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Title: Development of Primary Four students' information literacy and information technology skills

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Abstract

This paper reports on a study that investigated the development of Primary Four (P4) students' information literacy and information technology skills over a period of six months. During the six months, the P4 students in Hong Kong completed two inquiry-based learning group projects as part of their General Studies' curriculum. To help students maximize their learning through incorporating the expertise of various teachers, a collaborative approach involving three teachers and the school librarian was taken in guiding students through the two projects.

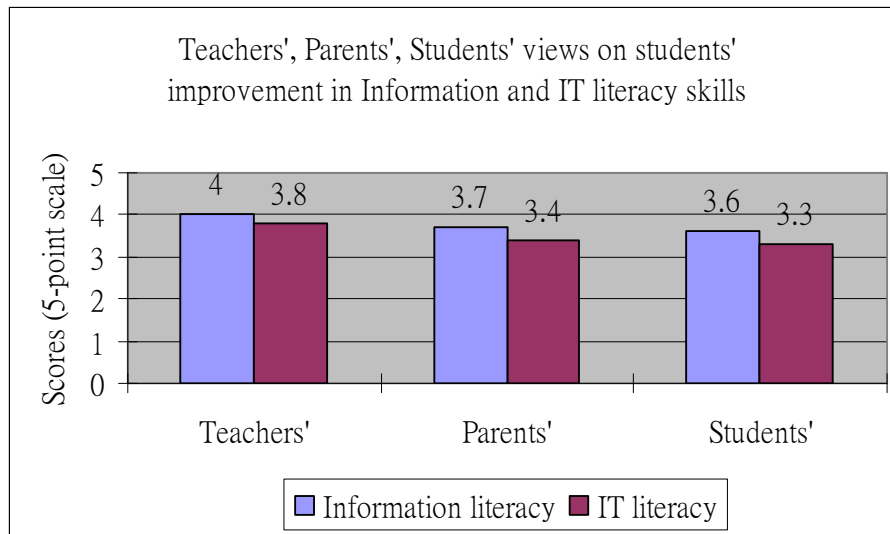
The specific roles taken by the school librarian and the Information Technology (IT) teacher in the two projects will be examined in this paper. The support and instructional design provided to students to equip them with the necessary information literacy and information technology skills to work on their projects effectively will be discussed. Furthermore, the perceptions of the students regarding their familiarity with (and perceived importance of) different information technology related knowledge and skills will also be discussed. This research may provide findings to shed light on desirable changes in the current curriculum regarding IT education at the upper primary levels.

1. Introduction

This paper is part of a larger study that investigates the role and collaboration of three kinds of teachers (General Studies, Language, and IT), together with the school librarian, in guiding primary four (P4) students in a local Hong Kong school through inquiry-based learning (IBL) group projects (Chu, Tang, Chow, and Tse, 2007). The study shows that this approach is highly effective in guiding students through the projects. Under this approach, the quality of the students' projects in 2006-2007 was higher than those of the previous year; students were awarded an increase of about 40% higher points by the General Studies teachers this year (Chu, Lo, Chow, Mak, Ho, & Tsang, 2007). Moreover,

the collaborative approach also led to the students' improvement of various skills and abilities, including, information literacy, IT, reading and writing (Chu, Tang, Chow, and Tse, 2007).

Chart 1. Views of teachers, parents & students on student improvement in IT and information literacy skills through the IBL process



Note: The three parties were answering the question “Does the IBL project help students improve in their Information and IT skills?” according to a scale of 1-5, with 1 as ‘low improvement’ and 5 as ‘high’ improvement.

Teachers, parents and students all shared the opinion that students showed improvement in both their Information and IT literacy skills (Chart 1). The average scores given for information literacy were a 4 for teachers, 3.7 for parents and 3.6 for students. For IT literacy they were 3.8, 3.4, and 3.3 respectively. It can therefore be concluded that the IBL process helps students improve their Information and IT literacy skills. For a detailed discussion on this, see Chu, Tang, Chow, and Tse, 2007.

This paper focuses on the role taken by the school librarian and IT teacher in the students’ IBL projects. It will discuss the support and instructional design provided to the students in order to equip them with the information literacy and information technology skills needed for working on the projects effectively. Furthermore, it will discuss students’ perceptions of their own development in different information literacy and IT related knowledge and skills.

2. Literature review

Hong Kong’s Education Department Bureau (2007) defines inquiry-based learning as “a student-centered approach which helps students integrate generic skills, knowledge and values in the learning of General Studies. In the inquiry process, students are active constructors of knowledge and the teacher is a facilitator in their learning. Instead of having the teacher give the right answers to

students, they have to raise questions, find their own answers and look for necessary information. They thus become actively engaged in identifying problems, collecting information and solving the problems they encounter.”

Owens, Hester, and Teale (2002) reported on the use of technology to support IBL programs for 7-15 year old urban students. They suggested that technology enhances cognition, particularly in areas of reading and writing. Furthermore, access to technology makes schools seem more ‘real world’, and students are able to push the boundaries of their traditional school curriculum. Examining the use of information technology in facilitating students’ IBL projects is also a focus of this paper.

