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The role of Information Technology in collaborative inquiry project-based learning

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Abstract

This paper discusses the roles of IT teachers in the inquiry projects of Primary 4 students of the AM section of Shun Tak Fraternal Association Wu Siu Kui Memorial Primary School (WSKAM). Participated in a research project of the University of Hong Kong, the School implemented an innovative teaching approach that involve a collaboration teachers in four subjects, which are information technology (IT), General Studies (GS), Teaching Library, and Chinese.

Introduction

In a technology advanced 21st century, IT skill is in high demand and so education sectors start to provide IT skill training to students when they are young. IT skills are about the ability to use different IT tools like information searching from internet, professional in MS office software like Excel and PowerPoint (AASL 2007). Moreover, IT lesson is not only to enhance students' IT skill, but also to facilitate students' learning for other subjects. This new role of IT subject is remarked in a research project of the University of Hong Kong, which focuses on collaboration subjects for Inquiry project based learning (IPjBL).

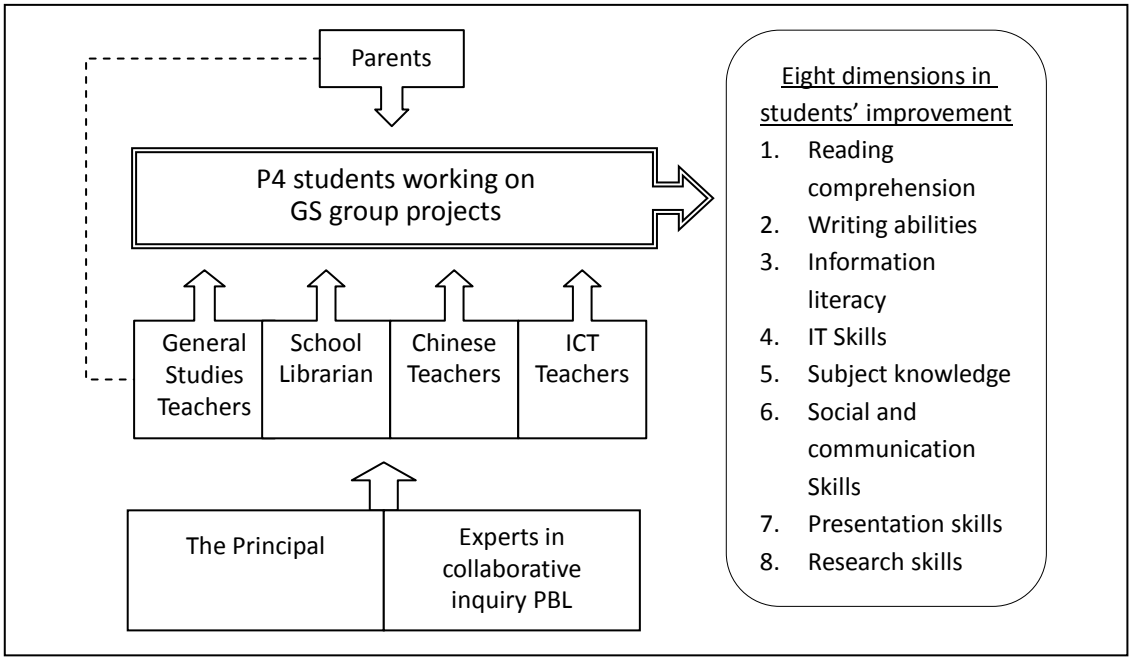
One of the participating schools WSKAM adopted an innovative teaching approach provided by this project, which General Studies teachers, librarian, Chinese teachers, and IT teachers collaboratively provided support and designed lesson to equip students with the knowledge and skills necessary for the GS project. This paper particularly studies how WSKAM IT teachers improve student IT skills, design IT lesson to coordinate, teaching schedule and collaborate material with other subjects in the projects.

Background

According to EDB of the HKSAR (2002), Inquiry based approach is a student–centre approach promoting the integration of skills, knowledge and values. Teachers take role of a facilitator to provide students with a better learning environment or with fundamental knowledge, and students need to actively raise questions and find answers through information searches. Teacher will teach student different skills including skills of analysis, problem solving, discovery and creation (UNESCO).

