Research and Development Work on

Quality Education Fund

"Project Learning" Projects

「專題研習計劃」研究及發展工作

(2008-2009)

Final Report

August 2009

Centre for University and School Partnership (CUSP)
Faculty of Education, The Chinese University of Hong Kong (CUHK)

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Content

Appendix List

Research and Development Work on Quality Education Fund "Project Learning" Projects

(優質教育基金「專題研習計劃」研究及發展工作)

1. Preface

The Research and Development Work on Quality Education Fund "Project Learning" Projects has been funded by Quality Education Fund ("QEF") and conducted by the Centre for University and School Partnership, Faculty of Education, the Chinese University of Hong Kong in 2008 – 2009.

This report has two key components. The first comprises research findings from 63 selected completed Project Learning Projects sponsored by QEF and terminating between 1998 and 2007, featuring salient factors for the successful implementation of "Project Learning". The second reviews development work including the compiling of a resource package and the construction of a website for the dissemination of good practice.

The Project helps to review, consolidate and distill the experiences of past QEF sponsored project learning projects for fostering implementation of project learning in the Hong Kong school context. The RE-AIM framework, comprising 5 major dimensions for evaluating project effectiveness and sustainability, has been adopted to review the 63 QEF selected projects. Twelve outstanding exemplary cases out of the 63 projects have been selected for further in-depth investigation. Interviews with project planners and teachers who were active in implementing the projects provide substantial data on the practical implementation of the projects in schools. In addition, questionnaire surveys were conducted with project planners to provide evidence to support the findings of interviews.

Dissemination of good practice and sharing of successful experience are important in this Research and Development work. The Project has developed educational resources in the form of a printed resource package and a webpage providing a rich resource for "Project Learning". Teachers and educators can access the webpage to find teaching materials online. In addition, a seminar was held to disseminate good practice drawn from outstanding exemplary cases and the exhibition of the twelve outstanding projects also provided a useful platform for enhancing professional dialogue. A booklet has been printed for disseminating the good practice of the twelve outstanding projects.

2. Project Introduction

2.1 Project Objectives

Commissioned by the Quality Education Fund (QEF), the Centre for University and Schools Partnership (CUSP) conducted a research and development project focused on the 63 "project learning" projects selected by the QEF. The objectives of the *Research and Development Work on Quality Education Fund "Project Learning" Projects* are: (a) to sort out, by meticulous research under the direction of a systematic research framework, from the cluster of the selected QEF "Project Learning" projects (see Appendix I, the Consultancy Brief) the good practices worthy of consolidation and promotion; and (b) to develop educational resources in the form of printed and/or electronic materials for dissemination purposes.

2.2 Team Leaders and Members

A team of professional academics cum educators across pre-school, primary, secondary and tertiary levels was responsible for the research and development work, comprising the following:

Co-principal Investigators (Consulting Team Co-Leaders)

Professor John Chi-kin LEE 李子建 (Professor, Department of Curriculum and Instruction and Director, CUSP, The Chinese University of Hong Kong)

Professor Edith Ling-yan LAI 賴靈恩 (Assistant Professor, Department of Curriculum and Instruction, Faculty of Education, The Chinese University of Hong Kong)

Dr. Julian Yat-ming LEUNG 梁一鳴 (School Development Officer, CUSP, Faculty of Education, The Chinese University of Hong Kong)

Co-investigators

Ms Louisa Yuet-sai CHEUNG 張月茜 (Administrative Coordinator, CUSP, CUHK)

Ms. Belinda Po-ying LAM 林寶英 (School Development Officer, CUSP, CUHK)

Ms. Cecilia Chuk Ching LO 盧竹青 (School Development Officer, CUSP, CUHK)

Ms Jane Pui-chun FONG 方佩珍 (School Development Officer, CUSP, CUHK)

Dr. Natalia Mi-ying LI 李美英 (School Development Officer, CUSP, CUHK)

Development and Support Team

Mr. Roland Chun-hay CHAN 陳春曦 (Project Officer, CUSP, CUHK)

Ms. Bonnie Lu-sai LAM 林璐茜 (Assistant School Development Officer, CUSP, CUHK)

Mr. Glen Ka-lun NG 吳嘉倫 (Project Officer, CUSP, CUHK)

Mr. Patrick Pak-chuen CHENG 鄭栢泉 (Assistant Project Officer, CUSP, CUHK)

2.3 Duration of the Project

Initially, the shortest possible time required for the completion of the project was estimated to be nine months (August 2008 - May 2009). For practical constraints and ensuring quality work, the project completion date was extended to July 2009.

2.4 General Design of the Project

The research team fulfilled the following tasks as required in the tender proposal:

(a)   Study past projects funded by QEF on "Project Learning" projects;

(b)   Select significant project outcomes, deliverables and exemplars for further research and development work, according to criteria professionally set (e.g., Cuban (1998) and RE-AIM framework);

(c)   Interview selected project leader;

(d)   Conduct research and development work on the selected project deliverables; and

(e)   Based on (d), produce resource package(s) and conduct activities to disseminate the good practice and exemplars consolidated and developed from relevant QEF projects.

The research team has conducted the following works to fulfill the above listed tasks:-

(a)   Study past projects funded by QEF on "Project Learning" (63 projects out of past funded projects as shown in **Appendix 1** of the consultancy Brief).

(b)   Select worthy project outcomes, deliverables and exemplars for further research and development work, according to criteria professionally set (e.g., Cuban (1998) and RE-AIM framework);

(c)   Interview project leaders concerned whenever necessary and interview key personnel (may include students).

(d)   Conduct research and development work on the deliverables of the selected projects by :-

(i)   updating the information of the projects still in operation and studying their sustainability;

(ii)   consolidating the good practices of the projects with emphasis on purpose, design, implementation, evaluation and sustained development;

(iii)   conducting a short questionnaire survey and focus group interviews to identify some of the key factors, processes and issues conducive to students' self-directed, self-regulated and self-reflecting learning;

(e)   Based on (d), produce a resource package and conduct activities to disseminate good practice and exemplars consolidated and derived from the QEF projects concerned.
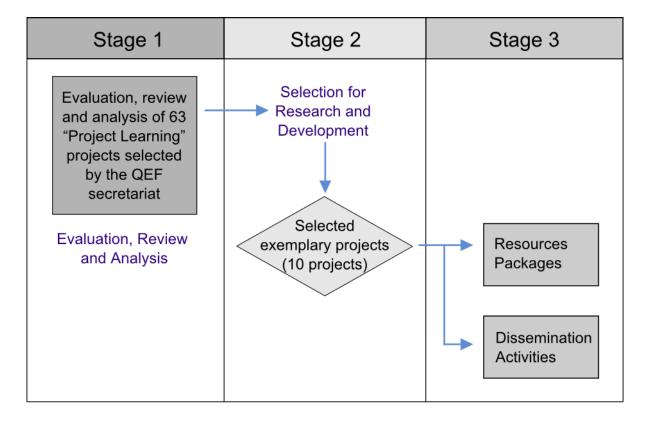
Fig 2.1 General design of the project.

2.5 Time Schedule of the Project

The project was completed in three stages:

Phase I   September 2008 – December 2008

Phase II   January 2009 – March 2009

Phase III   April 2009 – August 2009

2.6 Specific Tasks in the Different Phases of Work

Phase I   (September 2008 – December 2008)

♦ Review of the 63 QEF funded "project learning" projects selected by the QEF.

♦ When analyzing the 63 selected "project learning" projects, the REAIM model and Cuban's (1998) principles of evaluating educational reform were taken into account to provide selection criteria for the outstanding projects.

♦ Invitation letters were sent to the 60 project institutions of the 63 selected projects (as 3 project institutions had 2 projects) for participation in the "Research and Development Work on Quality Education Fund "Project Learning" Projects and updating information of the project programs/activities which have sustained development. 44 project institutions accepted the invitation.

♦ Updating and supplementing the project information.

♦ A literature review of the history, cross-national implementation and merits and difficulties of project learning as a learning strategy is conducted for inclusion in the final report.

Phase II   (January 2009 – March 2009)

♦ Construction of a questionnaire survey. This was aimed at collecting the heads/project planners' views of the key factors, execution, outcomes and experience of the projects.

♦ Nomination of 12 outstanding projects which fulfilled the selection criteria of good project learning. The composition of the 12 cases comprised tertiary institutions, secondary, primary and pre-schools.

♦ Construction of an interview guideline focusing on various aspects of the design, implementation and outcomes of the project program and activities.

♦ Liaison with nominee project institutions to arrange interviews concerned with the comprehension of the ideas.

♦ Distribution the questionnaire survey to all the participating project institutions.

♦ Case study interviews with key persons including project leaders, project coordinators, team members and students dependent on recommendation and availability.

♦ Analysis and summary of the data obtained from the survey and interviews.

Phase III (April 2009 – August 2009)

♦ Consolidation of interview data for regrouping the project programs and activities under selected sub-themes and sub-concepts.

♦ Analysis and summary of the data obtained from survey and interview.

♦ Identification of some good practice and exemplars, encapsulation of the outcomes and experience of the outstanding project learning projects for dissemination.

♦ Webpage design and construction

♦ Planning for a dissemination seminar held on 6 June 2009 to introduce the project rationale, present research findings and sharing of successful implementation experiences on Project Learning Projects.

2.7   Expected Deliverables of the Project

♦ Production of a resource package of printable quality.

♦ Production of a resource package in a web-based directory format.

♦ A seminar to disseminate good practice and exemplars for promoting the resources packages.

♦ Submission of the evaluation report.

3. Literature Review

3.1 Project Learning: an Overview

3.1.1 Project Learning: Origin and History

Project learning, now widely in use in various educational systems, whilst enjoying the advantages of appearing voguish and edge-cutting in the education field, actually has a long history traceable over hundreds of years.

Originally a method adopted for giving architecture students the opportunity to put into practice what otherwise would have remained a blueprint in their mind in the Renaissance European academies around the late sixteenth century, project work was not established as a regular pedagogy until the eighteenth century and did not get incorporated into the general European school system until the late nineteenth century.

By that time, the prevalence of project learning was pretty much a matter peculiar to the United States (Knoll 1997; 李子建 2004). It was only since the early twentieth century with John Dewey's pragmatic promotion of "learning by doing" and "constructive occupations" that the pertinence of project learning to the *Zeitgeist* of the modern world was discovered and thus got promoted back to Europe where it first originated. Ironically, it was since the space race that the insufficiency of the traditional educational mode for equipping students with the necessary qualities for the challenges of the contemporary world were unraveled, and a massive educational movement aimed at unfettering students' creativity and agency and conjoining them with the use of state-of-the-art technology was unfolded. In recent times project learning has been associated with a utilitarian approach to education, where it has been seen to be especially relevant for the education of less academic and less able students.