Past literature has covered the following areas related to the focus of this article:

- 1) General information seeking / searching patterns and customs of youths in different grades (Borgman, Hirsh, Water, 1995; Bowler, Large, Rejskind, 2003; Britt, & Aglinska, 2002; Kito, Moriyama, Matsuura, 2007; Large, Beheshta, Breuleux, 1999; Schacter, Chung, Dorr, 1998; Wallace, Kupperman, Krajcik, Soloway, 2000).
- 2) Theoretical approaches regarding students’ information seeking patterns (Dresang, 2005).
- 3) Use of the Internet for information searching (Dresang, 2005; Fidel, Davies, Douglass, Holder, Hopkins, 1999; Irvine, 1991; Kafai & Bates, 1997; Kuiper, Volman, Terwel, 2005; Takahira, Ando, Sakamoto, 2004; Wallace et al., 2000).
- 4) Usage of information sources (Britt & Aglinska, 2002; Large et al., 1999).
- 5) Relationship between the use of the Internet and information literacy skills (Takahira et al., 2004).

Wallace et al. (2000) tried to relate students’ information seeking behaviors with their IBL project. The information seeking activities on the Internet of eight sixth-grade students were monitored, with particular emphasis on their search strategies, including keyword usage and navigation strategies. Wallace et al. found that students and teachers had difficulties in using the Internet as a new medium of learning.

Takahira et al. (2004) focused on the causal relationship between students’ use of the Internet and their information literacy skills. The use of the Internet was studied from the dimensions of “Internet by tool” (including website browsing and e-mail), and “Internet by purpose” (including classes and homework), whereas information literacy was viewed as six abilities: the ability to collect, judge, express, process, create and communicate information. The study involved two sets of more than 700 students in eight elementary schools in Tokyo. The results showed a positive causal relationship between Internet usage—both ‘by tool’ and ‘by purpose’—and information literacy skills. There was a particularly strong correlation between student’s use of e-mail/web-browsing and their ability to collect information.

3. Research method

The above review suggests that few studies have focused on the development of upper primary students' information literacy and IT skills through IBL projects. This paper thus sets the following as key research questions:

1. What was the role of the school librarian and the IT teacher in the students' IBL projects?
2. How did the students' information literacy and IT skills develop as a result of IBL?

To answer the first question, the school librarian and the IT teacher were interviewed twice regarding their roles and the support they offered students to equip them with the relevant information literacy and IT skills. The second question was answered with the help of a survey taken by all 147 primary 4 students who completed the two IBL projects. The questionnaire assessed students' development in information and IT literacy in terms of (1) What information/IT skills and knowledge they have become familiar with; and (2) What information/IT skills and knowledge they find important/useful for their inquiry-based learning projects. More specifically, the questionnaire required students to evaluate their familiarity with sources/databases, search skills and knowledge, and IT skills and knowledge before and after the IBL projects. Their perceived importance of these was also recorded.

For further analysis, interviews with selected parents and students were conducted. Similarly, close observation of how certain students searched for information for their projects and the examination of two information literacy homework assignments was also carried out.

4. Findings

This section will first discuss the role of the school librarian and the IT teacher in students' IBL projects. It will then examine students' performance in two information literacy homework assignments. It is followed by a discussion of students' familiarity with (and perceived importance of) different information literacy and IT related knowledge and skills. Finally, the inter-relationship between the various skills and knowledge will be discussed.

4.1 Roles of the school librarian and the IT teacher

To a large extent, primary students' development in information literacy and IT skills depend on the support offered by the school librarian and IT teacher. To understand their roles in the IBL projects, each teacher was interviewed twice—once during the project, and the second upon completion. The roles of the librarian / IT teacher are summarized in Tables 1 and 2.

Table 1. Main roles of school librarian in IBL projects

-
- ‘As an information provider’; provided relevant books (a block loan of 200 books from public libraries), information folders (containing newspaper clips) and related webpage links.
 - Held information literacy classes to provide training for students on the use of various printed sources (e.g., reference books), information searching skills (e.g., Boolean operations), the school and public library catalogs, and the WiseNews database.
 - Assessed students’ effectiveness in using various information sources and information searching skills.
-

According to the school librarian, the provision of relevant material and training on its usage contributed to an increase in students’ motivation and interest in conducting their own inquiry-based learning. Students were equipped with basic skills for using various electronic sources. Moreover, the librarian tried to cultivate a positive attitude towards the use of the Internet amongst the students, by stressing caution of unhealthy Web materials and Internet addiction or overuse.