The Inquiry based learning (IBL) approach carries several fruitful results. Different from conventional imposed tasks, inquiry learning uses the idea of self-generated or semi-imposed tasks in which the students negotiates through a thematic and problem based content (Harada & Yoshina 2004a). According to Gross (1999) students choosing the project and working by their own will make a stronger sense of ownership to students towards those semi-imposed tasks, compared with the assigned tasks. The inquiry projects are completed well if more students are interested in the project topic (Alberta Learning 2004). Also, when the students are working on subjects that are interesting and relevant to them, they perform better in terms of research skills, subject knowledge and writing (Chu, Tang, Chow & Tse, 2007; Chu, Chow, Tse, & Kuhlthau, 2008; Frank et al., 2003).

Slightly different to other IBL research project, in the research project of the University of Hong Kong the IBL approach requires the collaboration among subjects, and it will take place in project. The collaborative inquiry project-based learning (IPjBL) approach was designed based on the models and guidelines from Harada and Yoshia (2004a, 2004b), Kuhlthau (1997, 2003, 1994), and Chu (2009). Throughout 8 weeks of participation in project, students have to decide and work on a research topic in group. Unlike other normal project learning, Chinese teachers, teacher librarian and IT teachers collaborate with GS teachers on this project learning. The GS teachers will overlook the project and teach student some research skill, basic knowledge relevant to their project and so on. Supplementary knowledge like students' reading and writing abilities, IT techniques and research skills will be taught by Chinese teachers, IT teachers and teacher librarian respectively. As a result, student ability in different aspects will be improved. The following graph shows the content of collaborative IPjBL model.



The proposed collaborative inquiry PBL model for GS group projects Chu (2009).

For the IT teachers, they take the role of facilitator to enhance student learning sufficient IT skill for the Inquiry project. Previous studies have shown that IT skills are important components in IPjBL (Chan Lin, 2008; Jonassen & Reeves, 1996; Owens, Hester, & Teale, 2002). Student should not only become critical users of information and creative producers of knowledge (Bowler et al., 2001, p. 205), but also become an expert to organize and edit their projects. At a higher level, IT skills empower students to communicate in different places, access information from a vast array of resources, and create multimedia presentations with high quality (Owens et al., 2002). There are numerous previous studies showed the importance of IT to student learning (Cognition and Technology Group at Vanderbilt, 1992; Lee & Kim, 2005; Owens, Hester, & Teale, 2002)

Discussion: The design of IT lessons based on the collaborative IPjBL approach

Based on the project of collaborative inquiry project-based learning, IT teachers should amendment IT lesson plan referring to the project. The changes of IT plan are listed below:

1. IT lesson before primary 4:

Started from Primary 1 to Primary 3, students learnt some basic IT technology like searching informative knowledge in Internets, for example using Internet explorer to browse different websites in Yahoo by clicking catalogues. In this process, students had experiences, with a simply click, to explore their interests throughout hundreds icons with colorful and entertaining information. In additions, student had attended lesson for learning drawing with mouse in Paint and other English and Chinese words processing in Microsoft Word. Keyword searching at this stage was still rare, as students' Chinese keyboarding skills were still developing.

2. IT lesson coordinated with the IPjBL approach in primary 4

In the past, primary 4 students had to learn image processing like how to use software to modify and edit pictures. Besides, different from a one way learning mode in P1, students in P4 learnt how to find information online by typing keywords in search engines and download programs to install. Improvement in students' searching skills was evident by switching from mouse clicking search observed during their lower primary levels to keyword search in primary 4.

To coordinate with the project, a more in depth and intensive IT teaching will be planned. Since reports and presentations were required for students in GS project, students should learn more precise and accurate information collection skills and methods of presentation. So students at the first semester learnt how to search information from internets using logical keys like 'AND' and 'OR' to narrow down the searched results of relevant information. Library teacher collaborated with IT teachers to teach students how to search information from the internet effectively with using advanced search engine.

Doing project requires lots of information and searching and hence essential IT searching skill is highly demanded. Throughout this year, the results showed that students had no difficulty in learning the logic keys skill in information searching. It revealed students learn narrow search easily based on the existing knowledge of

project topic learned from other three subjects in primary 4.

When the project is done, students need to do a class presentation and therefore presentation skills are in need. In primary 4, IT teachers taught student basic knowledge about using Microsoft PowerPoint like inserting slides, adding texts and picture. To have a fruitful presentation, supporting figures are essential and so IT teachers spent lessons on teaching how to use spreadsheets to create charts. Thanks to Primary 4 Mathematics lessons which students got familiar with the concept of charting, IT teachers only need to help them to understand the operation of charting, making the teaching progress more easily.