3.1.2 Essence of Project Learning

Generally known as "focused, experiential learning organized around the investigation, explanation, and resolution of meaningful problems" (Barrows 2000; Torp and Sage 2002; from Hmelo-Silver 2004), project learning differs from the traditional mode of learning in a host of ways, amongst them:

(1) the autonomy students enjoy in formulating the topic of study, which frees them from being mere "order-takers" in regard to what to learn (Chin and Chia 2004);

(2) its heavy reliance on students' own motivation and agency (Blumenfeld *et al.* 1991), as unlike the conventional pedagogy which takes students as the object or container wherein knowledge is injected, project learning gives a substantially more pivotal role to students in steering the whole process of knowledge quest;

(3) the centrality of collaborative learning (Solomon 2003) and communicative ability (李子建 2004), as distinct from the competitive modality traditional didactics generally fosters;

(4) being situational, viz. constructivist in its epistemological approach and building up a learner's knowledge in practical, lived environments rather than taking knowledge as fixed and given imparted intact from one party to another, and

(5) experientiality-ended and process-oriented, lifting the ability to learn and the rewarding experience acquired therein above the specific knowledge obtained at a specific point in time, thereby transcending the ingrained means/ends bifurcation in educational practice (楊驀，張振 2004).

3.1.3   Varieties in Project Learning

The concept of project learning is not crystal-clear. Its variegated forms and applications have bewildered researchers, so that they often question if education programmes implemented under the name of project learning do share any tangibly defining traits (Tretten and Zachariou 1997).

For one thing, in respect of curriculum, project learning could be practised single-discipline-wise, multi-discipline-wise or trans-discipline-wise (參照香港課程發展議會 2002); for another, whilst project learning by necessitating the input of student agency in effecting the programme is indeed a learning mode facilitating the transformation of students from the object to the subject of knowledge, depending on the role of a teacher as mentor, conductor, guardian or critical intervener, it could further differentiate into such sub-categories as teacher-initiated/student-initiated and teacher-dominated/student-dominated (楊驀，張振 2004).

By its unique nature, project learning could be an independent subject specially designed for the attainment of some educational goals proper to project learning itself, or it could be specifically an integrating pedagogy applied for the delivery of certain well confined disciplinary knowledge. In terms of embodiment, project learning could take forms as diversified as a research report, verbal report, study note, speech delivery, display board, and so on.

There is general agreement that project learning might be recognised more by *how* it is *like* rather than *what* it *is*; this means, rather than substantively defined as such and such (e.g. some particular programmes destined, learning activities launched or skills applied), project learning could be a certain *modus operandi* amorphous in content but uniform in both spirit and the way it got effected (e.g. process of enquiry experienced by students).

3.1.4 Wide Deployment of Project Learning in Recent Decades

Of the hallmarks of project learning one could always notice the peculiar shift of stress from what to learn to learning how to learn. This effectively means acquisition of practical knowledge is only secondary when compared with the *ability* to acquire them.

In a way, the popularity of project learning is arguably a reflection of how the educational field responds to the challenges of the changing world. Post-industrial society (Bell 1974; Ritzer 2007), knowledge-based society, high modernity (Giddens 1990) — whatever names have been adopted — thinkers unmistakably point to such a state where everything solid gets melted down in an ever faster tempo, and the key to survival transfers more and more from any particular conditions to the capacity for acclimatizing to mutating conditions.

Educators and the public growingly find that, in other words, amidst the information explosion there is too much to be received and students are not necessarily prepared for that. Rather than filling in the container prescribed knowledge, attention then most conceivably now alight instead on the way whereby students could actively shape themselves into such a malleable knowledge container, or better, knowledge pursuer.

3.1.5 Project Learning Worldwide

The explosion of knowledge associated with the information age provides the background for the increasing popularity of project learning in various parts of the world. Although it has the character of a worldwide movement, project learning appears to be most frequently encountered in economically advanced societies.

3.2 The United States

In the United States, project learning receives full support from the government and has established itself as perhaps the most salient constituent of daily schooling. At first an educational attempt to revitalize the ossified classroom atmosphere in many schools, project learning in the U.S. is now exalted to a national-strategic height, with the educational goal of "going beyond the classroom" conjoined with the federal government's political goal of securing the country's lead in the global technology arena.

A nation-wide program titled *Project-based Learning with Multimedia* and co-funded by the U.S. Department of Education's Technology Innovation Challenge Grant Program and the information technology giant *Joint Venture: Silicon Valley Network* has been launched. It aims at empowering students to draw up their own independent research schemes and developing their skills of collaboration, decision-making, and complex problem solving, specifically via the model of "Project-Based Learning using Multimedia" (PBL+MM) (Penuel and Means 1999).

Under this model, seven principles have been enunciated, namely the projects should be anchored in the core curriculum, should be multidisciplinary, involve students in sustained effort over time, involve student decision-making, foster collaborative skills, have a real-world connection, should have systematic assessment both along the way and of the end product, and, above all, use multimedia as a communication tool (*Ibid.*).

For the methodical monitoring of the program's effect, the federal government contracted SRI International (SRI) — accountable to the Multimedia Project's Coordinating Committee — to develop a partnership-approach comprehensive evaluation strategy, in the hope of further optimization of project learning as a mode adopted not only in schools but also in education and research institutions in general (Penuel, Cole *et al.* 1999; Penuel, Means *et al.* 2000; Penuel, Korbak *et al.* 2002).

3.3 Canada

In Canada, a project learning promotion programme very similar to the American model has been initiated. Named the School Net Grassroots program, the scheme has financed more than 15,000 projects in which students devised creative ways to utilize information technology for the modernization and implementation of their projects.

In the individual classroom learning environment, teachers and students have joined forces to work out their co-initiated projects, with special emphasis being placed on the exploitation of networked computers and computer laboratories to see how advanced network techniques could create a learning environment capable of catching up with the advanced network society (Castells 2004).

While taking into account socio-institutional differences, the programme has proved to be transferrable by having been built on parallel efforts in the Pennsylvania school system, U.S.A. and the Netherlands, and by attracting the attention of educationists in educational systems as varied as the British, the Philippine, the Cambodian, the Slovakian, and the Chilean (Réginald Grégoire inc. and Thérèse Laferrière 1998; Stockholm Challenge).

3.4 China (including Taiwan)

In the East, project learning has been tailored to suit the educational authorities' particular policy needs. In the Taiwan area, project learning as a highly characteristic mode of education, has been trialed in conjunction with the program for fostering the gifted and talented (特殊教育小組 1997; 蔡典謨 2000), with project learning being viewed as a highly effective lever for maximizing the room for autonomous creativity for the gifted and talented students.

It is hoped that by giving students a free hand in conducting their own research rather than placing them in the traditional straitjacket of mass education, project learning will provide an environment in which their aptitudes could be explored to the fullest. As regards average schools, the National Taiwan Science Education Center has regularly held project

competitions in techno-scientific fields intended to cultivate students' own interests (National Taiwan Science Education Centre).

In mainland China, the " Plan of Full-time General High-school Curriculum (revised trial version)" (《全日制普通高级中学课程计划(试验修订稿)》 2001) has recently been announced. In this, project learning — alternatively named "Yan-jiu-xing Xue-xi" (研究性学习) — has been integrated into compulsory "general practice activities" (综合实践活动), totaling 9 hours per cycle and 288 hours for the whole year curriculum.

Beyond this listing as a compulsory unit delivered in all high schools across the vast territory of mainland China, the importance assigned to project learning has been reflected in the issuing of the meticulously drafted "Direction for the implementation of Yan-jiu-xing Xue-xi in General High-schools" (《普通高中"研究性学习"实施指南（试行）)》2001) and the keen discussion that has followed.

Generally project learning has been seen as a powerful tool for the liberation of students from the rigid, stifling force-feeding mode of teaching. The mainland authorities have adopted a more cautious approach placing the accent on the "cultivation of modern vocational consciousness, skills and vocational guidance" (「现代职业意识、职业技能的培养和就业选择的指导」, from 普通高中"研究性学习"实施指南（试行）)》2001), revealing thereby the considerable flexibility of project learning as an educational mode especially with regard to its adaptation to various local contexts.

3.5 *Singapore*

In Singapore — a place particularly relevant to Hong Kong because of economic competitiveness —, project work has been implemented widely in recent years, and has been designated a compulsory component in all primary and secondary schools where it has to be introduced in at least one level.

In primary and secondary schools, project learning is assessed, graded and typically recorded in students' year-end reports. At the pre-university level, project learning has been listed as an examination subject and made a requirement for university entry; whilst assessed at the school-based level, for quality control it is overseen by the governmental Examination and Assessment Board.

In 1997, the Singaporean Ministry of Education announced its motto "Thinking Schools, Learning Nation" (TSLN), and asserted "Teach Less, Learn More" (TLLM) as the vision statement of their new policy approach. In a speech delivered in 2002, the ex-senior minister of state for trade, industry and education Tharman Shanmugaratnam highlighted the development of "a willingness to keep learning, and an ability to experiment, innovate, and take risks" as one of the key adjustments under way.

Understandably, with its strength at emancipating students from cramming and connecting

them to the real world, and with its accentuation of the application of up-to-date technology in the process — an additional advantage which most suits the Singaporean policy direction — project learning is to remain central to the overall direction of education policy.

3.1.6   Development of Project Learning in Hong Kong

In Hong Kong project work as a practical mode of learning has been adopted in many schools. To cope with the rapidly changing world as influenced by such forces as globalization, the information explosion and technology leap, the Hong Kong Curriculum Development Council has laid out the educational leitmotif of "learning to learn" and reintegrated various Key Learning Areas (KLAs) round four "key tasks" (Education Commission, HKSAR, 2000) .

The experience of project work has been synthesized and officially named Project Learning and it has been placed alongside "moral and civic education", "Reading to Learn" and "Information Technology for Interactive Learning", enjoying a special importance since it provides the cement between them (Education Bureau, HKSAR, 2001).

Project learning could provide vivid and benefiting means of promoting moral and civic education, redressing the inadequacy of uninspired moral lecturing characteristic of the traditional didactic mode. In project learning, the resources and materials collected necessitate meticulous reading, processing and analysis, suggesting students' "Reading to Learn" regardless of the finished product. The essential link between project learning and "Information Technology for Interactive Learning" is particularly noticeable, given information technology's role as a powerful tool of data collection, processing and presentation central to project learning.

The education authorities have given project learning strong support. The Curriculum Development Institute, for instance, has developed an on-line toolkit for project learning that can be uploaded for supporting students' autonomous learning. Students are encouraged to use the e-media provided for keeping a record of their learning track and to practice their research skills.

Substantial funding has been provided on an ad hoc basis for a number of university/institution-school partnership programmes to promote project learning, with the Quality Education Fund managing the allocation of funds to sustain the development of project learning at the school-based level.

3.2 Evaluation of a Project Learning Project

Cuban (1998) identified three common criteria used by policy makers to evaluate an education reform: effectiveness, popularity and fidelity. *Effectiveness* is the primary standard where

quantifiable results, such as student test scores, can be used to show that a reform has achieved its intended goal. *Popularity* standard refers to the extent ~~at~~ to which the proposed reform has been adopted and supported by the public. *Fidelity,* as the third standard, refers to an assessment of how well the initial design, formal policy, subsequent programmes and implementation fits.

Cuban commented that these standards are predominantly used by political policymakers, and from the perspective of practitioners two other standards, adaptiveness and longevity, must be considered. *Adaptiveness* refers to the ways teachers put their personal signature on the reform and make it work for their students and themselves. *Longevity* refers to the survival of the reform over time.