Table 2. Main roles of IT teacher in IBL projects

-
- Set up and managed the WiseNews database, which contains news sources from Hong Kong, mainland China, Taiwan, and other parts of the world.
 - Taught various IT related skills, including Microsoft PowerPoint and Excel, and Chinese input methods (e.g., Simplified Cangjie)
-

Apart from the responsibilities listed in Table 2, the IT teacher also trained students in the use of search engines (Yahoo and Google) and the WiseNews database. The IT teacher helped students to improve their IT and information searching skills and contributed to the development of their self-directed learning. He commented that students became better at creating PowerPoint slides for effective presentation by the completion of their projects.

4.2 Students’ performance in information literacy homework

In addition to providing training for the students, the school librarian assigned two assessment tasks¹ (one for each period of the two inquiry-based learning projects) to reinforce what students had learnt during their information literacy classes.

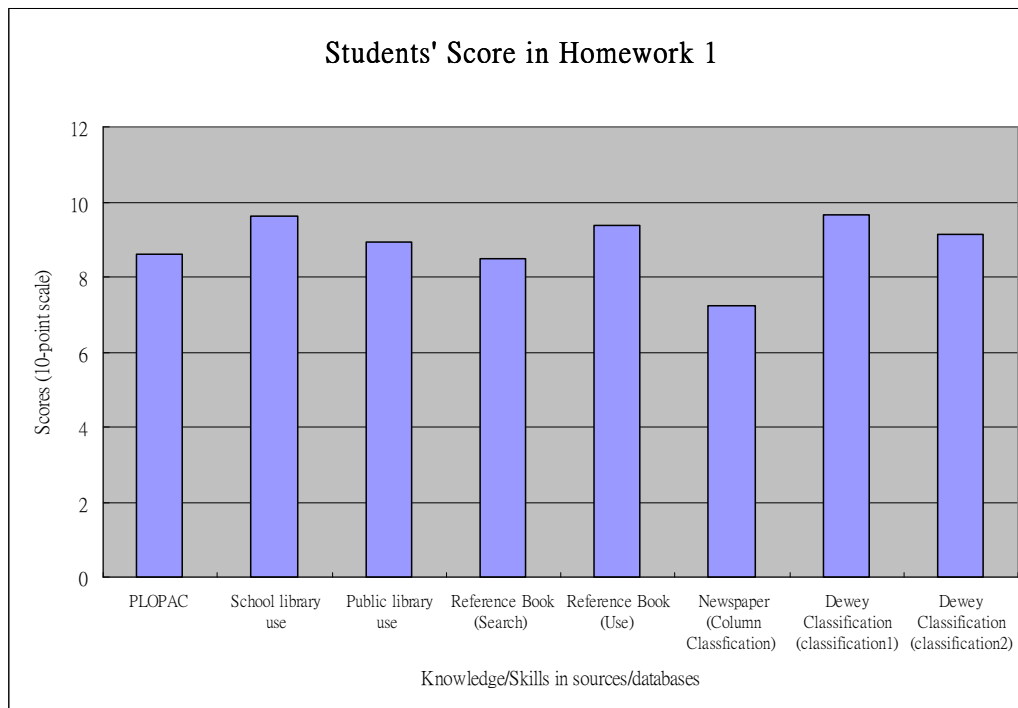
4.2.1 Students’ performance in the first information literacy homework

Questions in homework set 1 were of a basic level, testing awareness of the use of the Public

¹ No IT skills assessment tasks were assigned to the students.

Libraries' Online Public Access Catalog (PLOPAC), the use of the school library and public libraries, the use of reference books, the understanding of newspaper columns, and Dewey classifications. Chart 2 presents students' scores from this first assignment.

Chart 2. Students' scores² in homework 1



Students did well on all questions in this homework set. The first three sections of homework 1 were about PLOPAC searching and the use of the school library and public libraries; students correctly answered more than 80% of the questions. Students performed exceptionally well in the 'School library use' section; 96%. This implies that students had a basic knowledge of library use (e.g., how many books can be borrowed from the school library) and the ability to carry out simple tasks related to the PLOPAC (e.g., search for a book by its title using the PLOPAC).

Some students found the classification of newspaper columns problematic. One student mistakenly classified a job ad as "social services" for instance. However, all other questions in this first assignment were very basic (e.g. "find a reference book in a public library and write down its name, publisher, year of publication, and call number"), causing little surprise that the students excelled in the assignment.

