

Final Report of Project

Project No. : 2015 / 0261

Part A

Project Title: Developing effective dialogic mathematics lessons in junior secondary classes

Name of Organization/School: Methodist College

Project Period: From 01/08/2016 (month/year) to 31/08/2017 (month/year)

Part B

Please read the Guidelines to Completion of Final Report of Quality Education Fund Projects before completing this part of the report.

Please use separate A4-size sheets to provide an overall report with regard to the following aspects:

1. Attainment of objectives
2. Project impact on learning effectiveness, professional development and school development
3. Cost-effectiveness – a self-evaluation against clear indicators and measures
4. Deliverables and modes of dissemination; responses to dissemination
5. Activity list
6. Difficulties encountered and solutions adopted

Name of Project Leader: _____ Name of Grantee*: _____

Signature: _____ Signature: _____

Date: 16/11/2017 Date: 16/11/2017

** Final Report of Project should be submitted via "Electronic Project Management System" (EPMS). Once submitted, these reports are regarded as already endorsed by the supervisor of the school/the head of the organization or the one who signed the Quality Education Fund Agreement for allocation of grant on behalf of the organization.*

1. Attainment of Objectives

Objective statement	Activities related to the objective	Extent of attainment of the objective	Evidence or indicators of having achieved the objectives	Reasons for not being able to achieve the objective, if applicable
To transform the conventional monologic classroom into a dialogic one that students are motivated and engaged in constructing mathematics knowledge.	1. Four topics were selected from each junior form (F.1 - F.3) to conduct lessons in a dialogic approach. At least 40% of the mathematics lessons throughout the school year of 2016-2017 were conducted dialogically.	Fully achieved	1. Video clips and photos of the process of the lessons were shown in the public dissemination seminar. 2. The timetable of mathematics lessons of F.1-F.3 in the school year 2016-2017.	N/A
To establish a platform for Methodist College teachers to develop dialogic pedagogy that facilitates students in understanding mathematics from fundamental knowledge up to metacognition.	1. Three collaborative lesson planning (CLP) sessions were held for each chapter selected to be conducted dialogically. The CLP sessions were arranged as Pre-lesson, While-lesson, and Post-lesson discussions of the topics selected for dialogic learning. A total of 12 CLP sessions for each form	Fully achieved	1. All CLP sessions were recorded to minutes. 2. Video clips and photos of selected CLP session were shown in the dissemination seminar.	N/A

	<p>were held throughout the school year of 2016-2017.</p> <p>2. Department meetings were held at the end of each term for the whole department to review and evaluate the lessons conducted, efficacy of the approach used to conduct dialogic learning, common weaknesses of students in learning, performance of students, etc. An interim and wrap-up meeting were done at the end of first and second term respectively.</p>			
<p>To provide feedback to CDC and to share among secondary school teachers in HK the curriculum designed, corresponding teaching pedagogy developed and teaching materials designed.</p>	<p>1. Questionnaire surveys were conducted in September, February and May to evaluate students' attitudes towards mathematics.</p> <p>2. Student reflections were collected after the completion of each dialogic chapters to evaluate students' feedback on dialogic learning.</p> <p>3. Lessons were recorded or observed so that they could be evaluated in order to provide feedback to the teachers.</p> <p>4. Public dissemination seminar and sharing workshop in June 2017.</p>	<p>Fully achieved</p>	<p>1. A public dissemination seminar and a sharing workshop were held in June 2017 to share the experience and materials developed. CDC officials were invited to join in.</p> <p>2. Related details and materials were uploaded to the web page (www.goo.gl/B9F4Z6) to share with the public.</p>	<p>N/A</p>

Timetable of mathematics lessons and CLP of F.1-F.3

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
08:05 – 08:40	Morning Assembly/ Reading Time					
08:40 – 09:45	1B(CKH)/ 1R(YDP)	2G(LKK)	1B(CKH)	3B(LWSC)/ 3R(NMH)		3B(LWSC)
09:45 – 10:00	Recess					
10:00 – 11:05	3G(CKH)/ 3W(LWSC)	1G(LHY)/ 1W(CKH)/ 3B(LWSC)/ 3R(NMH)	2B(LLMS)/ 2W(CKH)	2B(LLMS)/ 2W(CKH)/ 3W(LWSC)		3G(CKH)
11:05 – 11:15	Recess					
11:15 – 12:20	2B(LLMS)/ <i>F.3 CLP meeting</i>	2R(LLMS)	<i>F.2 CLP meeting</i>	1B(CKH)/ 1R(YDP)	1W(CKH)/ 3B(LWSC)/ <i>CDO meeting</i>	1R(YDP)/ 2W(CKH)
12:20 – 13:25	Lunch					
13:25 – 14:30	1G(LHY)/ 2R(LLMS)/ 3R(NMH)	3G(CKH)/ 3W(LWSC)	1G(LHY)/ 2G(LKK)/ 2R(LLMS)/ 3G(CKH)		1B(CKH)/ 1G(LHY)/ 1R(YDP)/ 2R(LLMS)	1W(CKH)/ 3W(LWSC)
14:30 – 14:40	Recess					
14:40 – 15:45			<i>F.1 CLP meeting</i>	1W(CKH)/ 2G(LKK)	2G(LKK)/ 2W(CKH)/ 3R(NMH)	2B(LLMS)