In evaluation of school-based intervention, it has been said that "effectiveness" in real-world settings is often overlooked in favor of "efficacy" in controlled experimental settings (Merrell and Buchanan, 2006). Although it is generally agreed that both perspectives are essential (e.g. by Fishman (2000), Seligman (1996), Hoshmand and Polkinghorne (1992)), a rational tool to bridge the gap between "efficacy" and "effectiveness" is needed.

Merrell and Buchanan advocated the use of a public health model to bridge this gap in evaluation of education intervention, such as the RE-AIM model. Originally developed by Glasgow and his colleagues for public health intervention (Glasgow *et al*, 2002), this model has five dimensions: Reach, Efficacy, Adoption, Implementation and Maintenance.

The *reach* of an intervention describes the proportion of the target population participating in the intervention. An intervention's *efficacy* is defined as its success rate or impact on specified outcome criteria if it is implemented as was intended. These two dimensions are assessed on an individual level.

Adoption refers to the target settings or organizations that may adopt a given intervention program. *Implementation* in the RE-AIM framework refers to consistency and quality of delivery of the intervention. These two dimensions are assessed on a setting level.

The *maintenance* dimension refers to how well intervention effects on individuals and populations are maintained over time, or how well behavior change occurs over the long term. This dimension is assessed at both individual and setting levels.

4. Methodology

Aiming at understanding the selected 63 "Project Learning" projects thoroughly, the research team adopted both qualitative and quantitative research methods in the investigation, highlighting 3 research strategies: documentary analysis; questionnaire analysis; and interview analysis.

4.1 Documentary Analysis

The main objective of conducting documentary analysis was to overview the selected 63 "Project Learning" projects on the RE-AIM model and to select twelve outstanding cases for further investigation.

The RE-AIM framework was adopted for analyzing the selected 63 "Project Learning" projects in the following five areas:

i.   Reach

What is the number or percentage of eligible participants (i.e. students) (i) who took part, (ii) who are eligible but excluded and (iii) how representative were they?

ii.   Effectiveness

What impact did the project have on (i) all participants who actively took part in the program and (ii) on both (intended and unintended) positive and negative (unintended) outcomes?

iii.   Adoption

How many organizations and other participants within these settings (e.g., teachers, parents) were willing to participate and how representative were they?

iv.   Implementation

To what extent were the various components delivered as intended (in the design) or adapted when conducted by different members in various settings?

v.   Maintenance

What is the extent to which a program or policy becomes institutionalized or part of the routine organizational practices and policies? What are the long-term effects of a program on outcomes (individual) after the most recent/last implementation?

Evaluation on the selected 63 "Project Learning" projects is made according to the five components (Reach, Effectiveness, Adoption, Implementation, and Maintenance).

4.2 Questionnaire

4.2.1   Scope

The questionnaire survey aims to collect data from leaders of the project learning projects.

4.2.2   Population Size and Sample Size

Leaders of 45 of the 63 projects agreed to participate in the research, all of whom are included in the questionnaire survey. Therefore both the population size and sample size are 45.

4.2.3   Data Collection

Questionnaires were sent to the project leaders by post with stamped addressed envelopes included. Phone calls were made to non-respondents in an attempt to increase the response rate.

4.2.4   Questionnaire Design

The Questionnaire had three sections. Section 1 listed the name of the project, name of the organization and project code.

Section 2 was divided into two sub-sections. Subsection 2(1) comprised-50 questions using a five point Likert scale. Questions in six areas: A. Planning (7 questions), B. Human Resources (8 questions), C. Organization (7 questions), D. Resources Management (5 questions), E. Learning Process (10 questions), and F. Assessment (7 questions), along with G. Learning Achievement (6 questions)) required a respondent's self-assessment.

Subsection 2(2) asked the respondent to (1) rank the six areas according to their importance, and (2) identify three elements by question number in each domain.

Section 3 consisted of two open-ended questions. The first question asked the respondent to identify key concerns in the sustainable development of projects, the second asked the respondent for any other additional information.

4.3 Structured Interviews

4.3.1 Rationales

There are two rationales for conducting structured interviews The first is to compensate for the difficulty of the questionnaire in eliciting information about complex issues in project learning and probing into more in-depth and detailed views of respondents, for example, substantial benefits of project learning for students, teachers and schools; implementation difficulties and their solutions; and suggestions for improvement in the future. Furthermore, there is a chance for the researcher to check the understanding of respondents on the questions being asked, in case some questions might be misinterpreted by respondents. The second rationale is to increase the credibility and reliability of the data by probing more deeply into informants' ideas, clarifying informants' views and building up reliable, comparable qualitative data to triangulate with quantitative data collected from the questionnaires. To facilitate systematic interviewing, interview protocols for different interviewee categories were used for data collection (Appendix 7).

4.3.2 Criteria for Selecting Cases for in-depth Studies

Twelve projects were selected for in-depth study. There were two main groups of informants: the project leaders/planners and implementers/participants from selected kindergartens, primary schools, secondary schools and universities. The selection criteria for informants/sampled schools were worthwhile project outcomes excelling in the following key aspects of project learning: sustainability, targeted ability cultivation, process management, resources allocation, teacher professionalism and student input.

The following table shows the roles of informants in their projects:

Code for Report	Project Code	Grantee Name	Number of interviewees
K1	1999/1562	深信堂幼稚園 Faith Lutheran Church Kindergarten	1 project planner 4 implementers
P1	1999/1573	東莞學校 Tung Koon School (Sheung Shui)	2 project planners
P2	2000/0729	藍田循道衛理小學 Lam Tin Methodist Primary School	1 project planner 2 implementers

Code for Report	Project Code	Grantee Name	Number of interviewees
P3	2000/2378	路德會沙崙學校 Sharon Lutheran School PM	1 project planner 2 implementers
P4	2000/2390	大埔舊墟公立學校 Tai Po Olld Market Public School	1 project planner 2 implementers
S1	2001/0011	香港神託會培敦中學 Stewards Pooi Tun Secondary School	3 project planners, 3 implementers
S2	2002/0307	漢華中學 Hon Wah College	1 project planner 1 implementer
S3	2002/0500	佛教茂峰法師紀念中學 Buddhist Mau Fung Memorial College	2 project planners 3 implementers
S4	2002/1013	天主教母佑會蕭明中學 Daughters of Mary Help of Christians Siu Ming Catholic Secondary School	1 project planner 5 implementers
S5	2003/0596	仁愛堂田家炳中學 YOT Tin Ka Ping Secondary School	1 project planner 2 implementers
U1	2004/0480	香港大學地球科學系 The University of Hong Kong - Department of Earth Sciences	2 project planners 2 participants
U2	2004/0743	香港中文大學社會學系 The Chinese University of Hong Kong - Department of Sociology	1 project planner
		Total	17 project planners 26 implementers

Fig 4.1 List of Informants

4.3.3   Interview Progress

Interviews for the twelve in-depth case studies were conducted from February 2009 to April 2009. The research team sent invitation letters to and phoned the corresponding project initiator(s) of the twelve in-depth cases to invite them to participate in the research. Interviews

were conducted soon after the project organizers' confirmation.

4.4 Limitation of the Study

This in-depth case study has two limitations to be acknowledged and addressed. They are:

4.4.1 Sampling

Data of this study were mainly collected through questionnaires and structured interviews with selected informants who were accessible by the researcher. Nevertheless, a complete and representative sample of the teachers involved in the projects was not available because some of the informants could not be reached due to (i) the student beneficiaries (1999 – 2004)   had graduated **a**nd (ii) turnover of staff since some project planners and teacher implementers in case-study schools had left. For the questionnaire, only project planners were left to become the subject of survey. To compensate for such limitations, the principal and/or vice principal of the case project schools were interviewed if the original project planner had left.

4.4.2 Credibility and Reliability of the Data

As common to retrospective interviews, the informants' responses could have been affected by faded memory. This was compensated for by interviewing more informants in the same case-study school and the cross examination of collected documents.

5. Data Analysis

5.1 Documentary Analysis

5.1.1   Groups of Organizers

There were five groups of organizers in the selected 63 "Project Learning" projects: kindergarten, primary school, secondary school, university, and non-governmental organization (NGO). As Table 5.1 below shows, five organizers belonged to "kindergarten", twelve to "primary school", 34 to "secondary school", six to "university" and six to "NGO". This distribution reflects a wide coverage of service providers, ranging from kindergartens to NGOs.

	Kindergarten	Primary school	Secondary school	University	NGO
Total	5	12	34	6	6

Fig 5.1 Groups of organizers

5.1.2   Conduction Period

The selected 63 "Project Learning" projects were conducted within the period 1998-2006.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	
Total	3	9	9	12	7	5	6	10	2	

Fig 5.2 Conduction period

5.1.3   Pattern of Implementation

The selected 63 "Project Learning" projects manifested the following patterns based on a matrix analysis of their organization, platform of delivery, spatial dimension, embodiment, teaching materials and deliverables. Fig. 5.3 illustrates these patterns.

A.   Curriculum organization

	Number of Respondent	Percentage of Respondent
Single Subject	9	14.29%
Cross Subjects	10	15.87%
Cross KLAs	1	1.59%
Interdisciplinary	31	49.21%
NGO / University PBL program with specific subject	12	19.05%

B.   Level of Delivery

Kindergarten	5	7.94%
Primary School	16	25.40%
Secondary School	45	71.43%

C.   Platform of Delivery

Library	8	12.70%
IT/ IH lab	7	11.11%
Mass Media	2	3.17%
Cyberspace	12	19.05%
School settings	12	19.05%
Field, Community	48	76.19%

D.   Embodiment

Project learning day, week	7	11.11%
Project learning camp	5	7.94%
Project Competition	11	17.46%
Independent Project Report	53	84.13%

Systematic Project Learning Program	10	15.87%
Classroom orientated training of skills	32	50.79%
Project Approach	5	7.94%

E.   Teaching Materials

Rubrics	26	41.27%
Learning Log	12	19.05%
Teaching Plan	33	52.38%
Teachers' Guidance	16	25.40%
Students' Guidance	13	20.63%
Structured Worksheet	22	34.92%

F.   Deliverables

Report	47	74.60%
Verbal Presentation	22	34.92%
Display Materials	23	36.51%
Multimedia Presentations	7	11.11%
Webpage	6	9.52%
Booklet / Pamphlet	7	11.11%

G.   Workshop

Teachers' Workshops	32	50.79%
Students' Workshops	38	60.32%
Parents' Workshops	9	14.29%

Fig. 5.3 Pattern of Implementation of the 63 'Project Learning" projects

From this analysis, it can be seen that, regardless of level of schooling, the majority 49% (31cases) of the 63 "project learning" projects followed an interdisciplinary approach. A very high percentage of these projects 76% (48 cases) were conducted in field and community

settings beyond the physical school settings. As for embodiment, 84% (53 cases) of these 'project learning' projects took the form of independent student reports, and 51% (32 cases) were related to classroom orientated training of project learning skills. A great majority of the deliverables were student reports (74.6% and 47 cases) but there was not a high percentage (35% and 22 cases only) of verbal presentation by students. The utilization of multimedia and electronic means for presentation was quite low (11% and 9.5% respectively). In the process of project learning, 53% (33 cases) of the projects followed a clear teaching plan and 41% (26 cases) of them were monitored by prescribed rubrics; 60.3% (38 cases) of the projects conducted workshops for students, and 51 % (32 cases) for teachers.