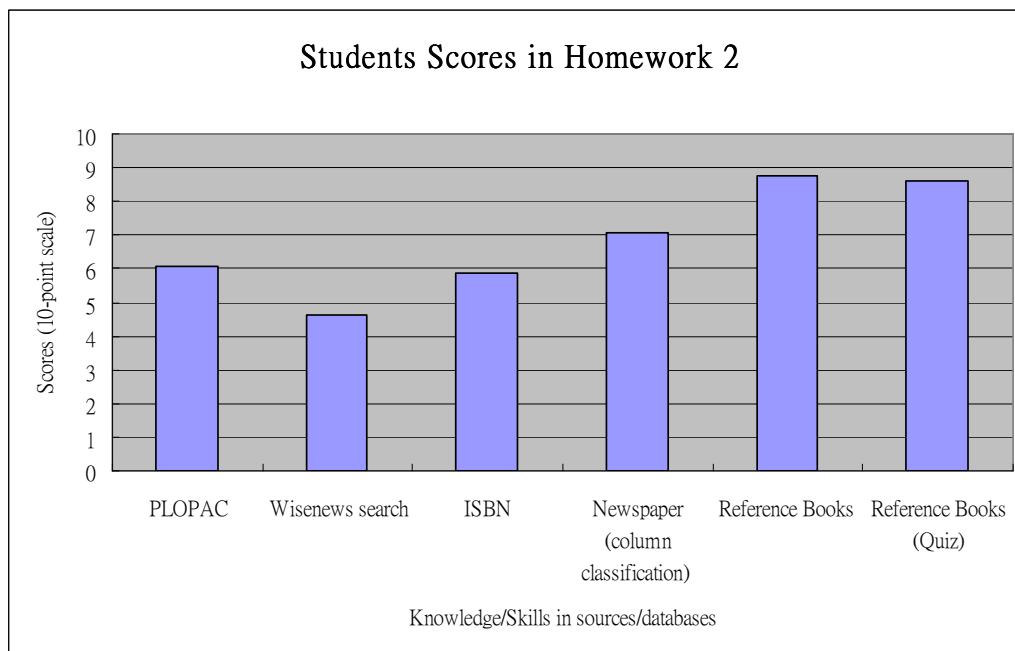
4.2.2 Students' performance in the second information literacy assignment

Homework 2 was of a more difficult level than homework 1. In addition to areas covered by the first

² Students' scores, the number of correct answers, have been converted into a 10-point scale.

assignment—PLOPAC, newspaper columns and reference books—it also included new areas such as WiseNews and ISBN.

Chart 3. Students’ scores in homework 2



On average, students’ scores in homework 2 were lower than those in homework 1. While students’ average score on questions about the PLOPAC was 8.9 in homework 1, it was only 6.1 in homework 2—a decrease of nearly three marks on a 10-point scale. This is reasonable as questions in the second assignment were considerably more difficult, requiring students to use their critical thinking skills (e.g. “Which Boolean operator, ‘And’ or ‘Or’, will you use to search for books about water and pollution?”).

Both assignments gave students opportunities to practice and reinforce what they had learnt from their school librarian and IT teachers. Such reinforcement is essential for the development of their information literacy and IT skills.

4.3 Students’ familiarity with (and their perceived importance of) various information sources

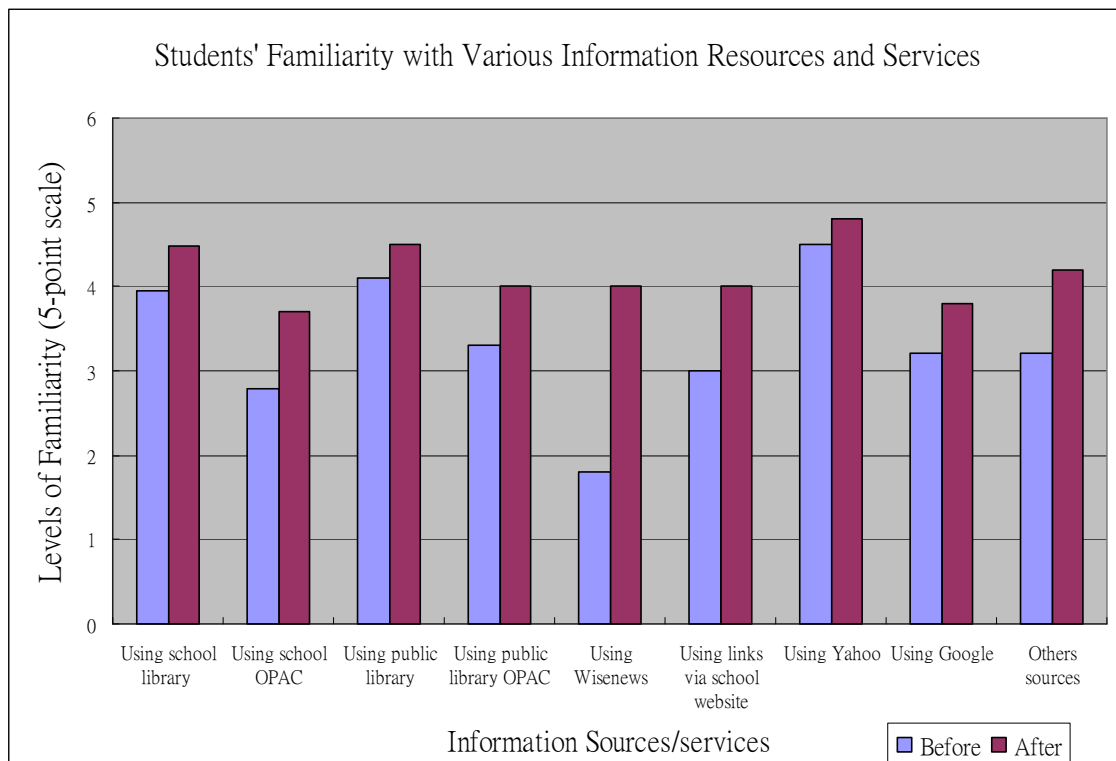
Students’ development in information literacy skills involves an increase in their knowledge on sources important to them, and this section tries to measure such an increase.