3. Student example in primary 4 General Studies project

Here, a student example in primary 4 General Studies project is shown. The following is the bar chart they used in their report, and the data was collected from conducting questionnaire. The title of the questionnaire is which scenic spot the school teachers and students like mostly in Kowloon/Hong Kong Island/ New Territories (fig 1). They create a bar chart with logical arrangement after received and manage the data. As we can see, they separate the questionnaire into two parts. In the first part they studied the scenic spots in three districts. And they took out the most chosen one in each group and compared them again in the second part, which was illustrated in a pie chart (fig 2).

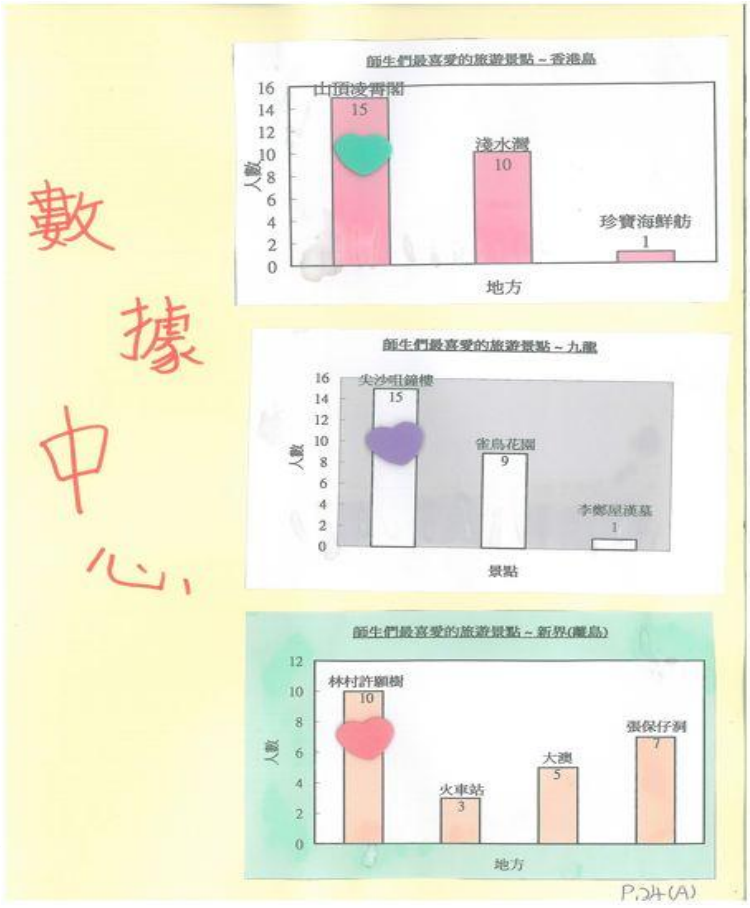


Figure 1 Students' research project shows some bar charts. The title of the questionnaire is which scenic spot the school teachers and students like mostly in Kowloon/Hong Kong Island/ New Territories.

