

Research and Development for Sustainability Education in China

Project Report 2020

Prepared for the Tencent Foundation

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The second project year is highlighted by several major changes to the project, as both research partners continued to explore new opportunities to make this joint effort generate the most meaningful impact on sustainability education in China. The most noticeable changes include: 1) the decision to focus school curriculum on one pilot school, and develop customized modules for the school; 2) the extension of each module to a semester-long course with 80 class hours; 3) Update of project timeline; and 4) the potential to replace the Charity Platform modules with a series of sustainability education teacher training camps, which might further change the project timeline. Given the various changes, the objectives listed in the original proposal may no longer be relevant. Therefore, this report highlights the key progress of the project in year 2020, along with the areas we will continue to work on, and the key objectives for the third year.

1. Modules Outline

Upon completing the summary report of interviews, the research team began developing an outline for sustainability education curriculum in January. Based on experience gained from the literature review conducted in the first year, the team compiled a set of 12 modules with 12 interrelated topics:

Module 1: Introduction to Sustainability

Module 2: The Science of Climate Change

Module 3: Oceans and Sustainability

Module 4: Renewable Energy

Module 5: Trees, Forests, and Biodiversity

Module 6: Sustainable Finance/Green Economy

Module 7: Sustainability and Climate Policy

Module 8: Waste Management

Module 9: Food Systems and Agriculture

Module 10: Employment

Module 11: Inequality

Module 12: Sustainable City Planning

Although the general scope of sustainability education can be so broad as to become a life-long learning process, these set of topics reflect the knowledge framework we determine to be most appropriate for sustainability education in China, for both secondary school students and adult learners. The outline was shared with Tencent Foundation in the beginning of May. In addition to the topics of the twelve modules, the document summarized the overarching concepts, expected learning outcomes, and tentative applications and case studies for each module.

2. Collaboration with Shenzhen Mingde Experimental School

With the help of Tencent Foundation, the research team established collaboration with Shenzhen Mingde Experimental School International Division in the summer. After discussion between all three parties, the school curriculum will be designed specifically for implementation at Mingde's 9th to 12th Grade students. On July 24, 2020, Dr. Guo visited Mingde on behalf of the research team, and met with the school principal and teachers. Dr. Guo and Mingde staff discussed the expected outcomes and deliverables for the school curriculum during the visit. The curriculum was planned to be implemented as twelve semester-long courses each. The visit was followed immediately by a formal online meeting between the research team and Mingde school staff, on July 29, to kick off the curriculum development.

In the beginning of August 2020, Mingde proposed the following timeline for modules implementation.

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Grade	Semester	Module	Subject	No.Class
9	Fall 2022 ¹	Module 5: Trees, Forests, and Biodiversity Module 8: Waste Management	Biology, Physics	80
	Spring 2021	Module 2: The Science of Climate Change Module 3: Oceans and Sustainability	Biology, Chemistry, Physics	80
10	Fall 2021	Module 1: Introduction to Sustainability Module 4: Renewable Energy	History, Economics Physics, Chemistry	80
	Spring 2022	Module 9: Food Systems and Agriculture	Biology	80
11	Fall 2022	Module 6: Sustainable Finance/Green Economy	Economics	80
	Spring 2023	Module 7: Sustainability and Climate Policy	History, Management	64
12	Fall 2023	Module 10: Employment Module 11: Inequality	Macroeconomics	80
	Spring 2024	Module 12: Sustainable City Planning	Macroeconomics	64

The timeline maps out the twelve modules to the four grade levels at Mingde. The initial implementation of the modules generally follows the same cohort, incoming 9th Graders in Fall 2020, with the exception of Module 5 & 8 which will be introduced to a later cohort. The first module is to be taught in Spring 2021, and the last module in 2024. The sequential implementation of the modules also allows the research team adequate time to develop 1-2 modules each semester.

3. Module Development

Following the adoption of the above timeline, the research team began developing the first module to be implemented in the Spring semester of 2021 which starts on February 22, 2021, for

¹ The initial implementation of these modules (5 & 8) will be on a different cohort (incoming class of 2022).

Mingde's Grade-9 students. The initial draft of the module was completed at the end of the year. At the time of this report, the module has finished internal review and been delivered to Mingde for feedback and teaching preparation.

The first module *The Science of Climate Change* includes five parts: Climate as a System, Natural Variability, Climate Proxies, Human Contributions and Evidenced Impacts of Climate Change, and Predicting and Adapting to Our Climate Future. The whole module was delivered in a single document and serves as both the textbook and teaching instruction. In each part, there are knowledge relevant to the topic, additional resource for teaching or assigning student reading, explanation of key vocabulary, and instructions for student activities. As previously discussed with Mingde, the 9th graders may not necessarily have the English language skill to independently comprehend the module content. Therefore, the module document would mainly serve as the basis for teachers to prepare classroom presentation, student handouts, and a guideline for developing lesson plans.

The development of the second module, *Oceans and Sustainability*, will begin as soon as the first module is finalized for Mingde, and is expected to be completed in March 2021.

As they review the first module, the teaching staff at Mingde will specifically discuss when to introduce the second module, whether in the second half of the Spring semester, or in the fall. Additionally, Mingde teachers will highlight the areas in the first module that require additional support from the research team. We will arrange online meetings to help with teachers accordingly.

4. Project Timeline Update

In response to the project's shift to focus on customized curriculum development for Mingde, and the curriculum implementation timeline, the research team updated the project timeline going forward in August. The new project timeline prioritizes the delivery of school curriculum modules, and intends to complete all school modules by the end of 2022, leaving the year 2023 to adapt the modules for adult learning on the Charity Platform.

5. Teacher Training Camp

Since September, Tencent Foundation has suggested the idea of establishing teacher training camps on sustainability education for teachers in China, hosted by Columbia University in New York. The training camps will be held for multiple years, following the completion of sustainability curriculum development in 2023 or beyond. The purpose of the camps is to increase the capacity of teaching sustainability education by raising the competence of content knowledge, and training on pedagogies. The initial participants will be a group of selected Mingde teachers, with future participants coming from a more diverse background.

The research team is currently conducting a feasibility study to determine if the remaining grant is enough to support hosting the teacher training camps.

6. Objectives for Next Year

6.1 Modules Development

The first objective of the research team in 2021 is to deliver the completed first module to Mingde and address their feedback, particularly regarding the areas Mingde teachers would need additional support on.

Upon delivering the first module, the team will immediately move on to develop the second module with the goal of completing the module by March 2021. During this time, the team will

also discuss with Mingde about changing the deliverables in the following semesters. Specifically, considering the relatively long module development process, the research team will be more confident in delivering 1-2 modules as a single full-semester course each semester, instead of two modules for two 80 class-hour courses. We will work with Mingde teachers in updating the module implementation timeline. The eventual goal is to ensure that the contents of all 12 modules listed above will be delivered and implemented in Mingde in time.

The team will spend the summer developing modules for the Fall semester for Mingde's Grade-10 students. If international travel is viable, we would also like to visit Tencent Foundation and have an update of project development and discuss relevant issues.

From fall to the end of the year, the team will be working on modules for Spring semester 2022.

6.2 Teacher Training Camps

The research team will continue working with Tencent Foundation on exploring the feasibility of the training camps. We are currently finalizing a demo plan for a week-long program that combines content knowledge teaching, workshop on classroom practice, and field trips. The team will then conduct a cost estimation for the demo program as a reference, and evaluate whether the training camps are financially feasible with the remaining budget.

We will discuss further with Tencent Foundation on how to proceed with this program, as well as necessary updates on project timeline.