4.3.1. Students’ familiarity with various information source and services

Chart 4 describes the students’ familiarity with various information sources before and after the IBL projects in a self evaluation. Students evaluated their abilities before the projects as moderate; of the

nine sources, five were evaluated between 2.8 and 3.3 on a 5-point Likert scale (with 1 being the least familiar and 5 being the most familiar). Students did show a relatively higher familiarity with several areas however, including ‘Using school library facilities and borrow/return books’ (3.9 out of 5), ‘Using public libraries facilities and borrow/return books’ (4.1 out of 5), and ‘Using Yahoo’ (4.5 out of 5). Among all the sources, the WiseNews database was the most unfamiliar to students (1.8 out of 5) before the IBL projects. This was confirmed by the students’ relatively weaker performance in their second homework assignment.

Chart 4. Students’ familiarity with various information resources/services before and after the projects



It is not surprising to see that the students were familiar with the use of school and public libraries even before the IBL projects, since one of the four emphases in primary schools nowadays is reading, and libraries are the logical place for this activity. It is surprising however, to learn that students’ familiarity with Yahoo is greater than that with Google (4.5 compared to 3.2). This could be explained by Yahoo’s children services such as “Yahoo! Kids” (<http://kids.yahoo.com/>), which Google, with its adult focus, does not seem to offer.

As students did not have access to the WiseNews database at school in the past, and as it is not a freely accessible database available on the Web, it is understandable that students’ familiarity with WiseNews

was substantially lower than with all other information sources and services before their IBL projects.

Chart 4 also shows that students gave remarkably higher scores to their information literacy related knowledge and skills after completing the IBL projects. Out of the nine sources, seven rated an average of 4.0 or above. The highest score was 4.8 /5, given for their familiarity with using Yahoo, while the lowest score was still a high 3.8 for using the school library’s OPAC.