5.1.4   In-depth Analysis of the Pattern of Implementation in the Twelve Exemplary Projects

The table below (Fig. 5.4) summarizes common features of the twelve exemplary cases in their school-based implementation of project learning according to nine key attributes: (a) learning to learn, (b) real life connection, (c) level of student decision, (d) problem formulation, (e) level of independent enquiry, (f) evaluation mechanism, (g) complexity of skills, (h) curriculum scope, (i) presentation format. This analysis shows that the twelve exemplary projects have demonstrated a general coverage of the nine key attributes yet the extent to which each attribute is attested differs.

	Learn to Learn	Real-world Connections	Student Decision Making	Problem-based	Independent / Collaborative Enquiry	Self-assessment	Multi-skills	Curriculum Organization	Research Study Mode
Faith Lutheran Church Kindergarten	Purchase of toys, teaching materials and books in science for young children; allowing them to explore scientific principles by group experiments and "Science Corner".	Using themes such as "Learn about myself", "Spring", "Transportation", etc. to explore issues such as "The Five Senses", "the effect of sunlight, air and moisture on plants" and "machines in everyday life".	In the process of scientific enquiry, teachers raised the hypothesis for K1 students and allowed them to choose the methods for testing. K2 students would make their own hypothesis while K3 students would also design the inquiry experiments.	Teachers posed questions for students to make hypothesis, then students conduct scientific inquiries according to the hypothesis.	Collaborative Enquiry		Developing a new curriculum on helping young children explore science. Cultivating the young children the habit of enjoying learning, enjoying inquiry, curiosity and collaborative, as the base of life-long learning.	Developed a new curriculum on helping young children explore science with diversified, integrated, interesting daily life topics.	Children were required to do a research through observation, categorization, collection, design scientific experiments, planting and husbandry, playing science games and toys, doing preliminary science reading.
Tung Koon School (Sheung Shui)	The organic farm and theme garden were set up. The design and facilities of Organic Farm effectively developed the school-based environmental education activities. It provided a venue for diversified teaching activities. Some P3 & P4 students would do the observation on insects in the Organic Farm spontaneously.	Using the facilities in the Organic Farm to do project learning.						Environmental Education and Cross-curriculum	Deliverables of the project include: learning logs, written reports, WebPages, PowerPoint, activities photos, video clippings of presentations, posters and display boards.
Lam Tin Methodist Primary School	Adopting 4P model in project learning: Students first identify a problem in daily life experience. According to that, they have to collect relevant information in order to find a solution for the problem. After that, have to evaluate the feasibility of their solution. If the solution can not solve the initial problem, they have to identify the problem again and re-do the inquiry.	Project topics for P1 to P5 are "Our School", "Toy", "Out Community", "Food and Nutrition" and "Resources" respectively.	P6 students were allowed to select their own favorite topic or the area which they are familiar with. They would use different methods to do the inquiry under the guidance of teachers.	The school adopted problem-based learning as the strategy of doing project learning in order to train the problem solving skills of the students. Students started with a daily life problem and went deep into the inquiry.	Collaborative enquiry in P4 and P5. Independent inquiry in P6.	"Work Report", "Self-assessment" and "Cross-assessment" sections were included in learning log.	By way of project learning, students achieved all-around development skills such as problem-solving, creativity, critical thinking, collecting and organizing information, presentation, construction of questionnaires, Information Technology, studying and collaboration.	Project learning became routine of the curriculum. And it also became the key task of curriculum development for the subject General Studies.	Project learning activities were held according to the 4P model and students had to do written records. Students would follow the learning logs made by teachers to do the project systematically and step by step.

	Learn to Learn	Real-world Connections	Student Decision Making	Problem-based	Independent / Collaborative Enquiry	Self-assessment	Multi-skills	Curriculum Organization	Research Study Mode
Sharon Lutheran School	There were joint-class thinking skills training activities. Thinking skills are life-long and they would lay the foundation for "Learn to Learn".	Using daily life topics , such as "ideal home", "Eating with nutrition", "Sports are full of fun", "Health life", "Growth Healthy" and "Green life" for project learning.	After constructing the topic web and discussing with group members, students identified the research areas and research questions.	After constructing the topic web and discussing with the group members, students identified research areas and research questions. The learning log points out that the principle of doing project learning is to start with problem-solving.	Independent enquiry	"Work division report", "Procedures", "Self-evaluating form" sections were included in learning log. Students were asked to note down their achievements, difficulties, areas of interests and areas for improvement.	1. Project learning skills training workshop & joint-class project learning activities: Skills of doing project were learnt, for example drafting topics, information search, report writing. 2. Tasks were divided to students according to their capabilities in order to develop their own potential. 3. Aimed to develope collaborative learning atmosphere and enhance team spirit among students.	Projects were done in the subject General Studies. There were loint-class project learning activities for different grades. There were also cross subject Collaborative Lesson Planning meetings.	1. Construction of topic web with group members in the lessons; 2. Identified the problem and set the topics for the project; 3. Designed the questionnaires and methods of information collection; 4. Finished the written reports after the completion of questionnaires and information collection.
Tai Po Old Market Public School	Wireless networking was installed in all classrooms. 30 tablet PCs were bought so that students have more chance in using computer to facilitate learning. Students would use multimedia technologies as the platform for collaborative learning in the project. They would also form the habit of self-learning.	Use "Sewage Treatment" and "Plants and Environment" as the main topics for project learning.	Students would brainstorm on the main topics and make a mind map. They would identify meaningful inquiry subtopics based on the mind map.	Following the request of the learning log, students would set up the objectives and inquiry questions of the project by themselves.	Collaborative Enquiry	"Students' attitude assessment", "Self evaluation" and "Peer evaluation" sections were included in personal learning log.	Wireless networking was installed in all classrooms. 30 tablet PCs were bought so that students have more chance in using computer to facilitate learning. Students would use multimedia technologies as the platform for collaborative learning in the project. Their generic skills were developed.	Project learning as part of curriculum in the subject General Studies.	1. Teachers set up the main topics; 2. Students drafted the subtopics and inquiry plan; 3. Students collected information and presented them to their group members; 4. Students did the information organization and analysis; 5. Findings , argument, opinions were presented in written words, charts, etc; 6. Choosing a suitable way to do the presentation of the project.

	Learn to Learn	Real-world Connections	Student Decision Making	Problem-based	Independent / Collaborative Enquiry	Self-assessment	Multi-skills	Curriculum Organization	Research Study Mode
Stewards Pooi Tun Secondary School	A multi-media learning classroom was set up. Students learnt beyond the text book and used online resources in their projects in different subjects. They truly became active learners.	Using daily life topics, such as "Allurement of Ice-cream" and "Renewal Plan of San Po Kong ", for project learning.	The project's topics, methods, schedules and budgets were designed by the students.	Using "Renewal Plan of San Po Kong" as topic of the project.	Collaborative Enquiry	Students were required to write their reflection in project report.	Training of various skills and attitudes in Thinking Training Class.	Attempted single-subject and cross-subject curriculum in the past; now adopted project learning as an independent subject.	1. Decide enquiry topics with the aid of KWL or mind map; 2. Design and modify questionnaires; 3. collect and organize information (including questionnaire surveys); 4. compose reports and submit in both electronic and written form; 5. Presentation.
Hon Wah College		There was a whole school Field Studies day. Students did the field studies and data collection in different locations in Hong Kong. The Situated learning was changed to Authentic Learning.		Teachers set up situated questions.	Independent enquiry	Students' self-evaluation form which counts for 10% of the total point.	Through project learning and field studies, students' collaboration, communication, creative thinking, critical thinking and IT skills were developed.	Subject based but not in formal curriculum	Students in different grades did the field studies in different locations in Hong Kong.
Buddhist Mau Fung Memorial College	Construction of a "Learn to Learn" curriculum. Students' generic skills including collaboration, communication, analytical and problem-solving skills were developed.	Using daily life topics such as "Community around my School", "An Ecology Journey", "Inquiry of Buddhist Art Culture in Chi Lin Nunnery", for project learning.	Students decided their own topics by group discussion or with the aids from teacher	Students tried to explore meaningful questions as the topics of their project. Guidelines for setting a topic were included in a student handbook.	Collaborative Enquiry	Students used a logbook to record their progress. F1 to F3 students also took part in a longitudinal study, by pre-project and post-project questionnaires.	Construction of a "Learn to Learn" curriculum. Students' generic skills including collaboration, communication, analytical and problem-solving skills were developed.	Cross-KLA	Guided by a student handbook and logbook: 1. Collect data 2. Design questionnaire and observation guide 3. Adopt sub-topic 4. Conduct survey and observation; 5. Analysis and Report.

25

	Learn to Learn	Real-world Connections	Student Decision Making	Problem-based	Independent / Collaborative Enquiry	Self-assessment	Multi-skills	Curriculum Organization	Research Study Mode
Daughters of Mary Help of Christians Siu Ming Catholic Secondary School	Students used their acquired knowledge to do an in-depth inquiry. The abilities of and interest in self-studying were enhanced. The habit of life-long learning was developed. For example, F2 students were required to pay attention on the new development of the society as well as those news related to their study project. Self studying spirit was evidenced.	In order to simulate students to think, daily life topics such as "Our Community", "Ideal quality of life", "Life in the 21ˢᵗ Century", "Geography field work investigation", "Project learning on current issues" were used for project learning.	A concept map was first drawn by using brainstorming skills. A subtopic was drafted according to the concept map. Information collection was done to enhance the understanding on the subtopics, in order to design the direction of the research.	A concept map was first drawn by using brainstorming skills. A subtopic was drafted according to the concept map. Information collection was done to enhance the understanding on the subtopics as well as identifying an inquiry subtopic.	Collaborative Enquiry.		Students did the problem solving by collaboration, discussion and other different ways. Different generic skills were developed so that students could learn the basic skills of project learning in junior form. Project learning in different forms would coordinate with other key learning areas. In Form 1 it was coordinated with Reading to Learn. In Form 2 it was coordinated with Information Technology for Interactive Learning. In Form 3, it was coordinated with both of them.	The curriculum integration was attempted through project study. Eight Key Learning Areas (Chinese Language Education, English Language Education, Mathematics Education, Science Education, Technology Education Personal, Social and Humanities Education, Arts Education and Physical Education) were integrated.	1. Students drafted the concept map with the guidance of teachers; 2. Students chose a topic and discussed with teachers; 3. Collected information; 4. Students wrote the proposal and set the topics for the project; 5. Conducted questionnaire survey / experiment / science project; 6. Presented the project to others together with a Q&A section and submitted a written report.
Yot Tin Ka Ping Secondary School	1. Implemented issue-based enquiry learning. Developed the self-learning skills and generic skills of students. 2. Taken the characteristic of each student into consideration, students could grasp different thinking tools and skills in the "learning by doing" process. 3. Developed students the ability of learning to learn, facilitating students to grasp the integration and practicability of different knowledge.	Using daily life topics for project learning, such as e.g. "Entrepreneurial Economics - Upper Floor Cafes", "Development of Chinese Architecture in Hong Kong", "Entrepreneur - furniture industry ", "Water Pollution in Tuen Mun District", "Water Pollution - Shing Mun River & Tuen Mun River" and "Cinematic Development in Hong Kong".	The project topics, methods, division of works were designed by the students.		Collaborative Enquiry	Every module included a reflection form. Students wrote down their feeling and teachers gave them timely feedback. Students' problems in doing project could be identified timely.	1. Life-wide Learning strategies and plans were implemented and their sustainability was studied in order to develop students all-around growth and enhance their generic skills 2. The optimization of whole school learning arrangements in different stages systematically developed students generic skills. 3. The implementation of issue-based enquiry learning also developed Students self-learning generic skills.	Linking with different modules in liberal studies, F.1 and F. 2 students would have at least two chances to learn outside the classroom. All F.3 students would do a complete social science inquiry project in group. It was an exercise for summarizing what the students had learnt about project learning in the junior form. By the means of several field studies in local and China, senior form students studying AS-level liberal studies, would have an in-depth experience in and think deeply about the topics.	1. Students discussed on the topics and collected written information; 2. Students designed the methods and planning for first hand information collection; 3. Students collected and organized information; 4. Students analyzed the information and drew a conclusion; 5. Students did an evaluation and presentation.

