory classes with the aid of online experimental videos and problem-based learning.**

Principal supervisor and unit: **Dr. Hau Chun Kit Sam (Department of Chemistry)**

Project objectives

This project used the guided inquiry-based and project-based teaching approaches to enhance critical thinking and problem-solving skills of the students. The usage of pre-recorded videos demonstrated the use of the E-resources as the flipped classroom materials and to assist students remote self-learning practical skills due to the restriction of face-to-face experiential learning. The employment of PRS showed enhancements on the students' self-learning and strengthened the students' engagement on the courses.

Activities, process and outcomes

The project has been implemented to the two sections of CHEM3860 – Transition Metal Chemistry Laboratory in three Phases (2nd term of AY2019/20 and 2nd term of AY2020/21). The implementation of experimental videos, PRS pre-lab quizzes and worksheets are done in Phase 2 for CHEM3860 in AY2020/21, also for CHEM2860 in AY2021/22. Pre- and Post-Course Questionnaires are used to monitor the intended learning outcomes (ILOs) and course delivery.

Deliverables and evaluation

Based on the evaluation results obtained, students showed a clear appreciation on the implementation of the mini-project and worksheet assessment on the course. Students also reflected their learning incentive and the interest on the Inorganic Chemistry is significantly stimulated and enhanced. The experimental videos function well to be a good teaching aid for the students to learn practical skills remotely and supplement the deficient on the lack of practical skills training.

Impact on teaching and learning

The implementation of a problem-based learning mini-project in the course received good comments and feedbacks from the students is much encouraging and it is happy to know that students' learning motivation is much stimulated. Through the Zoom platform, the teacher can communicate with students in groups easily and maintain a good communication to provide enough guidance for the students to design and write up their own laboratory manual. This can also help students to ease the challenges ahead of approaching and handling the mini-project and build up their self-confidence to accomplish the project. The mini project can stimulate the students to search reference materials and discuss with their peers. When doing the practical experiment, students can explore and compare the results under various reaction conditions with each other as each group of students' manuals are not the same.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Pedagogical studies of eLearning analytics for biological science STEM education and career development

Principal supervisor and unit: Dr. Lo Fai Hang (School of Life Sciences)

Project objectives

This project is composed on some pedagogical studies with three objectives: 1) the analytics of online teaching of biological science; 2) the pilot study of career planning of the students after online teaching; 3) the production of a STEM textbook tailored for eLearning.

For the first objective of the project, the big data stored on the cloud has been collected and analyzed from 1 April to 30 September 2021; the results have been submitted to and presented in *the 16th Congress of the Federation of Asian and Oceanian Biochemists and Molecular Biologists* (<https://www.faobmb2021.org/>).

For the second objective, the results have also been collected and analyzed from 1 April to 30 September 2021; the findings were submitted to and presented in the International Conference New Perspectives in Science Education Edition 12 (https://conference.pixel-online.net/NPSE/prevedition.php?id_edition=39).

For the third objective, the contents of the STEM textbook have been printed and distributed to the students with ISBN 978-988-76178-0-8.

It is grateful that, overall, the project completed as expected.

Activities, process and outcomes

The first objective of this project mainly focused on the pedagogical study of online teaching and learning (T&L) effectiveness of various lecture and laboratory courses in the School of Life Sciences. The study is divided into quantitative and qualitative aspects,

Quantitative Analysis

- Student perception: the students enrolled in the courses were surveyed to measure quantitatively their perception before and after their experience in the online teaching;
- Student motivation: the access of the eLearning materials by individual students was recorded and analyzed, in terms of the number of views and the number of minutes delivered in total
- Student performance: students were classified as ‘AB’ and ‘CDF’ groups, where ‘AB group’ indicated students with a final grade of ‘A’ or ‘B’ range and ‘CDF group’ indicated students with final grades of ‘C’, ‘D’, or ‘F’. Student performance were analyzed for any specific access patterns to the eLearning materials;
- Correlation study: the final scores of individual students were analyzed for any specific correlation to their access patterns to the eLearning materials.

Qualitative Analysis

- User experience: students were surveyed before and after the online teaching and their free comments will be recorded and analyzed;

The second objective of this project was a pilot study of how eLearning can be used for career planning and development in STEM education online.

Quantitative Analysis

- Student satisfaction: the satisfaction of the students for their career planning and development was surveyed and analyzed;
- Student values: the values of the students were studied by inventory and the students were asked to quantify their values for analysis;

Qualitative Analysis

- Student expectation: the expectation of university education of the students was surveyed and analyzed;
- Generic skills: some common generic skills proposed by the students were surveyed and analyzed; where, certain selected skills will be incorporated in the eLearning teaching courseware in the future;
- Career-specific issues: students were surveyed with a series of career-specific questions and their answers will be used for eLearning strategies and design;
- Correlation study: student academic performance and ideology, as well as the access patterns of eLearning materials were analyzed for any correlation to any possible career planning strategies.

The third objective of this project will produce a free textbook with professional collaboration tailored for online teaching. Pilot studies were performed to explore the possibilities of innovative eLearning activities.

As proposed, the findings of the two studies of the first and second object were presented in two international conferences; a textbook, which supplemented with two eLearning activities related to biological science, was printed and was also made available to the students for free.

Deliverables and evaluation

In addition to the two online micromodules (one was an online game related to COVID-19 PCR test and the other one was an in-house production of a documentary related to scientific innovation) incorporated to the proposed textbook, which were printed and distributed to students, the findings of the two studies were presented in two international conferences.

Gratefully, the three objectives and their deliverables of this visionary project were realized as planned without any changes: two abstracts were submitted and presented in two international conferences. The STEM textbook were printed by the end of 2021 with ISBN978-988-76178-0-8.

Dissemination, diffusion and sharing of good practices

The analytics of online teaching data, including 1) student perception, 2) student motivation, 3) user experience, 4) student performance, and 5) comparative study, were analyzed and the results were presented in FAOBMB 2021 in November 2021.

The findings of the pilot study of online teaching in facilitation of the career development of our students were presented in the 2022 International Conference New Perspectives in Science Education in March 2022.

The STEM textbook with ISBN was printed and distributed to the students, including Secondary School students in Hong Kong to university students in CUHK, taking our various online biological courses and STEM courses for free based on our established network.

Impact on teaching and learning

With reference to our findings of the analytics of online teaching data, the use of online teaching is correlated to the grading of the students. The results were promising that the effort put on online teaching or eLearning was worthwhile. With the preliminary data, we are able to effectively define the learning objectives and to better design further studies to study some subtler issues of online teaching and eLearning in the near future. Moreover, the data could also facilitate teachers to smoothly administer their online courses.

Regarding the findings of student career planning, they expanded the horizon of a teacher because some unexpected insights of the needs of our students for their career planning could be obtained. Based on the results, some more in-depth studies could be designed in the near future to practically help our students overcome their weaknesses and to look for a job.

Learning from the project:

- Key factors in determining success: to look for relevant literature so as to apply the theories and concepts of pedagogy during planning stage;

- Difficulties encountered: the unexpected outbreak of COVID-19 reminded us to be flexible and there ought to be some contingency plans;
- Impact and sustainability of the project: with data, some new ideas could be synthesized to suit the down-to-the-earth needs of teaching (online);
- Future plans/way forward: should have the big picture and vision of where the project is leading to;
- Suggestions to CUHK: it is a great effort to support some smaller pilot projects and let them grow to some great projects bringing about the impact on T&L effectiveness.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: DT-HUB – Developing a research-based resource collection for Learning Design Thinking and Technology Exploration with eLearning Tools

Principal supervisor and unit: Prof. Adam Fingrut (School of Architecture)

Project objectives

The objectives of this study are: (A) to promote and build capacity for pedagogy research on eLearning, (B) review of conventional teaching pedagogies among Hong Kong architecture studio courses in context of ‘making culture’, (C) develop and consolidate adaptations generated to those through eLearning and hybrid (on and offline) teaching methods, and (D) synthesize and report the findings from the previous points.

Significant progress has been made towards achieving the objectives in all aspects of the project. No changes are expected to be made to the original plan. The DT-HUB is now in working order, and module materials will continue to be added to the platform in perpetuity in areas pertaining to scanning, designing, and making methods for studio-based teaching and learning activities typically associated with architecture, but also including others.

Activities, process and outcomes

The DT-HUB has two primary functions:

1. As a platform for students to access to information from pre-existing micromodules. These are generally themed around technology adoption, under the umbrella terms of “scan, design, and build” as they related to observation/data collection, designing using computational technology, and the development of prototypes using robotics and CNC related equipment.
2. To collect specific feedback from students, pertaining to their use of the platform, further interests, and adoption of technology as part of their academic interests, and integration into their credit-bearing activities throughout UG and PG programmes.

Deliverables and evaluation

The key deliverables for this project are the following:

1. *Develop a working website entitled the DT-HUB, that can host teaching and learning materials in micromodule format.* A working prototype of the DT-HUB is near completion and includes a variety of teaching materials under the three key topics of SCAN – DESIGN – BUILD.
2. *Include methods for disseminating surveys and questionnaires to DT-HUB users. The working prototype includes a free user login system, that collects user contact information.* This was determined to be the most effective method for sending and receiving further communications, such as questionnaires about the use of the system, and new topics for expansion.
3. *Promote the system among students and faculty, as a conduit for continued development of materials and use among students.* This phase of the project has not yet begun as we are finalizing materials.

Dissemination, diffusion and sharing of good practices

The website interface of the DT-HUB has been developed using WORDPRESS and ELEMENTOR as an online web-development platform. While pre-developed templates and plugins were employed, these needed significant adaptation towards the graphic, formatting, and workflow requirements that were needed for the project, to tailor a system specifically for disseminating learning materials. In parallel to the website, templates for Micro Module formats and materials have been developed, as well as protocols for adding materials to the system – helping to set up Good Practice workflows for the future development of the platform shared between several members of staff, student assistants and students. To this end, an early year UG student has been engaged as webmaster – to facilitate updates into the future.

The development of the DT-HUB has been shared with other faculty who have shown interest in contributing once the system is fully operational – although given the pandemic situation, this will likely not occur until fall of 2022.

Impact on teaching and learning

This project has impacted the framing and development of instructional teaching materials by considering a growing framework for production, formatting, and dissemination of micromodules as a series. Under the three umbrella categories of SCAN, DESIGN, and BUILD, it contextualizes the work into Design Thinking methodologies based on the following breakdown:

SCAN - **observation**, data collection, digitization, emulation.

DESIGN – analysis, **definition**, simulation, modification, **ideation**, reflection, communication.

BUILD – synthesis, translation, **prototyping, testing**.

This type of resource is important as it allows students to find necessary references for highly specific material in a singular location online. This is fundamentally different than searching for resources on YouTube, as the material generated is fundamentally developed in coordination with faculty and students, and specific to the hardware and learning objectives found in CUHK course curriculum.