Chart 5. Students’ improvement in familiarity with various information sources

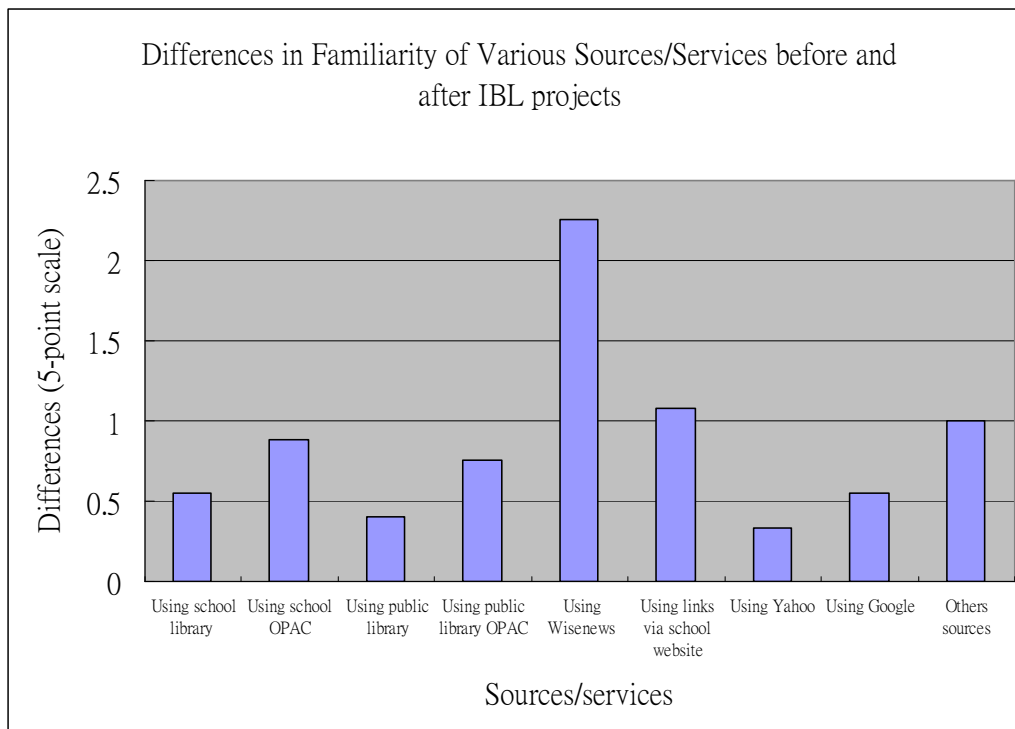
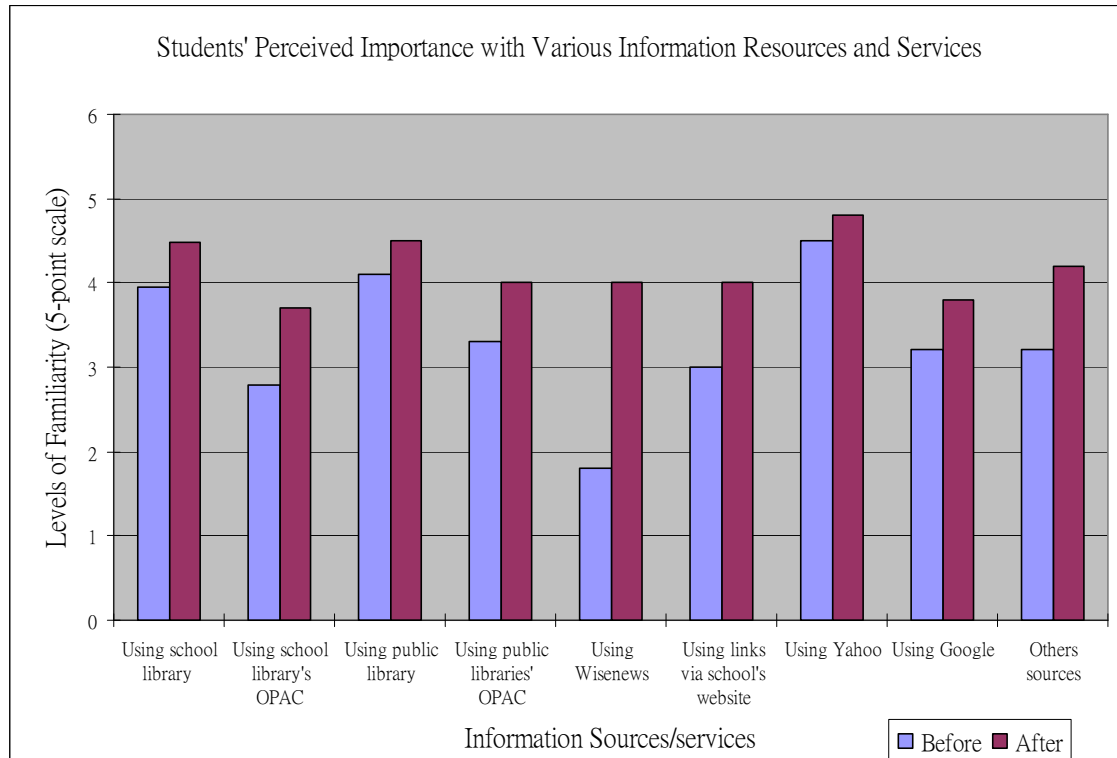


Chart 5 shows the mean score difference in pre- and post- IBL in the students’ familiarity with different information sources. Improvement was most obvious in ‘Using Wisenews’ (an improvement of 2.25 /5). Interviews with students also indicated that Wisenews was the most unfamiliar information source to students before the IBL projects.

4.3.2. Students’ perceived importance of various information sources/ services

The following chart presents students’ perceived importance of the various information sources and services.

Chart 6. Students' perceived importance of information resources and services



Yahoo is obviously the most important source of information as perceived by the students (4.5 /5). As mentioned earlier, Yahoo seems to be more child-friendly, and so may be more appealing to primary school children than Google. Moreover, the home page of “Yahoo! Hong Kong” (<http://hk.yahoo.com/>) is certainly more eye-catching than “Google Hong Kong” (<http://www.google.com.hk/>).

‘Using school library’s OPAC’, ‘Using public libraries’ OPAC’, and ‘Using links via school’s website’ were perceived as slightly less important than other information sources. Perhaps primary students prefer to browse through the shelves rather than search within library catalogs, particularly when there is a dedicated bookshelf—containing 200 relevant books from public libraries—for the IBL projects. Meanwhile, the relevant web links available via the school website, while useful, may have been perceived limited, when compared to the vast amount of resources available in the libraries and in search engines and databases.

4.3.3 Correlation between student's perceived importance of and familiarity with various information sources/services

Table 3. Correlation between students' perceived importance of and familiarity with various information sources

Paired questions	Correlation Coefficient (r)		Statistical Significance
Using school library's facilities & borrow/return books	0.146	Weak	N
Using school online book searching catalog	0.414	Moderate	**
Using public library to borrow & return books	0.420	Moderate	**
Using OPAC at public library	0.552	Moderate	**
Using 'Wiseneews' search	0.459	Moderate	**
Using links provided by school website	0.478	Moderate	**
Yahoo	0.156	Weak	N
Using other search engine ('Google')	0.557	Moderate	**
Others	0.604	Substantial	**

Note: Spearman correlation is used and the classification of correlation levels is defined by Ravid R. (1994).