Fig. 5.4

5.1.5 Typology of Project Learning

Based on the documentary analysis of the 63 "project learning" projects and in-depth analysis of implementation features of the twelve exemplary projects, it is possible to generalize a typology of project learning according to its course of development. As Fig. 5.6 below illustrates, project learning undertaken by schools often evolves from a preliminary stage toward an advanced stage, all of which fulfill the key attributes of project learning. It should be noted that the three typologies only reflect the progress of project learning experienced by schools according to their specific contexts, such as the level of schooling, the experience of conducting project learning and other school- based contextual features. Moreover, a particular project may remain in the preliminary stage in some attributes, such as problem formulation, level of independent inquiry but high in other attributes, such as presentation format and evaluation mechanism. Therefore, this typology is only meant for the self-reflection of schools undertaking project learning.

Key attributes	Preliminary Stage	Intermediate Stage	Advanced Stage
Problem /Topic Formulation	Strictly pre-designed, prescribed by teachers	Prescribed by teachers but allowing modification by students	Freely decided by students through brainstorming and refinement
Real Life Connection	Artificial, simulated situation	Controlled situation	Very strong in a very open field context
Level of Student decision	low	negotiated	high
Curriculum Scope	Subject based, narrow	Going beyond subject boundaries	interdisciplinary
Level of Independent Enquiry	Low, students mainly follow highly structured guidelines and steps to complete project	Intermediate; students follow broad guidelines and given flexibility	High, students complete a project independently
Evaluation mechanism	Simple and brief; Mainly summative evaluation of learning conducted by teacher	Detailed guidelines and multi-dimensional; Involve students' self-evaluation; Continuous evaluation	Clear rubrics written for different dimensions; Involve teachers, parents, and students ; emphasis on evaluation for learning.
Students' Self-reflection Opportunities	Little; mainly concerned with finished deliverables	Some opportunities are provided for students' reflection	Highly emphasized; students fill in reflection logs and provide reflection in end-product
Presentation Format	Written report mostly	Written and verbal presentation, employing some multi-media tools such as powerpoint	Complex and creative, such as drama, video, films, display boards
Complexity of Skills	Simple and basic information processing skills	Multiple skills; problem solving and decision making skills demonstrated	High research skills; critical thinking and creativity highlighted
Exemplary Projects	**K1, P1**	**P2, P4**	**S1, S3, S4, S5**

Fig. 5.5   Typology of Project Learning

5.1.6   Methodology of Project Learning

All 63 projects have undergone the five main stages of project learning, namely, problem formulation, data collection, data analysis, data completion and presentation. Again, the vigor of the five stages varies between projects according to their level of schooling and students

characteristics. Good exemplary practice of each stage are collected in a resource package of printed quality for dissemination.

5.2 Analysis of the Questionnaire

A summary of the analysis of questionnaire is provided below. For a full analysis, please refer to **Appendix 6**.

5.2.1 Response Rate

Participants from 47 projects agreed to participate the research work, 44 completed and returned the questionnaire, giving a response rate of 93.6%.

5.2.2 Mean Scores and Standard Deviation

Respondents have answered 93.82% of the questions in subsection 2(1) on average. The mean scores and standard deviation for each area are shown as below:

Area	Mean	Standard Deviation (SD)
A Planning	4.241883	0.524186
B Human Resources	3.470319	0.675149
C Organization	4.002814	0.533043
D Resources Management	3.889773	0.493147
E Learning Process	4.133201	0.496010
F Assessment	3.764341	0.701210
G Learning Achievements	4.019380	0.570678

Fig 5.6   Mean Scores and SD of each Area

5.2.3 Ranking of the Areas

Two respondents did not rank all areas, but only the 3 most important ones. Areas omitted by them are taken to be of them same importance, and are ranked by fractional ranking (all ranked 5th).

Count of ranking for the six key factors is tabulated below:

Factor/Rank	A	B	C	D	E	F
1st	26	6	4	1	7	0
2nd	13	7	12	2	7	3
3rd	5	10	8	3	13	5
4th	0	9	12	7	6	8
5th	0	11	7	11	9	10
6th	0	1	1	20	2	18

Fig 5.7   Ranking of the Areas

5.2.4   Key Concerns in the Sustainability of Projects

36 respondents completed this section. The most mentioned key concerns have been categorized and counted. The result is shown below:

Key Concerns	Count
Sufficiency of human resources or workload	13
Financial resources	9
Teacher training and developments	8
Support of teachers	7
Support of school leaders	6
Self assessment and reflection	6
Good planning	5
Linkage to real world experience	4
Integration with regular curriculum	3
Cross-school affiliation	3

Fig 5.8   Key Concerns of Project Planners in the Sustainability of Projects

6. Findings and Discussion

This section analyzes and discusses major findings in two major aspects: the key factors for successful implementation of project learning and benefits of implementing project learning in schools.

6.1 Identifying the Eight Key Factors of Success

Eight key factors for successful implementation of project learning in schools have been identified in this research by inductive generalization with evidence drawn from both quantitative and qualitative data being triangulated.

Quantitative evidence has been obtained principally from the questionnaire completed by respondents. In each area of the questionnaire, those items with high mean scores demonstrate strong evidence of high rating by respondents, and therefore can be taken as an indication of success and good practices. For example, three question items focused on learning achievement (section G of the questionnaire) gained high mean scores over 4 in the Likert scale (Fig. 6.1). Further triangulation with qualitative data generated from the interviews helps to confirm and enrich understanding of this aspect of practice.

Question Item	Mean Score	Standard Deviation
1. On the whole, students are involved in the activities earnestly	4.2558	0.6933
2. Objective(s) of the project is/are attained successfully	4.2558	0.6933
3. Learning skills of the students are significantly enhanced	4.0512	0.6468

Fig. 6.1

Qualitative evidence was derived from a dearth of transcribed verbatim data recorded in interviews with 43 interviewees (17 leaders and 26 implementers).These data were analyzed by the research team to identify emerging themes, which were then conceptualized as key factors of success. Data related to each factor were aggregated and weighted according to the meaning and emphasis of the expression of interviewees. A matrix shows how these eight factors are associated with the Twelve exemplary cases, as shown in Fig. 6.2 below.

Factors of Success / School/Organization	Positive External Stimulus	Intrinsic Motivation and Readiness for Innovation	Strong Core Leadership	Clear Planning and Vision	School-based Adaptation Strategy	Vigorous Evaluation Mechanism	Sufficient Administrative Supports	Effective Utilization of Resources
Faith Lutheran Church Kindergarten	✓	✓	✓	✓✓	✓	✓	✓	✓✓
Tung Koon School (Sheung Shui)	✓	✓	✓	✓	✓		✓	✓
Lam Tin Methodist Primary School	✓	✓	✓	✓✓	✓✓	✓✓	✓	✓
Sharon Lutheran School	✓	✓✓	✓✓	✓	✓	✓✓	✓✓	✓
Tai Po Old Market Public School	✓		✓	✓	✓	✓	✓	✓
Stewards Pooi Tun Secondary School	✓	✓	✓	✓	✓		✓✓	✓✓
Hon Wah College	✓		✓	✓	✓		✓	✓
Buddhist Mau Fung Memorial College	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	
Daughters of Mary Help of Christians Siu Ming Catholic Secondary School	✓	✓	✓	✓	✓	✓	✓	✓
YOT Tin Ka Ping Secondary School	✓	✓	✓✓	✓✓	✓✓	✓✓	✓✓	
The University of Hong Kong - Department of Earth Sciences	✓	✓	✓	✓		✓		
The Chinese University of Hong Kong - Department of Sociology	✓		✓	✓				

Fig 6.2 Key Factors of Success

✓   **represents an emphasis referred to by the interviewee on the related aspect.**

✓✓   **represents a very strong emphasis by the interviewee on the related aspect**

6.2 Keys to Success in Implementing Project Learning in Schools

By integrating the rating analysis (mean score, standard deviation), rank ordering of the questionnaire questions (Appendix 1) and the interview data, eight distinct factors emerged as keys to success in implementing Project Learning in schools. These eight factors have been grouped into three categories (Initiation, Implementation and Institutionalization) and elaborated below.

(I)   Initiation

A.   Supportive External Stimulus

From the study, it has been found that two external stimulus have provided a powerful impetus for success in implementing project learning in schools. While the Education Reform starting in 2000 sparked the paradigm shift of teaching and learning, with project learning as one of the key concerns, the Quality Education Fund provided timely fiscal resources as an incentive and encouragement for those schools wishing to embark on the reform journey, especially at the early stage. QEF has also enabled and facilitated tertiary professional agents to work with schools as partners in developing project learning. QEF support has been a crucial factor fully acknowledged by participants in all of the exemplary projects.

Nearly all the interviewees in Group A (planners) and many in Group B (implementers) stated that they were aware of the importance of project learning as one of the four key tasks in the Educational Reform. Furthermore, the availability of supportive resources for teachers was a crucial factor as the implementation of project learning involved changes to teachers including project learning skills and a paradigm shift in teaching and learning. The Quality Education Fund (QEF) brought additional resources and encouragement to teacher planners, implementers and schools, and acted as a catalyst for initiating and implementing project learning in some case study schools. Most of the interviewees claimed that one of the reasons for applying for QEF was to get resources for inviting professional agents to run training workshops for teachers. Support from professional agents (for example: the HKIEd, joint university and school partnership support (CUHK) was perceived by informants as a key promoting factor for project learning.

The following quotations from interviews illustrate the factor of external support and stimulus.

> *"As a front line worker, I feel that the most important success factor is to have professional support. From the very beginning Professor Chan introduced project learning and organized workshops for us to experience project learning……They have rich experiences and systematic methods which enable us to master the methods of project learning." (participant teacher in Case U2)*

"The reality is that we must face educational reform, and you can see that the whole system is changing...we all have to better prepare our pupils, but first we have to prepare ourselves as teachers. This is the right time to do it (project learning)."
(Planner of Case S3)

B.   Intrinsic Motivation and Readiness for Innovation

The outstanding exemplary projects in schools were all initiated by school teachers with high motivation towards experiencing the paradigm shift of teaching learning through project learning projects. With such clear vision and desire, the planners and implementers quickly formed a shared commitment of learning-by-doing, sharing extra burdens, seeking professional inputs, risk-taking for the benefit of their children. They became pioneers in project learning although they were not yet fully equipped with the knowledge and skills of project learning. Yet it was exactly this self-acknowledged deficiency that turned into a ferment of trial and learning, and a will to overcome difficulties.