Implementation schedule of dialogic chapters

Schedule	Form 1	Form 2	Form 3
<u>2016</u> Sep		Ch.10: Pythagoras' Theorem (27 th Sep 16 – 19 th Oct 16)	
Oct			Ch.2: Laws of Indices (20 th Oct 16 – 9 th Nov 16)
Nov	Ch.11: Congruence and Similarity (25 th Nov 16 – 20 th Dec 16)		Ch.1: More about Factorization of Polynomials (14 th Nov 16 – 2 nd Dec 16)
Dec			
<u>2017</u> Jan		Ch.6: More about Data Handling (23 rd Jan 17 – 15 th Feb 17)	
Feb	Ch.12: Introduction to Statistics (7 th - 16 th Feb 17)		
	Mar	Ch.0: Basic Mathematics (17 th Feb 17 – 14 th Mar 17)	Ch.7: Rate and Ratio (17 th Feb 17 – 10 th Mar 17)
Ch.4: Introduction to Geometry (Mar 17)			
Apr		Ch.12: Area and Volume (II) (24 th Apr – 17 th May 17)	
May			

2. Project Impact On

Although the project was designed to be implemented in junior form mathematics lessons for one year only (in the 2016-2017 school year), the effects and impacts to both the teachers and the students have been long-lasting, affecting the preparations and execution of junior form mathematics lessons in the coming school year 2017-2018.

The introduction of Collaborative Lesson Planning for teachers of the same form, and co-teaching lessons by teachers within the form, was the most significant differences between dialogic learning now and traditional method then. Through increased collaboration and communication among mathematics teachers, a synergy has developed among teachers in the same form. These also complemented the weaknesses in traditional individual teaching through others' ideas, suggestions and advice engaged in the Collaborative Lesson Planning. Continuous and regular CLP sessions over the school year have also helped the teachers to review and evaluate the effectiveness of the pedagogies and materials, and to identify the common weaknesses of pupils and problems encountered during learning, creating the chance to tune and adjust the way of presenting the lessons to cater for the diversified needs of pupils in learning.

Since a systematic approach for developing dialogic learning in junior form mathematics has already been established throughout the school year of 2016-2017, the culture of learning through dialogues with teachers or peers has been developed gradually, which was reflected in the ratings of the questionnaires conducted before the inauguration of the project and at the end of the second term – students were found to appreciate working with peer discussion and working problems all by themselves slightly more than the ratings for listening to the explanation from the teacher, and working problems/tasks under teacher's guidance after one year – using the pre-project and post-project mean scores for comparison. In the light of the accustoming to the dialogic method of teaching and learning by both the teachers and the students, the effects and impacts of dialogic learning should be able to sustain beyond the experiment year, and eventually transforming to the core value of mathematics education in Methodist College.

3. Cost-effectiveness

Budget Checklist

Budget Items <i>(Based on Schedule II of Agreement)</i>	Approved Budget (a)	Actual Expense (b)	Change [(b)-(a)]/(a) +/- %
Staff Cost	\$447,363.00	\$447,363.00	0%
General Expenses	\$11,317.00	\$5373.50	-52.52%
Service	\$60,000	\$60,000	0%
Others(Contingency)	\$2,220.00	\$0.00	-100%
TOTAL	\$520,900.00	\$512,736.50	-1.57%

In this project, all the junior form students in Methodist College were the direct beneficiaries.

A CM teacher for junior forms mathematics, a teaching assistant for mathematics, and a part-time Curriculum Development Officer were appointed for the project. The salaries of the CM teacher and the TA were covered by the budgeted Staff Cost. The remuneration of the part-time CDO was credited to Services of the budget.