The general response is that the website is simple, flexible, and usable for students.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Cantonese Linguistics****Principal supervisor Prof. Tang Sze Wing (Department of Chinese Language and Literature)
and unit:****Project objectives**

The course aims to explore the history, regional distribution, and language features of Cantonese, and to compare the grammatical differences between Cantonese and Mandarin, with a focus on the diachronic language changes, synchronic syntax, Cantonese phonetics and the applications of the phonetic clues.

Activities, process and outcomes

We hired part-time research assistants and other service providers to be responsible for an online discussion platform. Three- to four-minute video clips with voice-over and subtitles in Chinese were produced as the new micro-modules. Illustrations were adapted and written professionally by academics. Some assessment items are added, such as multiple-choice questions, fill-in-the-blank questions, and online discussion. Academic articles are also provided as supplementary materials.

Deliverables and evaluation

The project has developed 5 themed modules containing 17 video clips as the main course material of the micromodules. Some non-MM learning content and activities are added, e.g., supplementary readings, online exercises, online meetings, and summative assessment.

Dissemination, diffusion and sharing of good practices

The SPOC has been launched on KEEP Moodle as the first phase of the project. It will also become widely accessible by CUHK community and public through three layers: 1) preset as the self-learning materials for the courses of CHLT 1102, 1202 and 1104 in Blackboard; 2) made accessible through the KEEP platform; 3) promoted in the induction activities of mainland Chinese students.

Impact on teaching and learning

As supplementary self-learning tool, the Cantonese Linguistics SPOC can improve the effectiveness of teaching and learning by providing a platform for learning outside classroom. It can also provide learners with foundational knowledge for further exploration and studies in related fields and topics.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Using Superhero Films to Construct Transitional Courses to Assist Students in Developing their Learning Skills for University Studies**

Principal supervisor and unit: **Prof. Steven Gallagher (Faculty of Law)**

Project objectives

To produce six high quality animated superhero videos introducing basic and more advanced topics in the study of law. These will be available for students to watch before and after they take their classes. The RA will also help develop the supporting materials for the Videos- more detailed written notes and longer videos explaining general concepts of law. The RA will also oversee the collection of data for research into the success or otherwise of the project.

Activities, process and outcomes

The six videos were produced and supporting materials prepared. The first three have been used to support the course LAWS0008 The Avengers, Superheroes and the Law for CUHK's Summer Institute in 2021. They will also be used to support the next iteration of this course in August 2022. All six have been used to support continuing professional development (CPD) seminars for the Law Society of Hong Kong.

Deliverables and evaluation

The six videos have been produced and the supporting materials. The first three have been used in the SPOC for the Summer Institute in 2021 and all six will be used for the SPOC in August 2022. The feedback from participants was very positive, especially concerning the usefulness of materials in engaging participants in further developing their learning in these areas.

Dissemination, diffusion and sharing of good practices

The course and the materials have been presented at teaching and learning conferences including the CLEAR EXPO 2021, CUHK LAW's Directions in Legal Education Conference 2022, and as a seminar for CUHK LAW's teaching and learning in law seminars in 2022.

Impact on teaching and learning

- Students have commented in the CUHK CTE process that the materials supplemented the videos and online classes which enhanced their understanding and learning.
- Practitioners at the continuing professional development seminars gave very positive feedback on the materials and courses.
- From a teaching perspective, I found the animations and materials very useful to refer students to and to initiate questions from the students and discussion.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Guided Micro-Module Learning to Improve Student Mental Awareness and Well-Being: Online Training Modules to Prevent Sexual Harassment (Series 1)**

Principal supervisor and unit: **Prof. Simon Ng (Department of Surgery)
Dr. Isabel Hwang (Student Wellness)**

Project objectives

The major objective of this project is to empower and educate our medical students, through the use of guided and interactive micro-modules, to understand what constitutes sexual harassment in different scenarios that are relevant to their future profession. In this project, we pilot formal and professional micro-module training for all newly admitted (mostly first-year) medical students. The key learning outcome for students is knowing how to protect themselves, their university peers and their future patients. As students navigate the different scenario-based micro-modules, they also learn the duty of reporting and how such reports are done. For example, roles and impact of bystanders in some case scenarios. This early training is extremely important as it will lay the foundation for building resilience and professionalism into the curriculum. Moreover, the design of these micro-modules will be specifically adapted to the future work environment of doctors which are also relevant to other healthcare professionals.

Activities, process and outcomes

All newly admitted medical students is required to sign a *Code of Conduct* in early September 2021 which includes a mandatory requirement to complete these training micro-modules against sexual harassment. These micro-modules (in both English and Chinese) were accessible to the students starting from 29th December 2021 on Blackboard as a non-CUSIS course (i.e. no course code will be attached to these training micro-modules). The title of this non-CUSIS course is 2021 Online Training Micro-Modules to Prevent Sexual Harassment (MED-PSH). All students are given time to complete the micro-modules by their preferred language on or before 31st March 2022. A pre-launch survey was conducted in early December 2021 to measure the general awareness of sexual harassment in medical students. A post-launch survey was also conducted in April 2022 to measure if the online training is able to improve some general misconceptions about sexual harassment. More results will be available for sharing in suitable conference(s) later in 2022/2023.

Deliverables and evaluation

As mentioned in the application proposal, there are a number of pedagogical goals we aim to achieve in this project:

- To recognise definitions and types of sexual harassment
- To raise knowledge and awareness of sexual harassment
- To sensitise first year medical students about the offensiveness of sexual harassment
- To recognise the impact of bystanders
- To cultivate a more inclusive study and work environment amongst students
- To align with bioethics and professionalism training in the medical curriculum

Our preliminary results from the pre-launch and post-launch surveys showed that there is statistically significant improvement in the students' awareness towards sexual harassment, enhanced student knowledge, attitude and practice towards sexual harassment, with particular edge in addressing certain aspects of anti-sexual harassment. Interestingly but not surprisingly, we also found that students are still somewhat unsure about the roles and responsibilities of bystanders in sexual harassment even after receiving the online training. Therefore, this will be an important area that we need to reinforce or improve further in the future.

Dissemination, diffusion and sharing of good practices

A sharing about this online training to medical students via micro-modules was made possible by the Teaching

and Learning Community of Practice Sharing Series - Implementation and Designs of Micro-Modules across Disciplines. The sharing session was conducted on 01 April 2022, Friday (2:30 p.m. – 4:00 p.m. HKT)

Impact on teaching and learning

As we are still analysing our pre-launch and post-launch survey results, the measured impact of this project will be reported in the near future through suitable conference such as the Teaching and Learning Innovation EXPO organised by CLEAR, ITSC and ELITE.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Learning in-hospital cardiopulmonary resuscitation with web-based video games.

Principal supervisor and unit: Prof. Wong Wai Tat (Department of Anaesthesia and Intensive Care)

Project objectives

Managing different types of cardiac arrest is essential learning for final year medical students before their graduation. The virtual practice of leading a resuscitation team in the form of web-based video game to manage an urgent situation of sudden cardiac arrest in the ward can likely enhance students' technical and non-technical skills in resuscitation.

Activities, process and outcomes

A web-based video-game, which requires the students to finish all the tasks promptly, is produced. There are two scenarios in the game: 1. Management of asystole and Pulseless electrical cardiac (PEA) arrest and 2. Management of Ventricular Fibrillation (VF) and pulseless ventricular Tachycardia (VT) cardiac arrest. The game was made available for final year medical students during their two weeks acute medicine course in the academic year of 2021-2022 and 2022-2023.

Deliverables and evaluation

Eighty percent of them attempted the game before attending the face-to-face teaching session and most of them made multiple attempts to pass the game. Most students agreed that the CPR game could improve their understanding and confidence in the management of in-hospital resuscitations.

Dissemination, diffusion and sharing of good practices

The development process, the final product and the students' evaluation were shared in the teaching and learning Expo of CUHK 2021 and the Asian Pacific Medical Education conference 2022 as a poster presentation.

Impact on teaching and learning

This project will be the starting point to develop a web-based computer game for training in acute medicine. Besides cardiac arrest management, managing patients in shock, comatose state or developing anaphylaxis can be simulated in a video game learning platform. Other video game-based training modules can be produced as the extension of the project or other new projects.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Online Practical Course for Basic Bedside Surgical Procedures****Principal supervisor and unit: Dr. Futaba Kaori (Department of Surgery)****Project objectives**

To produce a peer-led small private online course for pre-interns to allow them to learn the essential practical skills needed as interns with supplementary hands-on practical course to allow the pre-interns to practice these skills on manikins, under the guidance of tutors.

Activities, process and outcomes

A Focus group was formed including interns and medical officers to decide on which procedures were important for interns. Video recordings were made for demonstrations of the procedures on manikins and on real patients. These video recordings were edited and narrated to fit the online material for the course. The course was offered to CUHK MBChB graduates. 160 students completed the online and hands-on course, supported by 16 tutors. Tutors were Interns and basic surgical trainees as they understood the needs of the pre-interns and participants found it easier to ask questions during hands-on course.

Deliverables and evaluation

The online course included modules on Personal protective equipment, arterial, venous blood and blood culture taking, urinary catheterization, hand tie, drain removal, anchoring and shifting drains, wound assessment. The hands-on course consisted of small group sessions (1 tutor:6preinterns) on above over 2 consecutive weekends.

139 students completed the evaluation form. 85.4% agreed that online interactive modules were helpful in learning bedside procedures. 89.1% agreed with the range of procedures covered. The majority found the course invaluable, especially due to limited clinical exposure during the covid pandemic.

Dissemination, diffusion and sharing of good practices

Oral presentation at the Teaching and Learning Innovation Expo 2021.

Impact on teaching and learning

Peer-led teaching ensured course content to be relevant with excellent tutor-participant interaction. Also inspired some tutors and participants to become an educator.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Introduction and Case Study Sharing on Human Physiology and Musculoskeletal System

Principal supervisor and unit: Prof. Yung Shu Hang Patrick (Department of Orthopaedics and Traumatology)

Project objectives

Application of hands-on practical skills and clinical examination in real-life setting is a crucial part in the study of Human Physiology, Musculoskeletal System and physical examination of MBChB year 4 studies. In order to promote effective learning, two new online courses, Human Physiology & Musculoskeletal System, have been developed. The project aims to equip students with in-depth knowledge in human physiology and musculoskeletal system and act as prerequisite courses for students with non-medical backgrounds would like to pursue further study in medical stream.

Activities, process and outcomes

Two courses, namely Human Physiology and Musculoskeletal System, are developed. The fundamental principles of Human Physiology and Musculoskeletal systems will be shared through lecture micro-modules. Common injuries and major diseases related to specific anatomy or physiology topics will be discussed in the lecture as examples or case studies to put theoretical knowledge into real practice.

Deliverables and evaluation

The project is expected to be completed in July 2022 as there was a delay in the progress due to COVID-19 pandemic. All lecture recording will be finished by the end of June. The courses will be launched at the online learning platform Coursera in August.