A high level of readiness of project planners was a crucial factor for the initiation and blossoming of project learning in schools. The questionnaire results on this aspect were further confirmed with interview data. Project planners rated high in questions 2 and 13 (Fig. 6.3).

Question Item	Mean Score	Standard Deviation
2. Relevant theories are consulted in the planning stage	4.0465	0.9500
13. Planners are equipped with professional knowledge and skills to conduct project learning projects	3.8372	0.7537

Fig. 6.3

Project planners gained their knowledge on project learning from different sources including EDB's document on Education Reform and sharing of practices with other schools. In addition to strong theoretical knowledge on project learning, project planners of the twelve cases had clear objectives of how to implement project learning in their school, with high awareness of what learners needed and how project learning would benefit them. This strong knowledge on project learning was an impetus to initiate and develop project learning in their schools.

Recognition of deficiency in knowledge of project learning became the driving force of some project planners who acknowledged past unsuccessful project learning experience (e.g. copy and paste projects, projects with little emphasis on process) and admitted their lack of project learning skills in question design, research methodology as well as facilitating skills.

Acquiring project learning leadership skills became a great demand, and teachers looked to tertiary institutions and even NGO's for help. With QEF support, these external professional agents filled the teachers' knowledge gap for implementing project learning in schools.

The following quotes are self-explanatory:

"We are quite ignorant (of project learning) but we hope to make use of this project to help teachers learn more (about project learning), especially in enquiry learning." (Teacher of Case K1)

"We think the education trend is towards developing students according to the ideas of project learning…it is urgent for us because of the policy. If we do not lay a good foundation in junior secondary level, students cannot cope with the requirement of the new senior secondary education." (Teacher of Case S3)

"Sooner or later we need to prepare students, but let us first prepare the teachers. This is the right time to do it (project learning)." (teacher of Case S4)

(II) Implementation

C．Strong Core Leadership

In all the exemplary projects there were leaders who initiated the project and collaborated with peers to move on. These leaders had clear objectives, perseverance, good inter-personal relationships and planning skills all of which enabled the whole team to become a cohesive core leadership. The core team was empowered by the school authority to undertake the project, and within the team there was a good division of labor, sharing of responsibilities and experiences. Team members were quick to summarize experiences for the next phase of work, and take concerted efforts to overcome various obstacles. Peer relationships of teachers were outstandingly strong in the exemplary projects.

The high mean score gained in question 17 clearly illustrates the importance of consensual

Objectives (Fig. 6.4).

Question Item	Mean Score	Standard Deviation
17. Among the Planners, they have consensus objectives and conducting strategies of the project.	4.3255	0.7471

Fig. 6.4

Strong core leadership yielded strong teacher collaboration and a high level of team spirit which explained why project learning was successfully implemented in the case-study schools. Teachers from the case study schools pointed out that shared vision and consensus on rationales were important in bolstering up team spirit to work for the benefits of students and in maintaining their high level of participation in the project.

Project learning requires a paradigm shift in teaching and learning and collaboration among teachers, which challenges what teachers have been doing in their careers. Without teachers' consensus and support, significant changes could never have been taken place. Project planners clearly attributed the success of implementing a project learning project to strong collaboration and the high team spirit of co-working teachers.

"As planners we have to take action and be responsible. It is important to walk together." (Planner of Case P3)

"There must be a core team of colleagues with the same objectives to lead and promote project learning." (Planner of Case P2)

"It is because of the principal's empowerment, allowing colleagues to dare to try ...the trust of the principal is a crucial factor for successful implementation of project learning." (planner of Case S5)

"The principal puts forth the overall direction. The vice-principal responsible for teaching and learning coordinates staff deployment. The teaching research team is the executive committee that carries out the planning, bringing teachers to work together according to a consensus view. This ensures sound administrative arrangement and a reduction of teacher workload." (Planner of Case S3)

D. Clear Planning and Vision

Although the twelve exemplary projects have taken different forms and developed in different scopes and levels, the core leadership had a very focused vision, that is, enabling their pupils to become self-regulated, independent enquirers and collaborative learners according to the rationales of project learning. For this purpose, very effective administrative arrangements were being made, ranging from well designed schedules to learning logs for teachers and pupils.

The following questionnaire data are supportive evidence of clear direction and planning (Fig. 6.5).

Question Item	Mean Score	Standard Deviation
1. Object(s) of the project is/are clear and definite	4.5227	0.5053
3. Activities are designed to be conducted orderly	4.3409	0.6450
4. Activities and program design are diverse	4.4883	0.5925
5. Activities are completed according to the plan	4.1590	0.8611
18. Planners were able to persuade the implementers of the objectives and conducting strategies of the project.	4.0371	0.8182

Fig. 6.5

Also in the rank ordering section of the questionnaire, planning was ranked the highest important factor for successful implementation of project learning by respondents.

All the planners in the case study schools had clear objectives and, using various means, their ideas were made clear to all participant teachers. Some schools undertook a whole school approach to project learning implementation whereas other schools highlighted project learning as their major area of concern in the relevant academic year. Besides, efforts were made to make guidelines clear to both teachers and students. Each participant teacher and student had a project learning handbook. Students were guided to project learning step by step.

Teachers spoke about the following reflections regarding clear direction and planning: -

"Leadership is very important. The curriculum leader is responsible for planning. There is an objective for each year of implementation, taking into account the conditions of students. It develops layer by layer. Teachers collaborate." (Teacher of Case P3)

"The core group must have very clear objectives. The briefing is very important. I think teachers' perception (of project learning) is the primal force of development." (Planner of Case S5)

E. School-Based Adaptation Strategy

Whereas project learning as an innovation exhibits distinctive intrinsic attributes and methodology, the mode of operation can be amorphous depending on the context of implementation. The exemplary projects well illustrated this diversity as a school-based adaptation strategy was adopted. Project learning projects can be delivered through the formal school curriculum in single subject, cross subjects, cross key learning areas and even interdisciplinary modes. They can be conducted within the school setting or outside the school in specific social (community issues) and physical settings (field study sites and farms).

Teacher implementers highly valued the importance of adopting a school-based adaptation strategy for implementing project learning:-

"Project learning involves such a wide scope, other subjects have to match well with project learning. We put project learning in a particular period, asking all students to work around a project learning theme with which every subject is associated." (Planner of Case P3)

"We hope to match (project learning) with an existing thematic approach, or other teaching-learning activities. In this way, the workload wouldn't be too heavy."

(Teacher of Case K1)

"By making use of the ecological environment of the school farm we developed pupils' ability to learn independently and observe carefully…we also developed a formal environmental education curriculum." (Planner of case P1)

"We have to reshuffle the school curriculum to make project learning an integral part of teaching and learning. Project learning is not an extra item of work, it can be implemented through three curriculum approaches. In the formal school subjects, we plan for three years in the junior secondary level. Each level has a particular focus in a specific KLA. For example, community study in mathematics

in S1; science in S2; religion and art in S3. We also set aside special lesson time to train students to conduct project learning. We also employ external experts to teach students the skills of mind mapping, designing questionnaires. We will not conduct project learning in senior secondary level. Even if it is done, it will be subject based." (Planner of Case S3)

"We integrate project learning with library lessons and the information technology curriculum. Before conducting project learning with pupils, teachers will plan ahead what and how the school library can contribute towards project learning, and how some of the skills, such as power point presentation and web page building can be taught through IT lessons." (Planner of Case P2)

F.   Evaluation Mechanism

When project learning takes different forms, it is crucial to have an evaluation mechanism that ensures the attributes of project learning are being genuinely acquired, while at the same time providing assessment for learning feedbacks for monitoring continuous development. All the exemplary projects demonstrated that they had devised an effective evaluation mechanism to monitor and evaluate the effectiveness of implementation. This mechanism included students' self reflection, teachers' self reflection, classroom observation, log books of work and various kinds of rubrics for self evaluation, peer evaluation and teachers' evaluation of pupils' end products.

The following evidence has been drawn from the questionnaire analysis indicating the importance of a built-in evaluation mechanism (Fig. 6.6).

Question Item	Mean Score	Standard Deviation
38. Rubrics are used by project implementers to assess students' performance	3.7000	0.9392
39. Continuous assessment is used during conduction of the project	3.7317	0.9753
40. Students are required to use learning logs for their self-reflection	3.7179	1.0247
41. Self evaluation or inter-student evaluation is included in the assessment scheme of the project	4.0000	0.9856
42. Students' performance during the process is a major basis of the assessment	3.7000	0.9661

43. Assessment is based on students' performance as a group rather than as individuals	4.0500	0.8149

Fig. 6.6

In all the case-study schools, project learning was not treated as a one or two years task but part of long term development. For continuous improvement, most of the exemplary schools adopted an evaluation mechanism to evaluate the effectiveness of the projects. Many interviewees stated that feedback from different stakeholders could help them understand different perspectives of project learning implementation, thus gaining valuable information for improvement as well as reflecting more deeply on the whole practice of project learning.

"As for evaluation criteria, we employed many different methods, such as student work, student questionnaire, parent questionnaire, teacher questionnaire, teacher observation…all of them aim at a holistic understanding of what are we up to." (Teacher of Case P2)

"All the way we conducted progressive and continuous follow up study, for S1, S2 and S3…we assessed students' abilities of doing project learning, their views and changes, we then purposively readjusted our strategy, and enhanced the (project learning) curriculum." (Teacher of Case S3)

"There was a network of expertise helping to develop a set of school-based evaluation tools. There was peer classroom observation among the 18 teachers involved (in project learning). At the end of the school year, all students filled in an evaluation form to find out their responses to classroom teaching and learning, such as whether there was sufficient teacher-student interaction, question and answer, etc." (Planner of Case S5)

"Our evaluation mechanism involves the following. Formative assessment – the teacher mentor interviews the student once, and gives suggestions on what can be improved in the project learning process; checklist and rubrics for teachers to ensure they follow and achieve prescribed objectives at different stages; rubrics for pupils' individual and group reflection. Lastly, there is a

system of continuous assessment of pupils' progress in the three years of junior

secondary schooling by means of student profiles." (Planner of Case S3)

"For every unit of work, there is a self-reflection form for students to write

down their feelings and queries. Teachers give immediate feedback to students." (Planner Of Case P3)

"Besides teachers evaluating students' work, we also invite parents to write encouraging words and comments on their children' work in the student handbook. Parents also fill in the evaluation sheet and give a grade. We integrate the marks of teachers, pupils' self evaluation and parental grade to form the final grade for project report." (Teacher of Case P2)

Nevertheless, as the following data (Fig. 6.7) illustrates the high deviation that was found in the answers to the major questions concerning the practice of evaluation. It can be seen that there was a great diversity in the practice of evaluation among different schools. Any effective mechanism should suit the needs of students and fit the school contexts.