In the General Expenses item, it covered the costs incurred by the preparations and making of teaching materials, the expenses of organizing the open seminar in June 2016, and the remuneration for auditing. As most of the teaching materials were prepared by our teachers with free resources, reference resources provided by the CDO, or from modifying teaching materials from the past, and with the printing cost of workbooks and worksheets already covered by the school, the spending on teaching materials was less than planned.

The materials developed and resources purchased in the project will be used as teaching materials or reference for the following years, hence the newly admitted F.1 students of the next school year will also benefit from the project. Eventually, the project should be able to sustain beyond the experimental year and affect students in the future.

4. Deliverables and Modes of Dissemination

Dissemination Value of Project Deliverables

Item Description (e.g. type, title, quantity, etc.)	Evaluation of the quality and dissemination value of the item	Dissemination activities conducted (e.g. mode, date, etc.) and responses	Is it worthwhile and feasible for the item to be widely disseminated by the QEF? If yes, please suggest the mode(s) of dissemination.
Student Questionnaire on Attitude towards Mathematics	Can be used as a tool to track and evaluate the learning progress of students and the effectiveness of lessons from time to time.	Displayed as one of the materials developed in the open seminar on 12/6/2017; uploaded to the web page (www.goo.gl/B9F4Z) designated for the sharing of the materials developed in the project for all teachers in HK to download.	The item can be disseminated by sharing of the link to the web page (www.goo.gl/B9F4Z) for interested parties to download.
Teachers' checklist on dialogic level in lessons	Can be used as a reminder/guidance in lesson planning. Can be used solely, or as the complement to lesson study form concerning dialogic elements.		
Lesson study form concerning dialogic elements	Can be used as a tool in lesson observations Can be used solely, or as the complement to teachers' checklist on dialogic level in lessons.		
Articles on developing collaborative lesson planning platform	A compilation of the articles from Dr [Name]'s column in the newsletter of	Published in various issues of PTU newsletter. Also uploaded to the web page (www.goo.gl/B9F4Z) designated	

	the Professional Teachers' Union on developing collaborative lesson planning platform. Can also be found in the internet.	for the sharing of the materials developed in the project for all teachers in HK to read.	
Teaching materials for S1 mathematics (on units of Basic Mathematics, Introduction to Statistics, Congruence & Similarity, and Introduction to Geometry)	Quintessential to the implementation of dialogic lessons in school year 2016-2017. Reflecting all the work done by the mathematics department of Methodist College in developing effective dialogic mathematics lessons. Can be used as reference materials in developing dialogic lessons in other schools.	Selected samples from the materials developed were displayed in the open seminar on 12/6/2017.	
Teaching materials for S2 mathematics (on units of Data Handling, Rate & Ratio, Pythagoras' Theorem, and Area & Volume of Circles, Sectors and Cylinders)			
Teaching materials for S3 mathematics (on units of Factorization of Polynomials, Law of Indices, Deductive Geometry, and Coordinate Geometry of Straight Lines)			
Sample student reflection form on Law of Indices	Can be used as the sample in developing a customized feedback system for different	Displayed as one of the materials developed in the open seminar on 12/6/2017; uploaded to the web page (www.goo.gl/B9F4Z) designated for	The item can be disseminated by sharing of the link to the web page (www.goo.gl/B9F4Z) as reference material for interested parties.

	<p>topics to fit the needs of diversified needs in learning.</p>	<p>the sharing of the materials developed in the project.</p>	
<p>Sample summary on student reflection form on Law of Indices</p>		<p>Displayed as the summary of the effects of dialogic learning of mathematics in the open seminar on 12/6/2017; uploaded to the web page (www.goo.gl/B9F4Z) designated for the sharing of the materials developed in the project.</p>	

5. Activity List

Types of activities <i>(e.g. seminars, performance, etc.)</i>	Brief description <i>(e.g. date, theme, venue, etc.)</i>	No. of participants				Feedback from participants
		schools	teachers	students	others <i>(Please specify)</i>	
Collaborative Lesson Planning and Designing of Teaching Materials for each junior forms	Discussions, preparations, demonstrations and summarizations of lesson plans, methods of teaching, teaching materials, performance of students, and the efficacy of lessons. Dates: From 26/8/2016 to 23/5/2017 Duration & frequency: 1hr/meeting, 3 meetings/chapter, 4 chapters/form, 12 meetings in total for each form Venue: Collaboration Room/ Conference Room	Methodist College	3 junior form mathematics teachers per form meeting (3 forms in total)		Head of Mathematics Department, Part-time Curriculum Development Officer, Teaching Assistant	The CLP sessions have been useful and meaningful in terms of communication and collaboration among teachers, and the effectiveness of the teaching materials produced.
Mathematics Lessons, Tests & Exams	Conducting of lessons with various methods of teaching, including co-teaching, e-learning, self-learning, group presentations, reading report, etc.	Methodist College	8 junior form mathematics teachers	388 junior form students	2 Student teachers from CUHK (teaching practice period: 31/10-	Students' feedback were collected by student reflection