	Human Physiology	Musculoskeletal System
Number of sub-topic	5	4

Dissemination, diffusion and sharing of good practices

The courses will be promoted using online channels, e.g. CU Mass Mail, Department's Website, etc. Online learning facilitates knowledge transfer as it makes knowledge easily accessible for students at anytime and anywhere, even if they were in quarantine.

Impact on teaching and learning

E-learning has become a major teaching force in the world. The integration of new technology into education provides more possibilities for both teachers and students.

Students can replay the video continuously for a better understanding of the topic they are studying, as to deepen the impression while in the learning process. Students are expected to develop a more comprehensive and in-depth understanding of different anatomical and physiological problems after taking the courses.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Combining Live Streaming Demonstrations and Pre-Recorded Micro-modules for Online Teaching of Organic Chemistry Laboratory Courses

Principal supervisor and unit: Dr. Mak Kin Wah Kendrew (Department of Chemistry)

Project objectives

To develop possible methods of delivering laboratory courses over online platforms, and evaluate their effectiveness, so as to provide protocols and experience for teaching online laboratory courses in the future.

Activities, process and outcomes

Live streaming of real-time demonstrations and pre-recorded micro-modules on experiment demonstrations were evaluated in a total of six courses in the four semesters of 2020-21 and 2021-22. It was found that although students still strongly prefer first-person hands-on experience for laboratory courses, they accepted both ways of conducting the laboratory courses online whenever face-to-face session cannot be arranged. Pre-recorded demonstration videos were also tried to be used as pre-lab tasks as supplements for hands-on laboratory sessions.

Deliverables and evaluation

Although students still strongly prefer hands-on experience, both methods of conducting the laboratory courses online were accepted. Both methods are effective on showing how the experiments are carried out, and students can have a better understanding of the experiment by watching pre-recorded videos. Pre-recorded videos can also be used as course supplements when F2F session can be arranged, as it improves students' understanding of the experiment's theory and result.

Dissemination, diffusion and sharing of good practices

The project idea, deliverables and outcomes were shared in the recent CUHK EXPO (July 2021) as a poster presentation. Pros and cons for both methods were discussed. For pre-recorded videos, although the video quality can be optimized, and the content is more condensed, there is no teacher-students' interaction and it's difficult to keep track of students' attention. As for live-streaming, there is teacher-students' interaction, and students can view the details of the experiment. However, students have a hard time to concentrate for 2-3 hours, and the video quality is not as good as pre-recorded videos.

Impact on teaching and learning

Pre-recorded videos and live-streaming as substitutes of face-to-face sessions were explored and evaluated, and were both accepted by students. This means that when face-to-face learning is restricted again, there will be a ready-to-use protocol to keep the course schedule uninterrupted. Pre-recorded videos were also found to be possible supplements for hands-on laboratory sessions to increase students' learning effectiveness and their confidence when performing experiments. The protocol can also provide reference for collaborative teaching for practical training among teaching organizations that are geographically separated.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Dr Ray's magical virtual lab in biochemistry ~SPOC of experimental skills of biochemistry~

Principal supervisor and unit: Dr. Lo Fai Hang (School of Life Sciences)
Dr. Ngai Hung Kui Patrick (School of Life Sciences)

Project objectives

This project aims at producing a high-quality Small Private Online Course (SPOC) of a one-unit Biochemistry Laboratory with six virtual experiments in clinical biochemistry. Virtual Reality (VR) is a technology allowing our students to enter an artificially created high risk clinical laboratory which is usually unavailable for undergraduate students. The six micro-modules (or virtual lab game) covering a series of representative and relevant techniques, including mass spectrometry, medical microbiology, and immunohistochemistry, for the students to complete as a course. The content is equivalent to a standard one-unit laboratory course in the university. In this SPOC, the student users will meet Dr Ray, who will guide them to go through the six individual virtual lab games (micro-modules) related to some high-risk experiments; only after the completion of game 1, which serves as the pre-requisite, should be students be granted to play game 2, and so on. Finally, when the students finish all the micro-modules, they will say good-bye to Dr Ray and move to take some quizzes for the consolidation of their learning.

Activities, process and outcomes

The present project planned to produce five micro-modules for the SPOC as follows,

#	Topic	MM Name	Language	Duration (in minutes)	Styles
1	Biochemical diagnosis	Introduction to mass spectrometry	English	20 minutes	Virtual lab
2	Biochemical diagnosis	Introduction to selective media in microbiology	English	20 minutes	Virtual lab
3	Biochemical diagnosis	Introduction to the measurement of antibiotics sensitivity	English	20 minutes	Virtual lab
4	Biochemical diagnosis	Introduction to bacterial enzyme expression	English	20 minutes	Virtual lab
5	Biochemical diagnosis	Introduction to the principles of immunohistochemistry	English	20 minutes	Virtual lab

Each micro-module shall contribute a specific virtual experiment in the SPOC; in this proposed SPOC project, each micro-module shall be designed as a virtual lab game. Each student is invited to play according to the funny guidance of Dr Ray in the game. Dr Ray will also highlight the key concepts and skills of the experiments in each game. Collectively, this SPOC service as a virtual laboratory course dedicated to the education of the practical skills in clinical biochemistry.

Deliverables and evaluation

This SPOC is a virtual laboratory course designed for life science students to enhance their practical skills. The academic standard of this SPOC is roughly equivalent to a one-unit laboratory course; which consist of six representative experiments in clinical biochemistry to practise with the aid of VR technology. There are two pedagogical goals: 1) gamification of the learning process and 2) the mastering of standard procedures.

Once the hardware and software of the SPOC are established, it will be incorporated in the final year laboratory courses in the Biochemistry Programme for the students to enroll and practise according to their pace of study.

A number of key performance indicators (KPIs) have been developed by the team that serve as the evidence of success; quantitatively, there were three indicators: 1) the positive feedback from our experienced experts; 2) positive feedback from the student users; 3) improved performance among our students. Qualitatively, there were two indicators: 4) positive survey/focus group feedback from the students, and 5) positive outcomes from the feasibility study. Details of the KPI and evaluation are as follows,

User experience

- understanding of the objectives of the virtual lab
- understanding of the procedures of the virtual lab
- understanding of the data interpretation of the virtual lab

Expert review

- effectiveness of the virtual lab to capture students' attention
- effectiveness of the virtual lab to engage students
- effectiveness for learning the experimental procedure
- effectiveness for learning the principles of the experiment
- extent of the virtual lab to replace real lab

Dissemination, diffusion and sharing of good practices

Owing to the outbreak of COVID-19 from January and April 2022, official face-to-face student activity was not possible in CUHK. The SPOC is expected to be available to the students to try in 2022/23.

Impact on teaching and learning

We are confident that there is some impact of our project and the pedagogical effectiveness is significantly improved (Lee *et al* 2021). Based on personal reflection, unlike other traditional laboratory, there was a lot of laughter during the virtual lab activities. The students were having fun. Owing to the promising results, we would continue our effort to expand the SPOC to other platform so as to make the online course even accessible even if face-to-face teaching is suspended.

Moreover, in terms of the project deliverables, the SPOC will be made available in 2022/23. According to our studies, the SPOC could be considering as a formal training activity of the laboratory skills concerned; students experienced with the virtual lab are better prepared for the real experiments. Furthermore, students were less stressed when they tried the virtual lab and they had more fun.

Since our team has tried out many different pedagogical innovations with multiple technological platforms, we are amazed by the latest technology, such as the integration of the concept of 'metaverse' to education. The key to success is the motivation and vigour to catch up with the unquestionable digital revolution.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: To support the development of an online course on national security

Principal supervisor and unit: Ms Judy Lo (Information Technology Services Centre) / the Centre for eLearning Innovation and Technology (ELITE)

Project objectives

This project team aims to support the development of the University 1-unit online course related to national security. The course will be launched in 2022/23 as pilot. Upon successful pilot run, the course will be offered to CUHK students as part of the core-requirement. The key objective of the course is to help students build a sense of national identity and commitment, and awareness of national security law, and increase their readiness for global challenges. It aligns with the University's strategic goal on the development of global-ready graduates. To make the course an attractive one to students and address their needs, much effort is needed to design the content and pedagogy of the course. Assessment of this one-unit online course will be based on completion of the online learning module of each topic and a final exam.

Activities, process and outcomes

The project team started supporting Professor Zhaoxin Jiang on the content development of the course. The course title is "Hong Kong in the Wider Constitutional Order". A working group with members from OGE and CLEAR help review and provide Professor Jiang feedback on the course content. While Professor Jiang is fine-tuning the course content according to the feedback from the working group, the project team started working on the course video design to fit the course content and to ensure effective delivery to students from a wide range of background.

Deliverables and evaluation

The 1-unit online course on Blackboard (including the course learning videos, topic quizzes) will be the deliverables of this project. Once the online course is ready for initial preview, stakeholders will be invited to preview the course and provide feedback to fine tune the course before official launch for the students.

The project team will make use of all possible evaluation tools and dimensions, including student surveys, focus-group interviews and the course logs to evaluate the effectiveness of the online course.

Dissemination, diffusion and sharing of good practices

The development and production process of this online course are documented and will be shared with teachers and units interesting in development similar online courses in the future as a showcase example. Attention will also be on ensuring the accessibilities of the course to students with a wide range of background and special educational needs.

Impact on teaching and learning

Upon successful pilot run, this 1-unit online course will be offered to CUHK students as part of the core-requirement. The development and production will also have a showcase effect to teachers and units interested in developing online courses in the future.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: To support the development of an online course on understanding China

Principal supervisor and unit: Ms Judy Lo (Information Technology Services Centre) / the Centre for eLearning Innovation and Technology (ELITE)

Project objectives

This project team aims to support the development of the University 1-unit online course on topics related to understanding China. The course will be launched in 2022/23 as pilot. Upon successful pilot run, the course will be offered to CUHK students as part of the core-requirement. Assessment of this one-unit online course will be based on completion of the online learning module of each topic, the readings, and a final exam.

This new one-unit online course would be positioned as a series of master classes. The series of master classes would start off with an introductory lecture by Professor Rocky Tuan, the Vice-Chancellor. The introduction would be followed by master classes conducted by renowned scholars, most of whom had been holding key positions at CUHK throughout the time, each on a major component of the course.

- I. Introduction
- II. Cultural Perspectives
- III. Historical Perspectives
- IV. Modernization and Society
- V. Economic Development
- VI. Science and Technology

Activities, process and outcomes

The project team started working with CUAV and OGE on the master class lectures. The video shooting of most master class lectures will be completed in June. The introductory lecture by Professor Tuan will be scheduled in 2022 July or early August.

Deliverables and evaluation

The 1-unit online course on Blackboard (including the course learning videos, readings, and topic quizzes) will be the deliverables of this project. Once the online course is ready for initial preview, stakeholders will be invited to preview the course and provide feedback to fine tune the course before official launch for the students.

The project team will make use of all possible evaluation tools and dimensions, including student surveys, focus-group interviews and the course logs to evaluate the effectiveness of the online course.