Question Item	Mean Score	Standard Deviation
20. The project had an objective evaluating system or index, in order to examine its effectiveness	3.7500	0.8105
21. Activities were systematically evaluated and supervised.	3.7906	0.9401

Fig. 6.7

(III) Institutionalization

G. Strong Administrative Support and Empowerment

All the planners and implementers of the exemplary cases acknowledged the importance of the support of the principal who provided various types of administrative support to facilitate the successful implementation of project learning. This support included motivational elements such as empowerment, trust and spiritual encouragement which are pivotal in creating a positive climate for innovation. On the other hand, there were specific tangible administrative measures taken to sustain the implementation of project learning, such as timetable readjustment, special sessions for teacher workshops, special time blocks for planning, time release for training and insurance arrangements for pupils engaging in fieldwork.

Teachers' high rating of question 16 confirmed the importance of strong administrative and supports (Fig. 6.8).

Question Item	Mean Score	Standard Deviation
16. Planning and execution of the project are supported by school/organization planners	4.3636	0.7803

Fig. 6.8

Of the twelve cases, most adopted a whole school approach in implementing project learning in school. Even though some cases did not take a whole school approach, all their teachers received related training whenever external professional agents were invited to run training workshops. This was recognized by project planners as important support in mobilizing enough manpower, developing teachers' understanding, equipping teachers with necessary skills on project learning as well as sustaining a long-term development. Another kind of support was the empowerment of middle managers in initiating and undertaking school-based curriculum development.

Principals' support was important as the development of project learning involved many uncertainties, challenges and difficulties. Whereas principals' support encouraged risk taking in any large-scale curriculum change, empowerment enabled middle managers to develop stronger sense of control and ownership over project learning. As the case-study schools indicated, principals' administrative support and empowerment were pivotal in creating a positive climate for initiating and sustaining the further development of project learning in school.

The following quotes are convincing evidence:

"The support of the school authority is very important. Out school culture is quite open. We find it easy to adopt the change (towards project learning)." (Teacher of Case P2)

"The school principal has to explain the rationales (of project learning) to colleagues clearly. There must be a means of doing this so that teachers would willingly and joyfully participate…Both the principal and vice-principal are involved.

The principal sets an example by leading 4 groups of students. This plays an important leadership role. Those teachers who hesitated changed their attitude after seeing the principal's involvement." (Planner of Case S1)

"The principal is a stronghold of support. He needs to take the lead, and be involved. He has to insist on the rationales, but work progressively towards achievements. He consolidates the fruitful results, and builds up a tradition to enable everyone realize the expectations." (Planner of Case S2)

H.   Effective Utilization of Resources

QEF itself is an important enabling source of resources for schools to implement project learning by giving the schools additional manpower and fiscal resources for soliciting professional inputs or purchasing needed facilities, such as computers and setting up an IT laboratory.   At the same time the exemplar projects have utilized existing and additional resources effectively, such as using a cyber platform for searching information, or mobilizing parents, alumni and community resources.

As shown in Fig. 6.9, the importance of effective utilization of resources was recognized by the respondents in the questionnaire:

Question Item	Mean Score	Standard Deviation
23. Resources for project activities are adequate	3.6136	0.8685
24. Resources for project activities are used flexibly	4.0000	0.5706
25. The project used information technology resources inside and outside school effectively, integrated to enhance students' learning	3.8048	0.7490
26. There are partnership with external agents (e.g. universities, associations, corporate, etc.) during conduction of the projects	4.0500	0.9044

Fig. 6.9

Teachers expressed the following reflections about the effective utilization of resources:-

" Simultaneously we applied for funding for environmental conservation to support our project learning activities in the school farm. We used the money to build an automated water sprinkling system to water the plants." (Planner of Case P1)

"If not for the expertise and support of the Chinese University, we could not have developed so quickly and so well." (Teacher of Case P3)

"We arranged one day for the whole school to undertake project learning outside our school…The core group undertook the central planning, making all the arrangements for outdoor activities. This reduced the administrative burden of all the teachers." (Planner of Case S2)

"From the administrative viewpoint, there must be sufficient concern of deployment of resources to enable teachers to feel that they are supported. By doing this, they will work smoothly." (Planner of Case K1)

"The school must take up the administrative role of arranging visits. Many community organizations would only allow 1 class of students to visit, at a time so the school has to make arrangements five times." (Planner of Case P2)

"We make use of the QEF to set up an ITLC platform, through which we expand project learning from 4 classes to 10 classes, and eventually to all the 15 classes in the junior secondary level. Also, project learning is adopted in both humanities and science KLAs through this ITLC platform. We could even exchange projects with students in Suzhou (in Mainland China)…The school constructs a platform of web based learning, allowing teachers and students to interact." (Planner of Case S1)

6.3 Benefits of Implementing Project Learning in Schools

Data collected from documents, questionnaires and especially interviews strongly indicated that project learning benefited students, teachers and schools.

6.3.1   Benefits to Students

The high rating and low deviation from questions 45 to 48 in the questionnaire shown below (Fig. 6.10) indicate that the objectives of promoting students' learning through project learning in school had been achieved. Abundant qualitative data also illustrate what teachers perceived as benefits for students.

Question Item	Mean Score	Standard Deviation
31. Learning theme of the project is connected with students' real world life	4.1428	0.7513
32. Emphasis is placed on enhancement of students' learning skills	4.2380	0.6555
33. Cultivation of students' interest of independent learning, individually or in a group	4.2857	0.5962
34. Students are required to collaborate during the learning process	4.4047	0.6270
35. The project includes a substantial portion of real life learning outside the classroom	4.2195	0.8220
36. Students are allowed to learn by practice	4.2380	0.7262
37. Students are encouraged or required to use multimedia or information technology	4.0487	0.8352
45. On the whole, students are earnestly involved in the activities	4.2558	0.6933
46. Objective(s) of the project is/are attained successfully	4.2558	0.6933
47. Learning skills of the students are significantly enhanced	3.8750	0.6864
48. Collaborations between the students are significantly enhanced	4.0512	0.6468

Fig. 6.10

Specifically, teachers valued the following benefits to pupils in project learning.

Enjoyable learning in the project learning process was the first and most important benefit to students. Students could experience independent or group enquiry in different modes of learning contexts. Secondly, project learning greatly improved students' generic skills. In addition, students also acquired thinking strategies that enhanced their critical thinking and creativity. Students' information technology skills had improved as well. All these generic skills were very useful for their life-long learning. Thus, the core value of project learning is to let students learn how to learn.

Positive learning attitude was the most rewarding part of project learning. Students took the initiative in learning and became more independent learners. They engaged in extra reading about what interested them and were more eager to engage in analysis themselves instead of accepting spoon-feeding by teachers. Project learning classrooms became interactive rather than the traditional.

These are some teachers' reflections on the benefits of project learning their students:

"The most important point is that students tell us that their interest in the local community has increased. They can apply what they have learned in the classroom, such as information technology, survey and interview skills." (Teacher of Case S3)

"This project has provided a real life environment for students to observe and get in touch with birds and insects, some of which are not even found in textbooks. Teachers can make use of this natural environment to teach." (Teacher of Case P1)

"Students enjoyed learning more. When they were placed at the centre of the learning process, they felt empowered. They enjoyed the freedom to decide what to learn and ways to explore the issues that they were interested in. They treasured what they had learned through the activities. Students were able to develop self-confidence in learning. When students were provided with equal opportunities to participate and contribute in groups, they had a chance to demonstrate their potentials and multiple intelligences. Video-taped students' performance in the project activities acts as supplementary evidence to indicate that students, regardless their academic levels, were able to show confidence in expressing their thoughts and ideas." (Planner of Case U1)

"The greatest benefit is that preschool children find the true answer from mistakes. In the process of scientific investigation, the children became even more active when they made mistakes… Learning involves knowledge and skills, but the more remarkable achievement is the influence on the learning

attitude." (Planner of Case K1)

"The scope of students has expanded. In the past they didn't care much about the surrounding environment and events. In doing project learning, they were compelled to become aware of all these. Whenever they collected first hand or second hand data, they had to acquire knowledge beyond textbooks. This is a very good change for students." (Planner of Case S4)

6.3.2   Benefits to Teachers

Teacher interviewees emphasized that their concept and knowledge of project learning were greatly enhanced through practice. Some teachers said that they had learned new knowledge and skills after undertaking project learning with their students. They appreciated the interactive learning process in project learning.

Teachers' professionalism was greatly enhanced in project learning. Teachers recognized that they had also become learners in the project learning. To implement project learning, teachers realized that they had to change their mindset and thus many of them had tried to develop more teaching methodologies to support their facilitator role in leading project learning. In the process of project learning, teachers could understand students' potential more and developed closer relationship with students. The following quotations provide supportive evidence.

"By engaging teachers in both learners' and facilitators' activities, teachers developed a deeper understanding of PBL, particularly with the field components. By situating teachers in authentic field experience, they were able to grasp the main strategies for conducting PBL activities, particularly the role and technique of the facilitator. Through group sharing and discussion after PBL activities, teachers were able to address important issues concerning the adoption of PBL, and at the same time work out resolutions to the foreseeable constraints and problems. With the provision of guidelines and consultancy advice by the project team, teachers felt confident in setting up their school-based PBL curriculum." (Planer of Case U1)

"The scope of teachers has expanded. I am no longer confined to General Studies, instead I have moved to a broader interdisciplinary perspective. Even more, I can pay attention to developing students' generic skills."(Teacher of Case P2)

"With the support of QEF, teachers were given a chance to release their potentials. At first, the school authority did not have a fixed idea on what to do. It all depended on the creativity of teachers to work out the implementation plan by a learning-by-doing strategy. This was a process of self-learning. Finally, after many trials and consolidation of experience, we developed our school-based approach to project learning." (Planner of Case S5)

A collaborative culture was fostered among teachers. Because of the introduction of project learning, more meetings were arranged for discussion, sharing ideas of effective teaching methodologies, design and use of rubrics, and deciding measures to overcome emerging problems.

"Collaborative culture cannot be developed in one day. Colleagues have to be empowered, ensuring the importance of their participation. When they were involved, their sense of ownership and degree of participation both increased. Team spirit was enhanced." (Planner of Case P3)

"In designing our interdisciplinary approach to scientific investigation, we asked teachers to collaborate and brainstorm ideas across different KLAs. They could put forth wild ideas. Then we tried to link up related elements to hammer out a multi-disciplinary unit." (Planner of Case K1)

One additional bonus of project learning experienced by teachers was the increase in the school's capacity and teachers' readiness to prepare students for implementation of IES in New Senior Secondary Liberal Studies.

6.3.3 Benefits to Schools

All the project learning project schools witnessed an improvement of students' learning motivation and a more interactive teaching-learning strategy for teachers. Additional resources and recognition gained from the QEF or external professional agents also bolstered teachers' team spirit and morale.

In addition, some case-study schools took a concerted and cluster sharing approach to

implementing project learning. This approach not only enhanced teachers' professionalism, but also promoted inter-school collaboration for greater effectiveness.

7. Issues of Concern for Sustainability

To elicit teachers' concerns about project learning, two open-ended questions were included in the questionnaire. One question requested respondents to list their key concerns relating to the sustainable development of projects. 36 respondents completed this section. The most mentioned key concerns were counted and rank ordered, as shown in Fig. 7.1 below. Sufficiency of human resources or workload, financial resources and teacher training and development were ranked as the top three concerns.