N - Not statistically significant ($p > 0.05$)

* - Statistically significant ($p \leq 0.05$)

** - Statistically significant ($p < 0.01$)

Table 3 shows that a correlation exists between students' familiarity with and their perceived importance for six of the eight sources. Most of the correlations are moderate, ranging from 0.414 to 0.604. This means that when a student becomes familiar with a source, he will also tend to perceive it as important. For this reason, it is important to familiarize students with various information sources and services so they can realize the usefulness of these sources and services.

4.4 Students' familiarity with (and perceived importance of) information searching skills and knowledge

Apart from students' familiarity with various information sources and services, it is also important for them to be familiar with various information searching knowledge and skills. This will enable them to conduct effective information searches.

4.4.1 Students' familiarity with various information searching knowledge and skills

Chart 7 provides a comparison of the post- IBL project self-evaluated scores amongst various knowledge and skills. Before the implementation of the IBL projects, out of the seven aspects on information searching knowledge/skills, only three items scored above 3 on a 5-point scale. Students were relatively weak in using Dewey classifications to look for books (2.5 /5) and using the three Boolean operators in constructing a search query (2.6 /5).

Chart 7. Students' information searching knowledge and skills

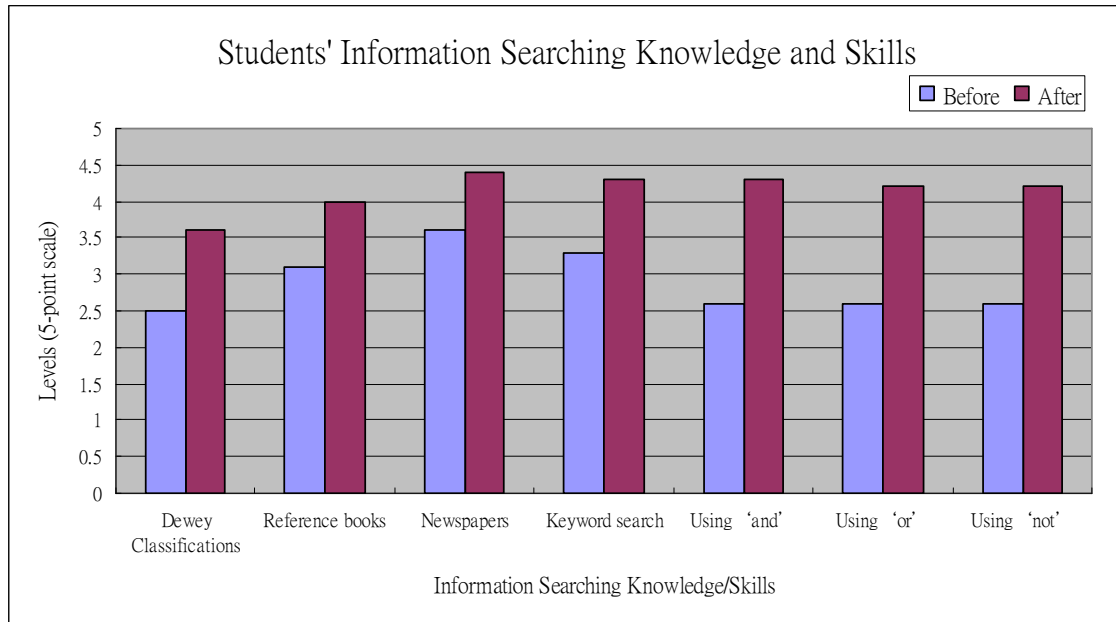
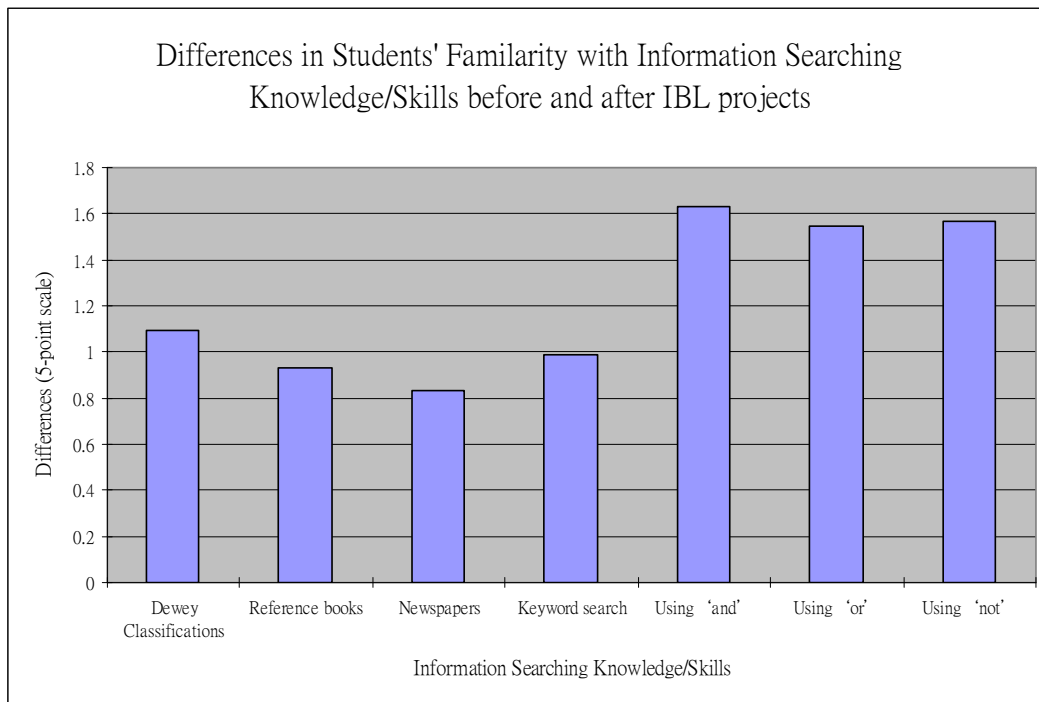