Dissemination, diffusion and sharing of good practices

The development and production process of this online course are documented and will be shared with teachers and units interested in development similar online courses in the future as a showcase example. Attention will also be on ensuring the accessibilities of the course to students with a wide range of background and special educational needs.

Impact on teaching and learning

Upon successful pilot run, this 1-unit online course will be offered to CUHK students as part of the core-requirement. The development and production will also have a showcase effect to teachers and units interested in developing online courses in the future.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Flipped Classroom through Gaming: Developing Web-based Computer Games and Illustrative Videos for the Study of Advanced Harmonic Practice in Music Composition**

Principal supervisor and unit: **Prof. Chan Kai Young (Department of Music)**

Project Summary

The compressed sound quality of Zoom online teaching has been a great threat to the teaching and learning in music courses. It is essential that e-learning resources with high-quality audio be developed to enhance students' learning of the core concepts and free up class time for group interaction and feedback. This project will move beyond micro-modules in my flipped classroom approach through developing web-based games and accompanying videos.

Advanced Harmonic Practice is a core theoretical and creative course of the Music Department. To make the learning process more engaging and effective through the online-teaching environment, this project aims to produce a total of three online games and a set of accompanying videos that cover three of the most challenging topics of advanced harmonic practice: symmetrical scales, modality, and polytonality. The games will be interactive and automatically generate musical chords in response to students input under specific constraints designated by the topics. As the students play the games, they will get familiar with the complex ideas through a fun, hands-on, and step-by-step approach. To assess their learning, students are expected to use results generated through the games to create music of their own, then share the results with the instructor and their classmates for feedback. The accompanying videos are designed to explain the musical concepts and will point them to other resources to further consolidate their learning.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: Online learning in undergraduate practical music classes****Principal supervisor and unit: Dr. Poon Kiu Tung (Department of Music)****Project objectives**

Social distancing under COVID-19 poses serious problems in applied music instructions, especially in real-time collaborative music making. Audio distortion in network communication worsens the teaching and learning quality and the network latency makes it impossible for musician to play together. This project aims to utilize technology to delivers alternative forms of Chamber Music training, to improve the audio quality of online practical music training, and to support practical musicianship training in a year one foundation course when face-to-face instruction is not available.

Activities, process and outcomes

Customized practical online music learning tasks were assigned to students for self-practice and assignments, and to facilitate online collaborative work and to make flipped-class approach possible on chamber music learning. Musicianship training in the foundation course was mostly substituted by customized tasks on a software. Several experimental network music performance platforms were experimented and successfully facilitated local and oversea exchange.

Deliverables and evaluation

1. The first successful remote masterclass with Yamaha Disklavier technology in Hong Kong and an exchange with the University of Memphis through the technology
 2. Student-faculty online exchange in the Hong Kong-Macau area
 3. Technology-enhanced self-practice, rehearsal, and chamber coaching for students
 4. Online and livestream concerts for assessment
 5. Two musicianship training digital courseware was adopted for blended learning
- A survey and a focus group interview were completed in 2021 on the effectiveness of implementing three software. The result was positive.

Dissemination, diffusion and sharing of good practices

This project resulted in a conference paper and an online talk presented in 2022. Another conference paper will be presented in January 2023.

Impact on teaching and learning

The pedagogical design achieved in this project and the experience learned is expected to be a valuable contribution to elearning development in applied music education.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: eLearning Courseware for Elementary Japanese Language Learning

Principal supervisor and unit: Prof. Ho Chi Ming (Department of Japanese Studies)

Project objectives

This project aims to create an eLearning platform for the elementary Japanese language learning Level 3 and 4 in CUHK. The original Japanese language textbooks ‘Nihongo’(Japanese) published by Department of Japanese Studies (first published in 1992 and 5th revised edition completed in 2019) is the main teaching materials for all CUHK elementary Japanese courses. With the support of Courseware Development Grant Scheme (2018-19), the first online Japanese language courseware for ‘Nihongo’ was launched successfully in September 2019. This courseware will be its second part.

Activities, process and outcomes

This courseware contains the following 3 parts.

- i Learning Vocabulary
Introduce new vocabularies which are related to the topics in textbooks but not included in the textbook.
- ii Online Vocabulary Game
Check the vocabulary knowledge in ‘Learning Vocabulary’.
- iii Online Grammar Quiz
Check the grammar knowledge with those new vocabularies by using multiple choice, matching, sentence completion type questions etc. The grammar patterns used in this courseware are the same as in the textbooks.

Project Plan

1st month – 6th month: preparation of courseware material for Book 3 (Chapter 25 - 36) and ITSC computer programming work.

6th month – 10th month: preparation of courseware material for Book 4 (Chapter 37 - 48) and ITSC computer programming work.

11th month – end of project: Survey for collecting comments/feedbacks from students and teacher is completed.

Deliverables and evaluation

The outcomes and deliverables are as below:

- i Learning Vocabulary
Total 24 chapters and around 600 new vocabularies have been created.
- ii Online Vocabulary Game
Total 24 chapters and around 500 new vocabulary game items have been created.
- iii Online Grammar Quiz
Total 24 chapters and around 300 grammar quiz questions have been created.

Dissemination, diffusion and sharing of good practices

Department of Japanese Studies plans to disseminate this courseware in 2022/2023 in JASP2470 and JASP2480 which are courses for Japanese Studies major students.

Impact on teaching and learning

This project can provide extra learning resources for students on top of regular teaching materials in order to

maximize the learning capacity in each chapter. In the pedagogical perspective, the project content is the best combination of supplementary course material for outside classroom learning. Students can apply the entire courseware or any particular chapter in the courseware to conduct self-study easily and effectively.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: From a fresh market to a modern retail space: Using VR technology to introduce Central Market in real estate education

Principal supervisor and unit: Dr. Liusman Ervi (School of Hotel and Tourism Management)

Project objectives

The project objectives are (1) to engage students using interactive courseware; (2) to provide students with immersive experiences; (3) to complement the physical field trip.

Activities, process and outcomes

The project period was from 5 October 2021 to 30 April 2022. The activities conducted include pre-filming location survey, VR filming and post-production, scriptwriting and voiceover recording, etc. The production was within schedule and HTMG3520 students could timely viewed the VR courseware as their virtual field trip.

Deliverables and evaluation

One interactive courseware “VR Central Market” was produced, consisting of more than 50 spots where the students need to explore on their own. It takes approximately 60 minutes to explore the entire spots. The project evaluation includes feedback survey, pretest and posttest quizzes, scrutiny of web log and teacher’s reflection.

Dissemination, diffusion and sharing of good practices

The developed VR courseware was launched on 23 March 2022 and is available on the website ([Central Market \(viewin360.co\)](http://CentralMarket.viewin360.co)). To share the good practices of adopting VR courseware as an alternative teaching approach, the project will be presented at CUHK Community of Practice Symposium of Education Innovation and Technology 2022 and 28th Annual Conference of the European Real Estate Society (ERES).

Impact on teaching and learning

Based on the questionnaire survey completed by HTMG3520 students, 86% of respondents satisfied with VR experience. 80% of respondents could fully engage themselves through VR tour. 96% of them agreed that VR tour provided them an immersive experience. Besides, their learning performance has been enhanced as their posttest quizzes accuracy were significantly increased after viewing the VR tour.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: An Online Exam Invigilation System Based on Face Recognition****Principal supervisor and unit: Prof. Wu Daoyuan (Department of Information Engineering (IE))****Project objectives**

In this project, we aim to propose a face recognition-based invigilation system to assist teachers and examine students (so that they have less intention to cheat). Specifically, this system takes in-exam Zoom video recordings as inputs and automatically recognizes unmatched students and the students with abnormal behaviors (e.g., hiding or rotating faces) during the exam.

Activities, process and outcomes

- Activities: we have designed and implemented an online exam analysis software called iExam;
- Process: we further evaluated iExam in the online exam invigilation of three CUHK courses;
- Outcomes: with iExam, students expect to behave better than that without iExam's monitoring.

Deliverables and evaluation

- Three courses have tested iExam in their online exam invigilation, i.e., IERG4130, CSCI3180, and IEMS5710. The evaluation shows that iExam achieves good accuracy and performance.

Dissemination, diffusion and sharing of good practices

- A website at <https://vpriab.github.io/iexam/> and the code at <https://github.com/VPRIab/iExam/>;
- A presentation https://daoyuan14.github.io/slides/Expo21_iExam.pdf at the 2021 CUHK Teaching and Learning Innovation Expo (<https://www.cuhk.edu.hk/eLearning/expo2021/talks/>);
- A technical report at *arXiv* (to be public and will be submitted to *Journal of Intelligent Systems*).

Impact on teaching and learning

- For teaching: iExam helps reduce teachers' overhead during online exam invigilation;
- For learning: (i) since iExam is open-sourced, any UG students who want to learn AI can study our code; and (ii) this project has trained one final-year UG student and a postgraduate student.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: 360-Degree Immersive Video Tours Inside Hong Kong Pharmacies****Principal supervisor and unit: Dr. Zhou Rui Keary (School of Pharmacy)****Project objectives**

The overall goal of the project is to introduce students to different environments where pharmaceutical products are manufactured, prepared, stored, and dispensed, including hospital and community pharmacies, as well as the industrial pharmaceutical manufacturing site.

The above is to be achieved by using 360 degree immersive site visit videos.

Activities, process and outcomes

- Five 360-degree immersive videos covering various pharmaceutical settings in Hong Kong were made.
- Finalized video films were uploaded to Blackboard and managed under each course' Blackboard page.
- Finalized survey questions for project evaluation were completed by pharmacy students after the completion of course
- Focus group discussions were also conducted. Students' feedback are quite positive in general.

Deliverables and evaluation

- Student surveys were conducted by questionnaires. The surveys assessed students' perception on the extent to which the project may have achieved its objectives
- Small group interviews of students' learning experience focused on
 - Clarity of the contents
 - Enhancement on understanding of various pharmacies
 - Further questions after the virtual site visit exercise and necessary discussion needed in class to facilitate learning

Dissemination, diffusion and sharing of good practices

- The videos we created may also be used for future international exchange students' self-learning of the Hong Kong healthcare and pharmaceutical system, before embarking on their exchange activities.
- The videos may also be shown to the School of Pharmacy's mainland and overseas visitors for a more in-depth introduction of the pharmacy world in Hong Kong.
- We hope to present the project in the next Teaching & Learning Expo and future pharmacy educational conferences.

Impact on teaching and learning

This effective way of site visits is time saving for both the site pharmacists as well as the students. Class time can be spared and turned into a flip-classroom format to further discuss the pharmacy sites and pharmacist duties in detail. The information given in the video is also consistent since the variability of delivery in between preceptors or in between site visit sessions can be reduced.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: The Operation Theatre Inside Out: 360-Degree Virtual Tours

Principal supervisor and unit: Prof. Wong Cho Lee Jojo (The Nethersole School of Nursing)
Mr. Cheng Hai Kiu Kelvin (The Nethersole School of Nursing)

Project objectives

This project aimed to develop a courseware that cover a major topic “Peri-operative nursing” in a third-year theoretical nursing course and a fourth-year clinical practice course. The objectives were to (1) maximize students’ learning by allowing them to learn at their own pace through the use of courseware; (2) enable students to better understand the different zones in the operation theater; and (3) support flipped classroom implementation.