Key Concerns	Count
Sufficiency of human resources or workload	13
Financial resources	9
Teacher training and developments	8
Support of teachers	7
Support of school leaders	6
Self assessment and reflection	6
Good planning	5
Linkage to real world experience	4
Integration with the regular curriculum	3
Cross-school affiliation	3

Fig. 7.1

To probe more deeply into teachers' concerns regarding project learning, interviews of teachers in the twelve case study schools were conducted. We sought to obtain fresh perspectives of what teachers perceived as concerns for implementing project learning. The following are their major issues of concern for improvement:

7.1 Teacher Training

Project learning is a complex curriculum change which requires both planners and implementers to acquire new skills, new values and extra efforts to sustain it. Teacher training is a crucial element to facilitate the paradigm shift of teachers and to inculcate new skills for implementing project learning.

7.2 Collaboration and Responsibility of the Steering Team

Project learning is a human enterprise which requires teachers' collaboration. As the findings reveal, teacher collaboration is of equal importance to teachers' commitment and dedication in project learning. Many interviewees stated that high team spirit and teacher collaboration were key factors for successful implementation of project learning in their school. Teacher collaboration could bring synergy (resources, expertise and confidence) to foster the further development of project learning.

However, teacher collaboration needs a catalyst. A steering team is a useful strategy to provide the necessary direction, support and coordination to foster collaboration and define responsibilities among various parties involved in project learning. As our findings indicate, more whole-school and holistic planning and development could be fostered if principals or vice principals chaired the steering committee. In fact, stronger belief and confidence of principals and vice principals in project learning could mobilize more human resources and financial resources.

As the interviewee in Case U1 pointed out, *"The effectiveness of project learning should reach the school authorities. Their belief in it will create a favorable environment for mobilizing teachers in implementing project learning."* He also stated that one of its project schools even set up a working team (under the Curriculum Development Committee of the school) to monitor project learning.

7.3 Control and Ownership

Teachers' control and ownership over project learning is another key factor for its further development. Doctrinaire approaches could kill project learning, so project planners or coordinators should give sufficient flexibility to teacher implementers in modifying the curriculum to make it more relevant to the actual classroom environment. Such flexibility gives teachers a better sense of control and ownership over project learning. Such flexibility is also a   recognition in the school of each teacher's expertise and professionalism.

7.4 Communication

Communication could be both an impeding factor and a promoting factor for the sustainability of project learning. Inadequate communication may lead to misunderstanding and misinterpretation of what and how to implement. Some informants recognized the importance of communication and they employed both verbal communication and written communication (by written memos) in clarifying their thoughts/problems as well as teaching focus. This kind

of communication not only supports the positive development of project learning but also increases teachers' involvement and understanding of the project.

7.5 Workload: Recognition and Release

In the open-ended question in the questionnaire on the key concerns in sustainability of projects, 13 of the 36 respondents indicated that sufficiency of human resources or workload was a great concern. The questionnaire rating of items concerning workload shown in Fig. 7.2 confirmed this.

Question Item	Mean Score	Standard Deviation
8. Manpower for the project is sufficient	3.4545	0.8199
9. Workloads of the project planners and implementers are appropriate	3.5348	0.8549
10. Teaching duties of planners and implementers are reduced to facilitate conduction of the project	2.3823	1.2796

Fig. 7.2

In three case study schools, teachers acknowledged that the QEF provided them with additional resources to employ substitute teachers to reduce their teaching workloads, as a result of which they could spare more time in the planning and running of the projects. Nevertheless, the enthusiasm of teachers was also crucial.

8. Conceptual Framework for Implementing Project Learning in Schools

Diagram 8.4 represents a conceptual summary of the implementation process, outcomes and experiences of the Project Learning Projects. It is a useful explanatory diagram that encapsulates all the key elements that work to foster the successful experiences of the Project Learning projects. The following paragraphs explain this conceptual framework.

Project learning is an education innovation with its own distinctive attributes and methodology. When it was first introduced to Hong Kong schools and teachers in 2001, it was part of the educational reform initiatives, carrying with it policy implications but it was not familiar to most school teachers. Teachers needed to understand the meaning of project learning and how to implement it in their schools. Some schools took the initiative to respond to the call of EDB to implement project learning, and made a timely decision to seek the fiscal sponsorship of QEF, with which they could strengthen resources and, more importantly, seek professional support from tertiary institutions for understanding the rationales and operational aspects of project learning.

For successful implementation of project learning, teachers need to realize their special roles of learner, facilitator and critical intervener. Leading students to undertake project learning is an interactive process. The emphasis is on encouraging students to become independent enquiry learners, and helping students master required skills.

School-based adaptation is the central feature when project learning is implemented in individual schools. For each school, the mode of implementation is unique but it is strongly related to specific school contexts and needs. The embodiment and deliverables of school-based project learning are also multi-faceted. Because of this great diversity, a stringent evaluation mechanism has to be created to ensure quality outcomes, and to sustain the continuous development of project learning.

Success in implementing project learning is attributed to key factors in the initiation, implementation and institutionalization aspects. The eight success factors, crystallized from implementation experiences of many schools, have proved to be crucial.
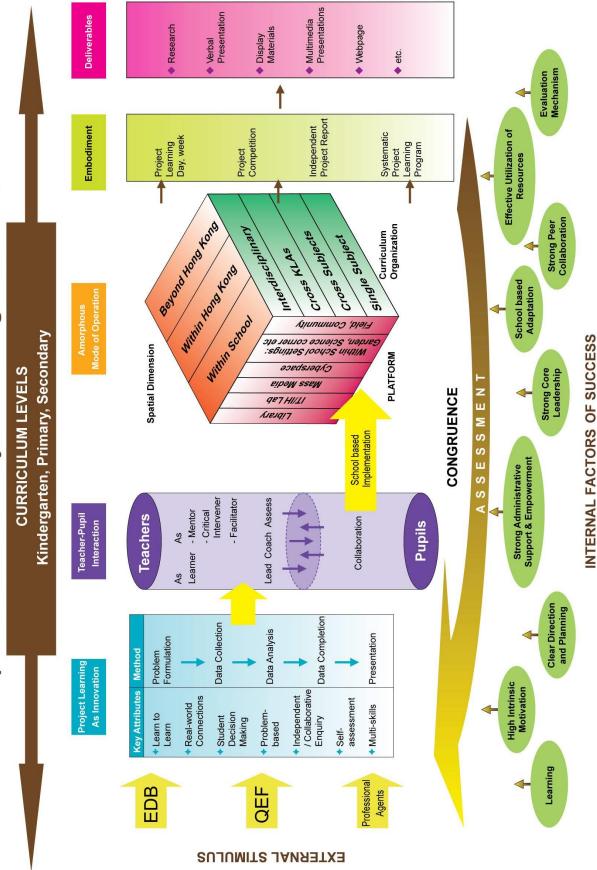
Fig 8.4 Conceptual Framework

9.   Report on Development work

Two main tasks were undertaken with regards to development work. The first was the production of a website for disseminating good practice and a "resource package" of printable quality as well as in a web-based directory format. The second was to organize a seminar to disseminate experiences and exemplars of implementation on "Project Learning" Projects. Both tasks were completed.

9.1   Website Construction

A website www.projectlearning.edu.hk has been developed and will provide a cyberspace platform which all teachers in Hong Kong can access to view the good practices of the twelve outstanding exemplary schools, including their project proposals, resource materials and students' work. It is intended that this website will serve as a free access platform for sustaining further development of project learning in Hong Kong schools.

9.2   Resource Package of Printed Quality

A booklet in printable format has been compiled for future dissemination. It includes practical exemplary practices relating to the methodology of project learning from problem formulation, data collection, data analysis, data completion and presentation. The index page of this booklet is listed in Appendix 15.

9.3   Dissemination

A seminar, attended by about 150 teachers and principals, was held on June 6, 2009 to disseminate the project deliverables and research findings. Three exemplary schools introduced the audience to their experiences in implementing project learning. An exhibition highlighting the features of twelve projects (See Appendix 12 and 13) was held in parallel with the seminar. The event obtained very positive feedback from the participants. The evaluation results are very satisfactory as most of the items are rated above four on a five-point scale. Some of the written opinions are beneficial to the Projects for further development. Details of the evaluation results are listed in Appendix 11)

10. The Way Forward

The research and development work on "Project Learning" Projects has distilled and consolidated the good practices of the selected Project Learning projects. It can be confidently concluded that project learning brings benefits to all the stakeholders concerned. Eight key factors of successful implementation of project learning have been identified for reference by all schools in Hong Kong.

Project Learning is no longer unfamiliar compared to its introduction in the 2000 Education Reform. By now, all schools in Hong Kong, in one way or another, have embarked on the implementation of project learning. Yet there is still a long way to go before universal good practice, quality work and sustainable development are realized.

Based on lessons drawn from the case studies and the insightful comments of interviewees, the following observations are put forward to support the continuous implementation of project learning.

10.1   Teachers' Conceptual Understanding of the Essence of Project Learning

Teachers need to realize that project learning is not merely one of the four designated tasks in the current educational reform to be executed superficially, but is a fundamental paradigm shift of teaching and learning, incorporating role changes for teachers and learners. Without such a thorough understanding, teachers will only struggle hard and complain of additional workload to conduct project learning.

10.2   Partnership Development with Tertiary Institutions

An outstanding facilitating factor enabling teachers' understanding of the rationales and logistics of project learning is the professional input of tertiary institutions through partnership development with schools. Such support is still necessary for the majority of schools that continue experimenting with project learning in their own ways without proper and effective professional support. In the light of the introduction of independent inquiry study (IES) in the new senior secondary education, such professional input from tertiary institutions is needed.

10.3   Synergy of Project Learning with Other Educational Innovations

It was observed in the exemplary cases that project learning was at first implemented as a single task, or related to other subjects. But as time goes by, it has been found more effective

and efficient to integrate project learning horizontally with different aspects of the school curriculum and other educational innovations injected into the school system. Such synergy not only better mobilizes human resources and fully utilizes fiscal and physical resources, it also creates a concerted approach for sustaining project learning.

10.4 Vertical Integration with Independent Enquiry Study in the New Senior Secondary Level

With the introduction of independent enquiry study in the new senior secondary level, schools need to take a holistic view of implementing project learning, paving pupils' way for becoming fully independent enquiry learners. The experience and practice of developing students' multiple skills of undertaking project learning systematically from kindergarten, primary to junior secondary levels by holistic planning should be introduced to all schools for consideration.

10.5 A Mechanism of Evaluation Embracing Assessment-for-learning Concepts

A mechanism of evaluation embracing assessment-for-learning concepts, self-reflection and action research needs to be built so as to ensure the quality of work in project learning, and to enhance the development of learning communities within schools.

10.6 Territory Wide Dissemination of Good Practices and Experience

Territory wide dissemination of good practices and experiences through workshops, seminars and cluster sharing still needs to be organized to consolidate experiences and cut short the learning path of those schools still struggling with the implementation of project learning. The REAIM model itself has to be introduced to more schools to enable them to evaluate their own work in conducting project learning.

Acknowledgment