	<p>Dates: From 5/9/2016 to 20/6/2017</p>				10/12/2016 and 20/3-28/4/2017)	forms at the end of each dialogic topics.
	<p>Duration & frequency: 65 mins/lesson, 4 lessons/6-day cycle, 26 cycles in total</p> <p>Venues: Classrooms/ MMLC/ Lower Hall</p>					
Lesson Observations	Observing the conducting of lessons by peers and the principal, and discussions on the performance between the being observed and the observers to improve the implementation and enhance the effectiveness of dialogic elements in lessons.	Methodist College	8 junior form mathematics teachers		Principal, Head of Mathematics Department, Part-time Curriculum Development Officer, Teaching Assistant	/
Evaluations of Learning	<p>Evaluating students' attitudes towards mathematics.</p> <p>Dates: 27-30/9/2016 (1st evaluation) 6-14/2/2017 (2nd evaluation) 19-22/5/2017 (3rd evaluation)</p> <p>Venue: Classrooms</p>	Methodist College		388 junior form students		From the data collected, students' interests in mathematics and willingness to solve problems by themselves and learn by discussion with peers increased after

						the completion of the project.
Department Meeting	<p>Sharing on the findings from evaluations conducted on students and topics aroused from lesson observations, the reviewing, concluding and evaluating on the overall implementation and the efficacy of the project in developing dialogic mathematics lessons in junior secondary classes</p> <p>Dates: 20/1/2017 5/7/2017</p> <p>Duration & frequency: 4 hrs/meeting, 1 meeting/school term, 2 terms/school year</p> <p>Venue: Classroom</p>	Methodist College	9 mathematics teachers		Principal, Part-time Curriculum Development Officer, Teaching Assistant	/
School Visit	<p>To observe and experience the differences in mathematics lessons between traditional local grammar school and international school</p> <p>Date: 22/2/2017</p>	West Island School	9 mathematics teachers		Part-time Curriculum Development Officer, Teaching Assistant, Mathematics	It was observed that dialogic elements should be introduced and injected to the lesson tactically in order to maximize the efficacy of the lesson,

	Venue: West Island School				teachers from West Island School	or students would be lost in the lesson and losing the effects of dialogic learning because of learner differences.
In-house Seminar	Sharing on the objectives of the project, teaching methods used, and significant observations from lessons to all teaching fellow in Methodist College Dates: 12/12/2016 Venues: Methodist College	Methodist College	9 mathematics teachers		Principal, Part-time Curriculum Development Officer, Teaching Assistant, Teaching staff of Methodist College	Concerns and worries on dialogic learning were expressed by teachers from other subjects for discussion.

<p>Public Disseminations of Works</p>	<p>Part 1 - Seminar and sharing on the implementation of Dialogic Learning in Junior Form Mathematics in Methodist College.</p> <p>Part 2 – Group discussions led by our math teachers: case study on exemplary dialogic lessons, answering questions concerning the project and exchanging ideas on mathematics education.</p> <p>Dates: 12/6/2017(Public Seminar)</p> <p>Venues: Kowloon Methodist Church (Public Seminar)</p>	<p>Secondary schools of the Methodist Church of Hong Kong & in the Yau Tsim Mong Districts (Public Seminar)</p>	<p>10 mathematics teachers</p>		<p>Principals and teachers from participating schools, student teachers from CUHK and bureaucrats from EDB</p>	<p>Participants were interested in the preparations and execution of lessons, and comments and reflections on teaching were exchanged enthusiastically in group discussions.</p>
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	<p>Sharing session in the HKMEC 2017 about Dialogic Learning in Junior Form Mathematics and its outcome.</p> <p>Dates: 16/6/2017(Workshop in Hong Kong Mathematics Education Conference 2017)</p> <p>Venues: Hong Kong Education University (Workshop)</p>		<p>10 mathematics teachers</p>		<p>Stakeholders of mathematics education from other schools, EDB and publishing houses</p>	
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6. Difficulties encountered and solutions adopted

As there were no difficulties encountered in the project, this part is irrelevant.