Activities, process and outcomes

A video was shot in nursing laboratory showing how the nurse prepare the patient prior to surgery. Three 360-degree immersive videos were shot in a public hospital, introducing the patient reception area; operating theatre room; and post anaesthetic care unit in the operation theater.

Deliverables and evaluation

A courseware consisting of four scenarios has been produced and used in two courses. The project has been evaluated through quantitative survey and qualitative interviews with positive results.

Dissemination, diffusion and sharing of good practices

This courseware has been used in a third-year nursing course “Nursing in the Hospital II” and a fourth-year clinical practice course “Clinical practice IV”. Deliverables have been shared at a local conference and a lecture related to the use of innovative technologies in nursing education.

Impact on teaching and learning

Findings of quantitative surveys and qualitative interviews indicated that courseware support students’ learning. As flipped classroom will continue to be implemented, the current project will also help motivate teachers to produce more innovative courseware (360-degree immersive video) to facilitate flipped classroom implementation in other courses.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Enhancing Interactive Teaching and Learning in Obstetrics and Gynaecology through the Use of Customized Graphic Designs and Innovative Animations**

Principal supervisor and unit: **Dr. Lau So Ling Caitlyn (Department of Obstetrics and Gynaecology)**

Project objectives

1. Uplift student attention and self-learning motivation;
2. Improve the effectiveness of teaching and learning (T&L) in medical curriculum;
3. Enhance the efficacy of teaching and student learning with innovative pedagogies.

Activities, process and outcomes

We have adjusted the project focus accordingly in order to meet the needs of teachers and students and to achieve the goals of this project and to increase cost effectiveness.

Part 1: Educational game for the chapters including: antenatal screening tests and prevention, abnormal fetal number, early pregnancy complications, treatment for infertility and reproductive technology and gynaecological oncology.

Part 2: Post-production of real surgical procedure

Part 3: Picture of dissected organs with explanation

Deliverables and evaluation

Updated project deliverables has been achieved as below:

No.	Expected deliverables	Key performance indicators (KPIs)
1	O&G interactive training	5 chapters
2	Video with demonstration of O&G surgical procedures.	28pcs of video clip
3	Medical picture of dissected organs with explanation	30pcs

Student and teacher satisfaction were examined by quantitative evaluation at the end of each module. The result reveals that the application is user-friendly. Meanwhile, their interests in learning Obstetrics and Gynaecology significantly improved after the activities.

Dissemination, diffusion and sharing of good practices

The developed teaching materials were introduced and implemented in the course MEDU4110 - Obstetrics and Gynaecology Module, which was taught in year 5 of the Medicine (MBChB) Programme, under the Faculty of Medicine, in the academic year 2020-21 and 2021-22, with over 240 students. Overall, based on the project outcomes and deliverables produced, the project was accomplished to satisfaction by both teaching faculty and students.

Impact on teaching and learning

This project fully embraced CUHK strategy with the sustainability of continuous quality enhancement in T&L by strengthening student self-learning skills and implantation of eLearning and innovative pedagogies.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Development of one-stop web-mobile quiz bank for in-class interactive activities and off-campus student self-exercise.**

Principal supervisor and unit: **Prof. Leung Tak Yeung (Department of Obstetrics and Gynaecology)**

Project objectives

- (1) To facilitate teacher to create, update and validate the questions anytime anywhere.
- (2) To promote student-to-teacher interactions with class activities.
- (3) To better engage students in their learning in medical education.
- (4) To increase self-learning motivation of students.
- (5) To analyze data on the learning progress of the students to enhances early identification of outstanding and weak students.

Activities, process and outcomes

As a team comprised of teachers of various subspecialties from the Department of Obstetrics and Gynaecology, we have successfully produced an one-stop web-mobile quiz bank on 42 lecture topics throughout the Obstetrics and Gynaecology Module of the medical curriculum, we have created the functions as below in the platform “OG Made Easy APP”:

- (1) Question creation, validation and updating (for teachers only);
- (2) Creation of in-class interactive activities (initiated by teachers);
- (3) Initiation of outside class self-exercise (can either be initiated by teachers or students themselves);
- (4) Collection of instant feedback and encouragement for students (for students only);
- (5) Data analysis of student performance and system usage frequency (for teachers and administrative staff only).

We have developed 500 questions and applied during and after classes.

This project will be applicable throughout the course MEDU4110 Obstetrics and Gynaecology Module, over 240 medical students can benefit from this project each year. The deliverables can be reused every year.

Deliverables and evaluation

Updated project deliverables has been achieved as below:

No.	Expected deliverables	Key performance indicators (KPIs)
1.	Online quiz questions	500 new questions to be designed
2.	Number of users	240 students per year to be benefited

Student and teacher satisfaction were examined by quantitative evaluation at the end of each module. The result reveals that the students appreciate this learning experience and the project goals have been fully attained.

Dissemination, diffusion and sharing of good practices

We have developed one-stop web-mobile quiz bank for in-class interactive activities and off-campus student self-exercise in the platform called “Made Easy APP”. The developed teaching materials were introduced and implemented in the course MEDU4110 - Obstetrics and Gynaecology Module, which was taught in year 5 of the Medicine (MBChB) Programme, under the Faculty of Medicine, in the academic year 2020-21 and 2021-22, with over 240 students. Overall, based on the project outcomes and deliverables produced, the project was accomplished to satisfaction by both teaching faculty and students.

Impact on teaching and learning

The project is in line with the goal of CUHK “to adopt innovative pedagogies for continuous teaching enhancement” and carries long-lasting impact beyond our Department. Medical learning is not simply

acquisition of knowledge, but more importantly the correct application of knowledge into practice. To achieve this, the platform facilitates the stimulating interactions between students and teachers.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title:	Cantonese Perceptual Evaluation of Voice eLearning Platform (CanPEV-EP): A courseware to enhance students' ability to conduct clinical assessment for voice disorders
Principal supervisor and unit:	Prof. Law Thomas Ka Tung (Department of Otorhinolaryngology, Head and Neck Surgery)

Project objectives

This project aims to develop an e-platform courseware, namely Cantonese Perceptual Evaluation of Voice – E-Platform (CanPEV-EP), to enhance students' training and practice on perceptual evaluation of voice for patients with voice disorders.

Activities, process and outcomes

The CanPEV-EP prototype has been developed. Engagement of students as partner in the development of the e-platform. The CanPEV-EP supplements in-class teaching which allows revision and exercise for students to acquire competency in performing perceptual evaluation of voice.

Deliverables and evaluation

The CanPEV-EP prototype consists of 4 modules, training and evaluation. The preliminary evaluation was participated by 25% of the students of the MSc SLP programme. Results showed from the survey showed that students believed that the e-platform can enhance their clinical skills. Ratings of survey in ranged from 3.8 to 5, with 5 being strongly agree with the e-platform's functions and perceived effectiveness.

Dissemination, diffusion and sharing of good practices

The students' feedback on the e-platform prototype was positive and believed the platform can enhance their learning in conducting voice assessments.

The team expects that the final e-platform could be made for long-term use in the department and programme. Practicing speech therapists who would like further training and other institutions involved in speech-language pathology training may also be benefited.

Impact on teaching and learning

It is believed that the CanPEV-EP can have teaching and learning impact at both the teacher and student level. The total teacher instruction time can be shortened so that additional hours could be dedicated to other clinical teaching. Students may have unlimited access to training via the e-platform. Students can also learn at their own pace and at their own convenient time.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Extension of CUOG established web-mobile platform for undergraduate programme to Paediatrics Module (Genetic Education)**

Principal supervisor and unit: **Dr. Chong Shuk Ching Josephine (Department of Paediatrics AND Department of Obstetrics and Gynaecology)**

Project objectives

The project objectives are:

- (1) Personalized Learning: the mobile platform changes the traditional learning landscape by allowing learners to charter their own learning paths. While fast learners can learn anytime and anywhere at ease, slow learners can revisit the lessons.
- (2) Student empowerment: student can do exercises repeatedly till they can master the concepts. Students are able to obtain an instant feedback on their performance and identify their areas of weakness for further improvement.
- (3) It is a paper-free electronic logging system to facilitate instant management of student participation in clinical attachment at the wards and outpatient clinics of the Prince of Wales Hospital, other regional hospitals, or other organization.
- (4) Big Data for teaching: by analyzing big data at the administrative platform, teachers can have deep insights on the progress of the students and their common weakness. Teachers can then identify those students who are having unsatisfactory academic progress earlier, and provide suitable assistance to them on time.

Activities, process and outcomes

As a team comprised of teachers from Department of Paediatrics and the Department of Obstetrics and Gynaecology. We have successfully produced an interactive educational platform to enhance the effectiveness of teaching and learning (T&L) in the Department of Paediatrics, receiving positive feedback from teachers and students. The functions include: E-book Learning, Exercises and assessment, Logbook and Course management system.

Deliverables and evaluation

Updated project deliverables has been achieved as below:

Functions	Updated plan and taken action
(1) E-book Learning	The development of E-book platform is completed. After communicated with the teaching faculty
(2) Exercises and assessment	(1) The development of Exercises and assessment platform is completed. (2) This platform is frequently adopted for assignment collection and grading.
(3) Logbook	(1) The development of Logbook platform is completed. (2) The adoption of logbook will start in phase II after the project period.
(4) Number of users	(1) The development of Course management system is completed. (2) This platform is frequently adopted for assignment collection, grading and data management.

Dissemination, diffusion and sharing of good practices

Applicability: All CUHK medical students are eligible to use the app for free. Students can use the app with

their hand-held device at all the classrooms and clinical areas (including operation theatre, clinics and wards) in Prince of Wales Hospital and our partnering hospitals.

Replicability: This web-mobile learning platform for the medical undergraduate teaching is the pioneer. The success of this project will demonstrate the current web-mobile platform for undergraduate programme can be successfully extended to the MEDU4210 Paediatrics Module of MBChB. Thus the platform will be proven competent to expand and integrate to the undergraduate programme of other departments in CUHK. With the established framework, the platform can be easily replicated by other departments or programmes

Sustainability: The courseware developed in this project can be repeatedly used every year in the course until certain technologies render obsolete. We will review the course materials annually to keep the content updated. Moreover, this platform will be the core T&L tool in the MEDU4210 Paediatrics Module in CUHK Medicine MBChB programme. Thus, it will not only be sustainable, but also be a successful example for other departments under Faculty of Medicine and eventually other departments in CUHK.