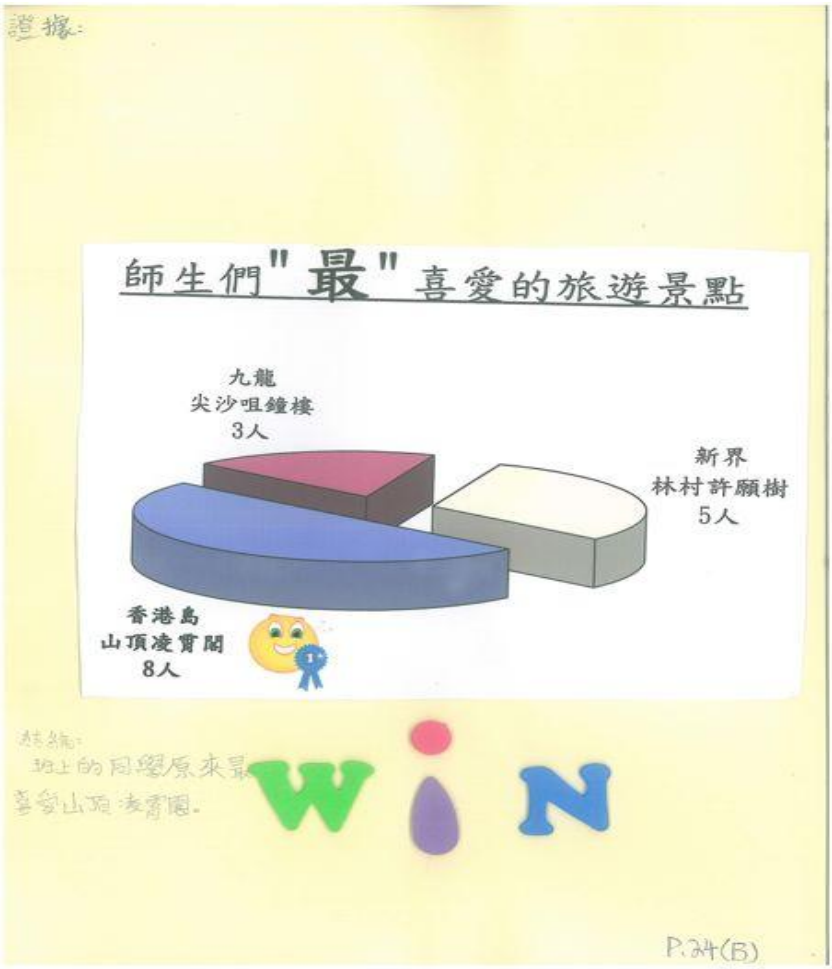


Figure 2 Students' research project shows a pie chart. The title of the questionnaire is which scenic spot the school teachers and students like mostly in Hong Kong.

4. Outcome in primary 4 General Studies project

The group project is the first trial of IPjBL for the P4 students. During the project, they have learnt how to communicate with each other. Team work, in their point of view, is a hidden new topic and Team spirit, communication and presentation skills are essential. Students revealed they have learnt during the project. Flexibility and self-controlled progress build up students' interests with funs and joys.

Unbounded research leads to no restriction to students' creativity. Students' curiosity drives them to learn more within or outside our curriculums. For example, the P4 students touched the software 'Photostory' from the internet that made the presentation more fruitful. They requested the IT teacher to teach them making photo presentation, which is out of the IT curriculum.

IT teachers experienced to teach statistical tools (i.e. creating charts in Excel) to P4 students with real data obtained from the classes. In the past, IT teachers taught this

topic with existing and simplified data from textbooks. Students worked on those second-handed data were reduced their interests. However, in the IPjBL approach, students had experiences to handle data obtained by themselves, in the meanwhile, learnt the whole process of obtaining data, organizing information and presenting ideas using IT, their IT skill are hence improved. This is consistent with previous studies indicating that IPjBL can enhance student's IT skill. (Chu, Chow & Tse, 2011).

Future plan: IT lesson coordinated with the IPjBL approach in primary 5

In the past IT curriculum in P5, the teaching will focus on the fundamental and advanced usages of Microsoft Excel (spreadsheet) and PowerPoint throughout the whole academic year.

To applying the IPjBL approach in Primary 5, the time spent in Microsoft office application cannot be too much. Since P5 students will be required to do a larger scaled General studies project in the first semester which requires lots of information searching and content organization. In order to work more effectively, students are suggested to apply collaborative skills on the project. A new element called 'Google Sites' is therefore added into the curriculum. 'Google Sites' is a kind of Web2.0 tools developed by Google, and it provides a platform of collaboration for the user. IT teachers will teach students how to use Google Sites skills in IT lessons and General studies teachers will assist the student on group working.

Collaboration with IT, General Studies and Chinese teachers to teach students presentation skills in their practical oral presentation with aid of PowerPoint is essential. General Studies Project requires student to do an in-class presentation. So the trainings of oral presentation and using PowerPoint to organize their speech are need. Such teachings establish the foundation for the student on the future study since students in higher level primary have experiences to present others within languages lessons

Students will have to work in a collaborative writing in the second semester. English teachers will teach students, and will start to assign different learning tasks to enhance student ability of collaborative thinking.

Division of work was a challenge for IT teachers. IT teachers had to put in new things into the existing syllabus, which was different from other subjects in characteristics. However, as teachers teaching Information Technology, a professional way for teachers to understand the teaching methods more and further analyzing the

teaching effect. Therefore, in the project, IT teachers would teach students how to learn, for example, how to solve the video problem by checking the 'Help' button in the software, instead of directly telling them the solution.

Conclusion

This paper went through the significant roles of IT teachers in the IPjBL approach, and discuss how the IT teacher coordinate the teaching content with the IPjBL schedule, and collaborate with other subjects teachers to assist student in doing project.

Acknowledgement

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