Impact on teaching and learning

The project fully supports CUHK strategy with the sustainability of continuous quality enhancement in T&L by strengthening student self-learning skills and implantation of eLearning and innovative pedagogies. This project can be applicable throughout the course MEDU4210 Paediatrics Module, over 240 medical students can benefit from this project each year. The courseware can be reused for every cohort of students. We will review the course materials annually to keep the content updated

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Learning in practice for nursing students via mobile app: From assessment to evaluation to meet patient's oral feeding and nutritional needs

Principal supervisor and unit: Prof. Chan Ngo Sheung Dorothy (The Nethersole School of Nursing)

Project objectives

The objectives are to: 1) develop an interactive mobile app, helping students to learn various health-related assessments, planning, implementation and evaluation of nursing care to improve patient's nutritional needs and oral feeding; 2) engage students in active learning and allow them to learn at their own pace; and 3) support the implementation of flipped classroom in the course.

Activities, process and outcomes

A mobile app with six interactive scenarios concerning the health-related assessments, identification of personal and environmental factors during care planning, preparation and implementation of measures to enhance oral feeding, comfort and safety, and evaluation of outcomes of care was produced. The mobile app was implemented in the Bachelor of Nursing Year 2 course. This allowed students to try and test their knowledge gained from the learning materials and any areas that need further self-directing learning before they attended the skill laboratory session. A total of 69 students completed the satisfaction survey regarding the mobile app. Overall, 72% of them agreed that they were satisfied with the mobile app and it enhanced their knowledge on the topic.

Deliverables and evaluation

A mobile app with six interactive scenarios was developed. The course students' satisfaction with the mobile app and their knowledge gained were explored.

Dissemination, diffusion and sharing of good practices

The process and outcome of developing and implementing the mobile app was disseminated in international conference.

Impact on teaching and learning

This project impacted the teaching practice of teacher that a combination of teaching methods and materials should be adopted to enhance students' active and self-directed learning.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: eLearning Courseware Development for Project-Based Learning in Calculus Courses

Principal supervisor and unit: Dr. Wong Chak Fu Jeff (Department of Mathematics)

Project objectives

Our project objective was to produce and develop interactive eLearning courseware that demonstrates the applications of Calculus in various disciplines.

Activities, process and outcomes

Activities

- Applications of Minimization to Optics: Fermat's Principle Implies Snell's Law
This unit is divided into five parts:
 - Introduction
 - Two main concepts
 - Fermat's principle
 - Snell's law
 - Geometrical perspective
 - Plane mirror
 - Parabolic mirror
 - Spherical mirror
 - Mathematical perspective
 - Question set
- Applications of Differentiation to Mechanics: The Mathematics of Bungee Jump
This unit is divided into four parts:
- Introduction
 - Before the cord is stretched
 - Change of variables
 - Distance, velocity and time before the cord is stretched
 - Once the cord is stretched
 - Solving the ordinary differential equation (ODE)
 - Some characteristics of a simple harmonic motion of the jumper
 - Bungee jumper's height graph
 - Question set
- Applications of Minimization to Modelling: Curve Fitting
This unit is divided into five parts:
 - Introduction
 - Finding the slope of the best fitting curve by minimization
 - Worked example
 - Application demonstration
 - Question set
- Differentiation and Newton's Method: Homemade Calculator
This unit is divided into three parts:
 - Introduction
 - Worked example set
 - Question set
- Applications of Integration to Physics: Calculus of Variations
This unit is divided into three parts:

- Introduction
- Worked example set
- Question set
- Applications of Taylor Series: Approximation Methods and Error Estimates
This unit is divided into four parts:
 - Introduction
 - Problem set 1: a review of power series
 - Problem set 2: series solutions about an ordinary point
 - Problem set 3: applications of power series in differential equations
 - The Legendre equation
 - The Hermite equation
 - The Chebyshev equation
- Nonlinear Approaches in Engineering Applications: Introduction to Artificial Neural Networks
This unit is divided into eleven parts:
 - Introduction
 - Motivation
 - Matrix multiplication
 - Activation function
 - Single-layer network
 - Learning rule
 - Generalized delta rule
 - XOR problem
 - Multi-layer network
 - Back propagation
 - Back propagation example
 - MATLAB codes
- Applications of Differentiation and Integration: Inequalities
This unit is divided into eleven parts:
 - Introduction
 - Jensen's inequality
 - AM-GM inequality
 - Bernoulli's inequality
 - Young's inequality
 - Hölder's inequality
 - Minkowski's inequality
 - Normed space
 - Cauchy-Schwarz inequality
 - Chebyshev's inequality
 - Summary

Process

1. Insert the following types of answers inside the box using a MATH calculator mode:
 - o A mathematical expression
 - o A numeric number
2. Complete multiple choice tests
3. Match the items
4. Visualize the graph of the given function using the graphical animation/visualization and the sliding bar
5. Select either TRUE or FALSE for a mathematical statement

Outcomes

By applying the mathematical theory to real-world examples, knowledge can be consolidated and learning is promoted. By demonstrating the connections to other subjects, students' interest in and motivation for studying Calculus, especially for non-major students, can be enhanced.

Deliverables and evaluation

Deliverables

Project website

<https://www.math.cuhk.edu.hk/~mathcal/mathproj>

- Applications of Minimization to Optics: Fermat's Principle Implies Snell's Law
<http://mathcal.math.cuhk.edu.hk:7535/home>
- Applications of Differentiation to Mechanics: The Mathematics of Bungee Jump
<http://mathcal.math.cuhk.edu.hk:7536/home>
- Applications of Minimization to Modelling: Curve Fitting
<http://mathcal.math.cuhk.edu.hk:7537/home>
- Differentiation and Newton's Method: Homemade Calculator
<http://mathcal.math.cuhk.edu.hk:7007/home>
- Applications of Integration to Physics: Calculus of Variations
<http://mathcal.math.cuhk.edu.hk:7008/home>
- Applications of Taylor Series: Approximation Methods and Error Estimates
<http://mathcal.math.cuhk.edu.hk:7538/home>
- Nonlinear Approaches in Engineering Applications: Introduction to Artificial Neural Networks
<http://mathcal.math.cuhk.edu.hk:7539/home>
- Applications of Differentiation and Integration: Inequalities
<http://mathcal.math.cuhk.edu.hk:7551/home>

The online survey site is:

<https://cloud.itsc.cuhk.edu.hk/webform/view.php?id=13637755>

The number of visitors to each site is recorded.

<http://mathcal.math.cuhk.edu.hk:7540/>

Dissemination, diffusion and sharing of good practices

We shared our pedagogical teaching experience at the 2021 Teaching and Learning Innovation Expo at CUHK. An oral presentation, *Ensuring mathematical success for all students using an online cooperation, communication and competition-based learning platform*, and our conference paper were accepted by Expo2021 held at CUHK on July 29, 2021. Please refer to the link below for the video:

<https://cuhk.ap.panopto.com/Panopto/Pages/Viewer.aspx?id=ae676c64-fc47-4907-8aef-ad7a0039fcd0>

We presented our pedagogical teaching experience at the Community of Practice Symposium of Education Innovation and Technology 2022 at CUHK, Hong Kong on June 2, 2022. We gave a 15 minute pre-recorded presentation entitled “*Talk on the XOR Calculator using Artificial Neural Network Based Algorithms in the Applications of Calculus*”.

We presented our pedagogical teaching experience at the First International Workshop on Metaverse and Artificial Companions in Education and Society (MetaACES 2022), organized by The Education University of Hong Kong, Hong Kong on June 24, 2022. We gave a 20 minute live oral presentation entitled “*Helping freshmen students understand mathematical inequalities using an online-based learning platform*”.

Impact on teaching and learning

Our aim here is to develop an online project-based learning platform. Students and teachers use the eight units of applications of calculus as an in-class activity first and let students have hands-on intuitive experiences, and then assign students to look deeper into the context behind the animation illustrations, e.g., when and how these models can be modelled and solved by differentiation and integration techniques. Then teachers can pass out these questions as an out-of-class activity, e.g., students may do a mini project-based work. From easy to moderate to hard, students and teachers work together and see which project level is suitable for the student's need and interests. For Units 6 – 8, each unit has different topics under the same project theme, where students learn each subunit topic gradually and synthesize their knowledge to achieve a final goal.

Based on the general framework of “conceptual and procedural” mathematical thinking processes, students can improve their skills, e.g., science, engineering, business and even art. Students are able to understand mathematical concepts, generalizations, facts, principles, and laws, express them in graphical animations and

configurations, and realize the complementarity and interdependent nature of basic concepts and sub-concepts. Through specific and sequential procedures and steps, students are able to reach a solution to a mathematical task using a person-computer interactive learning mode. The methodology can be extended to develop eLearning tools for other courses in Applied Mathematics. More models and functions can be included in the future.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: 從旋轉的科學到大氣中的流體動力學 **From the Science of Rotation to Fluid Dynamics in the Atmosphere**

Principal supervisor and unit: **Dr. Au-Yeung Yee Man Andie (Earth System Science Programme)**

Project objectives

The plan is to make four videos which could demonstrate different Earth System Science concepts for four different courses with Weather in the Tank lego® experimental setup.

The tasks were carried out by four student helpers in ESSC under the “Atmospheric Science Ambassador Scheme”, which could engage motivated students who wish to learn more besides materials from regular courses.

Activities, process and outcomes

The student helpers had to host activities for secondary school students. They have made powerpoint slides to present the concepts and then guided the participants throughout the experiments.

Deliverables and evaluation

We have done four very short and concise videos showing earth system science concepts. The ideas originally should be taught in class for at least one-two university lessons for each video. The videos are supposed to raise the audience’s interest in the topic. If they wish to learn the full concept, they can join the arranged activities and carry out the experiments.

The student helpers have prepared all the video shootings for all four experiments, relevant animations and storyline for each video. All four videos have been finalized. The videos are uploaded on [Youtube](#) and have been posted on both the public and private ESSC/EESC instagram accounts (links [here](#) and [here](#)).

Dissemination, diffusion and sharing of good practices

Here are a list of the activities,

Date/ Period	Venue	Time	Experiments	Number of Participants	
				Target	Actual
20/3/2021	Online	3-7pm	Exp #1 and #2	Unlimited	77
7/8/2021	CUHK	3-7pm	Exp #2 and #4	16	9
14/8/2021	CUHK	3-7pm	Exp #2 and #4	16	6
16/10/2021	Online	3-5pm	Exp #2 and #4	/*	/*
10/11/2021	CUHK	2-6pm	Course ESSC3200 : Exp #2	~15	~15
17/11/2021	CUHK	2-6pm	Course ESSC3200 : Exp #2	~15	~15
Feb 2022	CUHK	/	Course ESSC3300 : Exp #3	Canceled	Canceled
Feb 2022	CUHK	/	Course ESSC2020 : Exp #1 or #4	Canceled	Canceled

The format of having educational videos with the corresponding designed workshops can be adapted to other disciplines with hands-on educational activities.

Impact on teaching and learning

The general purpose for the videos and demonstrations was to allow hands-on experience in simulating fluid dynamics related concepts. Nowadays computer simulation is very popular, however students still wish to have physical models/experiments instead of just performing them with a computer.

The physical setup needs time and logistics to carry out experiments. In the process it shows that experiments do not come as easy and fast as computer simulations (or so they would seem).

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Mobile Device Compatible Web-app - Interactive Virtual Flower Dissection Lab**

Principal supervisor and unit: **Dr. Chow Cheung Ming Cherry (School of Life Sciences)**

Project objectives

This project aims to generate a mobile compatible media-based interactive learning tool, Interactive Virtual Flower Dissection Lab (the Virtual Lab), which simulates the process of flower dissection in form of web-app.

Activities, process and outcomes

The project consists of 5 phases: Content design, sample and information collection, Development of the web-app, Proofreading, testing, de-bugging, fine-tuning and launching, Pilot run and evaluation and Evaluation and report writing. The Virtual Lab, which provides a self-learning tool that allows students to learn basic terminologies of floral features and masters how to dissect different flowers in an independent manner, has been generated. Trial run has been carried out in two undergraduate courses (BIOL3022 and BIOL3570) with student feedbacks collected.

Deliverables and evaluation

The web-app has five units, including ‘Learn the Basic Terms’, ‘Interactive Dissection Manual’, ‘Virtual Plant Dissection – Flower 1’, ‘Virtual Plant Dissection – Flower 2’ and ‘Virtual Plant Dissection – Flower 3’. The user experience survey result suggests that the general goals and specific goals for science students of this project have been achieved with satisfaction.

Dissemination, diffusion and sharing of good practices

The webpage of the virtual lab is openly accessible. It has been promoted through Biology webpage and Biology alumni facebook page, and has been posted in the blackboard courses of BIOL3022, BIOL3570 and UGEB2350 for the corresponding students. The web-app has been introduced to some staff/intern of SLS.

Impact on teaching and learning

The web-app promotes self-learning and supports flipped-classroom. It can partially substitute the hands-on experience of flower dissection during online teaching.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: User-friendly software for creating questions in WeBWorK

Principal supervisor and unit: Dr. Liu Chun Lung Kelvin (Department of Mathematics)

Project objectives

This project aims to develop a highly user-friendly online tool which generates questions for WeBWorK system. The teachers without prior knowledge in programming can use the tool to prepare questions in Latex format (which is very popular among math teachers and researchers) and then generate a WeBWorK recognizable file which can be imported into the system.

Activities, process and outcomes

Using our tool, a number of exercises in WeBWorK were developed and distributed to students in MATH1510, MATH1020, MATH2530. Based on our online surveys, students generally agreed that the questions we developed were well-designed and helped their understanding on the subjects.

Deliverables and evaluation

By using our tool, we have created over 800 math problems for 6 courses and about 650 students from Faculty of Engineering and Department of Physics have tried out the questions as extra exercises.

Impact on teaching and learning

Since WeBWorK questions are graded automatically, the workload on the teachers in developing new questions is minimized and it is now feasible to provide large amount of practice questions to students.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: **Typing Mathematics: in a Word, easy**

Principal supervisor and unit: **Dr. John Alexander Wright (Department of Statistics)**

Project objectives

To produce a short video and supplementary materials to help students learn how to type mathematics in Microsoft Word (and PowerPoint).

Activities, process and outcomes

An instructional video was storyboarded, scripted, filmed, voiced and subtitled. Exercises and their solutions were created. Students of three courses (two undergraduate, one postgraduate) were surveyed for their views, the resulting data was consolidated and analysed.

Deliverables and evaluation

The key deliverables are a 17-minute long video teaching CUHK how to use resources freely-available to them to include mathematical symbols seamlessly and effortlessly in their typed work and a set of twenty exercises (and their solutions) to aid their practice. These produced resources were evaluated by a survey of 28 students. The feedback suggests the video and exercises achieve the project's objective.

Dissemination, diffusion and sharing of good practices

The video and exercises are now publicly available at <https://www.sta.cuhk.edu.hk/jawright/TypingMathsInWord/>. Prior to that, they were shared to 129 students on their course Blackboard page via Panopto video.

Impact on teaching and learning

This small project helps students learn a new skill – one that enhances their digital literacy and will improve the appearance of their reports and presentations. Teachers may feel more comfortable requiring students to submit work in machine readable soft-copy rather than in pen-and-paper.

THE CHINESE UNIVERSITY OF HONG KONG

Courseware Development Grant Scheme

Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22

Project title: Development of Virtual Common Minerals By Using Augmented Reality (AR) On Mobile Devices and Promoting Geoscience with Youth Power

Principal supervisor and unit: Dr. Tam Pui Yuk Tammy (Earth System Science Programme)

Project objectives

- A) To raise students' interest and awareness of the Earth System from a scientific perspective by development of **10 Virtual Minerals** that are commonly occurring in nature using the Augmented Reality (AR) technology On Mobile Devices
- B) To encourage students to self-equip with geoscience knowledge and acquire experiential learning by organizing **5 student-initiated academic activities** with the Virtual Minerals and high-quality geoscience contents

Activities, process, and outcomes

Our AR teaching kit production team has **produced AR models of 11 mineral products**, including **4 non-silicates and 7 silicates**, surpassing our original target. In addition to the Virtual Minerals, we have produced an **extra AR set of 7 Crystal Systems** to complement the Virtual Minerals. This provides more fundamental information in the understanding of molecular geometry, molecular structure, and their relationships with physical and chemical properties. On top of social media platforms, namely Instagram and Facebook Camera, we have extended our AR products to CoSpaces Edu, which allows the delivery of contents in a remote setting, reaching diverse groups of audiences. The use of our AR products is not limited to mobile phones but tablet devices as well.

The AR developments have been delivered and incorporated as micro-modules in numerous geoscience courses, including ESSC1000, ESSC2010, ESSC2120, ESSC4120, and even out in the field. We have received positive feedback from our students in enhancing their understanding of minerals.

Apart from class delivery, the AR products have been incorporated to our reformed *Rocks and Mineral Gallery*, our e-learning webpage, and can be used together with each other. To provide a consistent and user-friendly format, our team has a revised description of a total of 25 minerals and 41 rocks, of which 35 items have been published in our e-learning webpage.

In addition, a total of **26 students were recruited and selected as Geoscience Ambassadors (GAs)** in the GA schemes from 2019-2022. The Ambassadors were requested to propose activities related to Earth System Sciences under ESSC supervision and through regular meetings to discuss their ideas, practical plans (including backup plans under COVID-19), and content delivery. They have established (i) a popular **Instagram page geoguy_HK**, organized (ii) **the Geoambassador Outreach Programme (GOP)**, and attended (iii) multiple minerals workshops and training under collaboration with professional parties. A total of 9 educational events were held to promote geoscience among ESSC and CUHK students, as well as the public, including 1 AR and VR workshop for CUHK students coordinated with the Science and Technology Committee of Chung Chi College, 2 public workshops in collaboration with MoCC, 2 Gemstone workshops and 3 Gemstone visits were organized for ESSC students.

Deliverables and evaluation

The overall evaluation reflects that, students are satisfied with the outcomes and our project is able to sustain continuous quality enhancement in teaching and learning. The new products and the student-initiated activities set up a platform to demonstrate the integration of Earth System Science and Environmental Sciences, which aligns with our faculty's recent integration. Our team has been collaborating with both internal and external professional parties, setting up an example of diverse collaboration in education.

Dissemination, diffusion and sharing of good practices

Face-to-face and online meetings were held with other parties from time to time to provide updates of the development of our teaching kits and to gain first-hand user feedback. Overall, the project has been a collaborative effort among ESSC and other professional parties, leading to diverse cooperation among different units. Our project outcomes meet 6 Sustainable Development Goals (SDG) #4, 7, 11, 13, 15, 17, raising the public awareness in urgent actions to combat climate change and being responsible for global environmental changes, as well as connecting with environmental sustainability industries by building partnerships with professional units.

Impact on teaching and learning

Application of our projects to public outreach and class delivery sets a breakthrough in pedagogy as they enhance teaching and learning under the impact COVID-19. 69-79% of the responding students agreed or strongly agreed that the AR materials are beneficial to their learning of mineralogy. Comments and suggestions from both the students and the professional parties could be the key factors to reform the pedagogy, best fitting the needs of the current globe.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: eLearning Courseware Development for a Constructivist-Based Approach to Sports Analytics

Principal supervisor and unit: Dr. Wong Chak Fu Jeff (Department of Mathematics)

Project objectives

- To create interactive tools for studying different sports analytics problems – Students learn up-to-date programming applications using Python and MATLAB.
- To develop a higher order thinking process of learning – Students are able to participate in learning by doing learning modes and reflect on their own thinking and problem-solving processes.
- To promote personalized learning via an online platform – Students are able to explore units based on their preferences.

Activities, process and outcomes**Activities**

- Randomness in Sports
- Patterns in Sports Data
- Sports Prediction Models and a Player's Social Network
- Sports Strategies
- Game Playing using Artificial Intelligence

Process

1. Upload variables from an Excel football data set file through the platform,
2. Hit a submit button, and
3. Illustrate the methodology of different sports analytics solvers, where the solutions are displayed on the screen in a sequential step-by-step procedure.

Outcomes

Students are able to make a comparative study of different sports analytics methods, e.g., sports betting strategies, voting and weighted voting methods, social network analysis tools, and game theory strategies, machine learning algorithms and judge the pros and cons of these methods to find the one that suits their need based on the artificial and real data set.

Deliverables and evaluation**Deliverables**

Project website

- <https://www.math.cuhk.edu.hk/~mathcal/mathgames>

Dissemination, diffusion and sharing of good practices

We presented (will present) our pedagogical teaching experience at the 8th International Conference on Frontiers of Educational Technologies (ICFET 2022), which is to be held in Yokohama, Japan on June 10-12,

2022. We gave (will give) a 20 minute live oral presentation entitled “Development of an e-learning teaching and learning platform using game theory - Applications of Sports Games and Real-life Scenarios”. The conference paper was accepted for publication in the conference proceedings. The site link is as follows: <http://www.icfet.org/>

We shared our pedagogical teaching experience at the Community of Practice Symposium of Education Innovation and Technology 2022 at CUHK, Hong Kong on June 2, 2022. We gave a 15 minute pre-recorded presentation entitled “*Establishing an Online Learning Platform in Sports Analytics and Social Networks using Soccer Game Data*”.

We shared (will share) our pedagogical teaching experience at the First International Workshop on Metaverse and Artificial Companions in Education and Society (MetaACES 2022), organized by The Education University of Hong Kong, Hong Kong on 24 June 2022. We gave (will give) a 20 minute live oral presentation entitled “*Analytics in sports using social network analysis tools and linear discriminant analysis*”.

Impact on teaching and learning

Our aim in using constructive learning theory for the teaching and learning aspects of sports analytics is to allow students to reflect on their own body of knowledge and engage with real-life data using interactive animations. Based on past experience, students revisit:

1. Facts or isolated pieces of knowledge
2. Procedural knowledge - how to do things
3. Conceptual knowledge - the intellectual rationales that explain how things fit together and why things work the way they do
4. Problem-solving strategies (rules of thumb for solving problems)

To create a teaching-learning interaction sphere, we embed these four mathematical thinking processes in the e-learning platform for these five units. Students not only verify their answers and justify their findings via the non-textbook and real-world examples but also make use of these online tools in solving sports related problems, such as, Sports betting and gambling, Players’ ranking problems, Sports team networks, Sports game strategies, and Sports predictions.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Using Interactive Video-based Learning to Support Sustainable Development Goal General Education (SDG-GE) course

Principal supervisor and unit: Dr. Wong Kwan Kit (Department of Geography and Resource Management)

Project objectives

This project aims to make interactive eLearning courseware to enhance students' understanding of how remote sensing technology are related to some of the sustainable development goals (SDGs).

Activities, process and outcomes

The videos were disseminated to students who have taken the course UGEB2132A Earth as Seen from Space in the first semester of academic year 2021-22. Three major outcomes are achieved. First, the courseware provides additional information about the problems related to unsustainable practices facing us today. Second, simple questions are included in the videos to test student's common knowledges. Third, the tested results can provide some insights for teachers to plan the lectures.

Deliverables and evaluation

Five interactive videos covering topics including land cover change, urban, forest, natural disaster and climate change with two case studies and testing questions in each video. Usage statistics were logged in the website and feedbacks were collected in form of online questionnaire afterward. Course evaluation results were explored to understand the learning outcomes.

Dissemination, diffusion and sharing of good practices

The courseware is posted to a video hosting platform, hihaho and targeting students who take the course UGEB2132 Earth as Seen from Space.

Impact on teaching and learning

First, the courseware becomes part of the learning which carries out online and students can learn by themselves anytime anywhere. Second, the preset questions in the courseware allows student to self-check their common knowledge. Third, the courseware not only help students to understand more about our Earth from various perspectives, it also arouses the interests of student on SDGs and remote sensing applications. Fourth, the videos provoke thoughts on sustainable developments by showing how human activities are exploiting our Earth and how technology are helping out.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Game-based Learning using Location-based Technology in Field Studies

Principal supervisor and unit: Dr. Lee Wai Ying Joanna (Department of Geography and Resource Management)

Project objectives

This project is to design interactive field trips in a game setting using location-based technology. Game-based and location-based learning are two main pedagogical goals. In order to integrate game elements into trip design, some enhanced functions of uReply GO such as peer competition and learning badge collection are added. While Geography emphasizes on locations, location-based approach becomes an effective tool in linking teaching contents to locations. It is hoped to facilitate course teacher to better arrange big-class field teaching and track the learning progress of students.

Activities, process and outcomes

Field trips in GRMD 1001 are conducted in May and December. By using this courseware, students become active participants through peer competition rather than passive receivers of knowledge.

Deliverables and evaluation

There are three major deliverables, namely four interactive trials, improvement on the functions and user-interface of uReply GO and a user guide. E-survey has shown that the courseware is useful in field teaching. Students are very satisfied with the learning experiences. About 97% of the respondents recommended continued use of uReply GO in field studies.

Dissemination, diffusion and sharing of good practices

The project team is applying a QEF project for sharing of good practices with secondary schools.

Impact on teaching and learning

Traditional fieldwork approach is enhanced by integrating game elements and location-based technology into trip design. It enables student access to a variety of spatial data in the field quickly and effectively. This teaching approach can facilitate big-class field teaching and better monitoring of the learning progress by accessing to real-time information on students' location and answers.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22****Project title: An E-Learning Space of Data Science for Public Policy****Principal supervisor and unit: Dr. Ho Chi Pui (Data Science and Policy Studies Programme)****Project objectives**

The project aims to construct an e-learning space to set up exemplary learning material and cases on conducting data analytics of public policies in Hong Kong and put them into comparative perspectives with other countries and regions whenever appropriate. In the e-learning space, we illustrated how to use major coding language such as STATA to conduct descriptive, predictive and/or prescriptive analytics; and Tableau to illustrate how to visualize the data and results to the wider public.

Activities, process and outcomes

Using the databank, we conducted policy analytics in Hong Kong, by applying the data analytics skills taught in the course DSPS2201. It also served as a complement in the course DSPS1003 to show how visualization skills are being applied to real data in Hong Kong tourism.

Deliverables and evaluation

The project deliverables consisted of demonstration, slides, coding and a short video for each coding. The open data related to Hong Kong tourist arrivals and spending was used as the core dataset. Five corresponding videos on foundational data science skills were shared with students in other programmes such as Global Studies and open to the public.

Dissemination, diffusion and sharing of good practices

As the final data analytics contents are open to all audience, including non-CUHK and international audience, this would help to build up the international image of CUHK in having a data science programme that conduct data analytics for policy objectives.

Impact on teaching and learning

The courseware is open to and welcomed by students, not only DSPS students have been wishing to see more application of applying data science skills in Hong Kong's contexts, but also other non-DSPS students who took an interest in analyzing data or/and public policy issues. With the five videos as the delivered courseware, they were easily accessible and shared among peers for better learning experience.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: **Mixed-Reality (MR) field trip game for innovative learning enhancement in Yim Tin Tsai in Hong Kong**

Principal supervisor and unit: **Prof. Chan Chung Shing (Department of Geography and Resource Management)**

Project objectives

This project develops a virtual field trip courseware (“MR-field trip game”) for the enhancement of teaching-learning of tourism education using Mixed-Reality (MR) and the approach of locational game-based learning.

Activities, process and outcomes

The project outcomes include a MR game for virtual field trip and question-and-answer platform for Yim Tin Tsai (YTT) in Hong Kong. The MR game allows students to conduct virtual game via Virtual-Reality (VR) platform (desktop website) or onsite game via Augmented-Reality (AR) mobile app (iOS and Android). This platform was successfully applied in-class during online teaching period. The project enhances curriculum design, innovative educational practices, and online self-paced and group-based exploration of YTT.

Deliverables and evaluation

The project deliverables include a web-based MR game platform with questions embedded in image objects, a mobile app with the function to scan objects onsite in YTT; 3 presentations in CUHK and international conferences; 2 courses using the platform, 1 round of experiential session and student feedback. The survey results of student users indicate that the overall satisfactory performance of the game and learning experience.

Dissemination, diffusion and sharing of good practices

One webpage of the online and mobile versions of the MR game is available. Experience and good practice sharing were conducted through conference presentations.

Impact on teaching and learning

This project has advanced a completed teaching-learning project by adding a game component to further stimulate students’ virtual field trip and e-Learning experience, and VR/AR applications. The project experience sets a good example to mobilize the innovative movement of online or mixed-mode teaching in the future, and achieve more cross-University collaborations.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Mapping SDG with Urban Design Projects: an online database and collaborative platform of global & local design case studies in sustainable development

Principal supervisor and unit: Ms. Yiu Hoi Lam Melody (School of Architecture)

Project objectives

In reaction to the overwhelming scope of SDG for student learning, the objective of this project is to construct a learning platform to incrementally build SDG knowledge through the exercise of mapping SDG targets with local urban design case studies.

Activities, process and outcomes

The activity is planned for architecture/urban design students to associate the making of built-environment with the SDG targets. It is conceived in two components – an in-class workshop to use SDG mapping to evaluate urban projects, followed an online platform with user contribution that will serve as a case study depository. The outcome is the enhancement of courses Arch1002 & Urbd5703 to highlight the relevance of SDG in urban practices, supporting the learning outcome to equip students with knowledge and skillset that can apply SDG principle into design projects.

Deliverables and evaluation

Key deliverables include SDG mapping workshop material and an online platform as teaching resources. Students who have participated in the workshop expressed positive feedback as the courseware helps them to gain better understanding of the SDG, focusing on how to map specific target and indicators to urban design projects.

Dissemination, diffusion and sharing of good practices

During the project period, major effort was focused on the production of workshop and web content, resulting in a student workshop and initial study cases for the online platform. External dissemination and knowledge sharing of the project as a teaching method are currently planned and scheduled for presentation and publication in the next 6-12 months.

Impact on teaching and learning

The impact of this project can be seen in two aspects. Internally it has improved the teaching of SDG knowledge from a one-directional lecture to a dialectic process where students are involved in the production of knowledge content. Furthermore, as the online platform will be available to the public, it has a greater impact beyond the specific courses but can be used as teaching material in other context.

THE CHINESE UNIVERSITY OF HONG KONG**Courseware Development Grant Scheme****Supported by the Teaching Development and Language Enhancement Grant Projects for 2019-22**

Project title: Enhancement of the self-recording studio for all CUHK teachers to produce high-quality MMs for teaching and learning support

Principal supervisor and unit: Ms Judy Lo (Information Technology Services Centre) / the Centre for eLearning Innovation and Technology (ELITE)

Project objectives

The project team proposed to upgrade the AV and IT equipment and furniture of the self-recording room in ELITE (on HYS 6/F) for better video recording effects.

In 2016, the self-recording studio (Studio 1) recorded 118 bookings. The number of bookings decreased significantly to 28 in 2020 due to COVID (hygiene concerns on using the shared microphone, and also outdated equipment (purchased mostly in 2015) in the self-recording studio.

After this proposed upgrade, ceiling microphone so that there will no longer be hygiene concerns on using the shared microphone. The setup also allows self-service group audio recording of up to 4 people (e.g. expert group interview).

Activities, process and outcomes

The project team followed the University Purchasing Guidelines to select the vendors to supply the hardware and equipment needed for the upgrade. The project team followed up with the vendors on the delivery and installation of the hardware and equipment, and their configuration.

Due to COVID and the lockdown in Shanghai, the delivery of some hardware and equipment were delayed. Specifically, the following could not be delivered before the end of 2022 June.

- Apple computers – to be delivered in 2022 August – October
- Sony DV Camara – to be delivered in 2022 August

Existing older computers and cameras in ELITE could still be used in the setup and therefore the operation of the self-recording room was not interrupted.

Deliverables and evaluation

After the upgraded recording room is ready, teachers will be invited to try the new setup and provide feedback.

Dissemination, diffusion and sharing of good practices

When the setup of the upgraded recording room has been fine-tuned after the initial trial, promotion videos will be created and added to the ELITE website to invite more teachers to try the studio. Experience sharing session can be arranged for units which are interested in setting up similar self-recording room in their offices.

Impact on teaching and learning

The self-recording room in ELITE will continue to be a very suitable and convenient on-campus space for teachers to create videos and instructional multimedia content for online courses and tutorials. With the upgrade, it can support more use case scenarios (e.g. group audio recording of up to 4 people for expert group interview) with eased hygiene concerns on using shared microphones. It will be a good showcase for other units interested in setting up similar facility for their teachers in their offices as well.