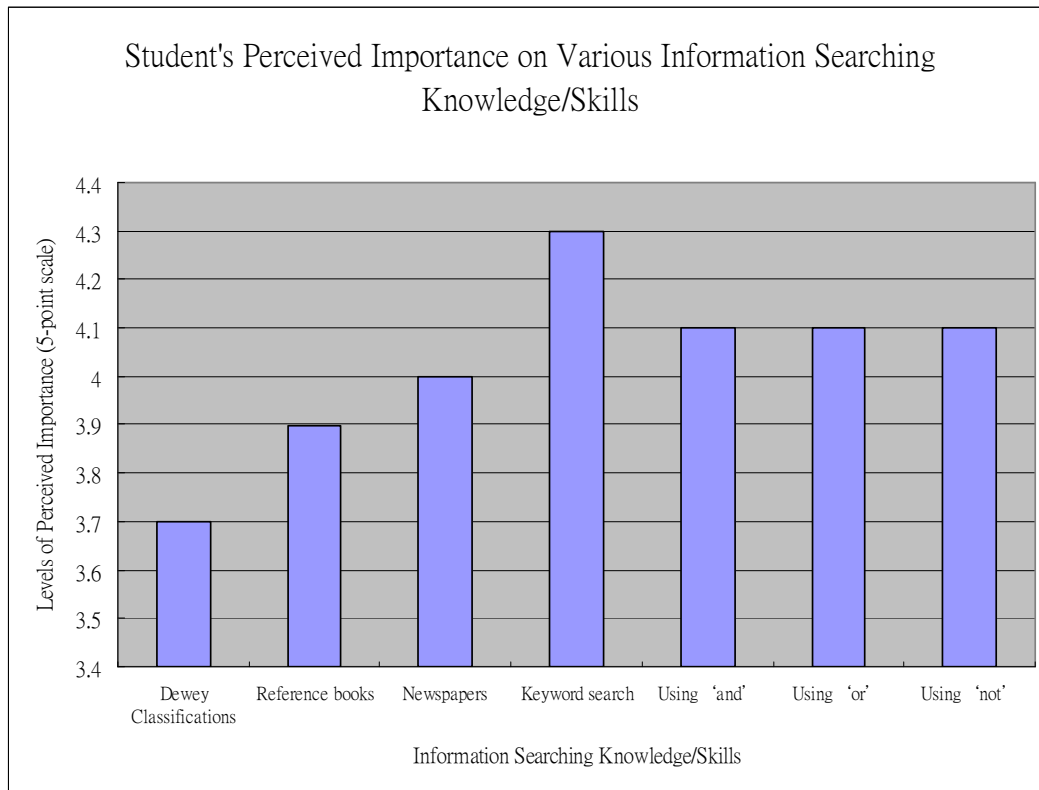
Chart 8 shows that students learned the most in the use of Boolean operators ('and', 'or', 'not') with an improvement of above 1.5 points. However, they seemed to gain little in more commonly used information searching methods, such as consulting newspapers and reference books. It is speculated that students gained most in searching with Boolean operators because they were considerably new to them and increased their incentives for learning.

Chart 8. Students' improvement in information searching knowledge/skills



4.4.2. Students' perceived importance of various information searching knowledge and skills

Chart 9. Students' perceived importance of search related knowledge /skills



Students perceived 'keyword search' to be the most important knowledge/skill, followed by the use of the three Boolean operators. This suggests that students find information search by electronic means through search engines and databases to be more important than printed resources, such as newspapers and reference books.

4.4.3 Correlation between student's perceived importance of and familiarity with various information searching skills and knowledge

To examine the relationship between students' improvements in information searching knowledge/skills and their perceived importance on these knowledge/skills, a spearman correlation between the students' post-project familiarity level and perceived importance was conducted. Results are presented in Table 4.

Table 4. Correlation of students' information search knowledge/skills and their perceived importance

Paired questions	Correlation Coefficient (r)		Statistical Significance
Dewey Classifications	0.507	Moderate	**
Reference books	0.381	Slight	**
Newspaper	0.341	Slight	**
Keyword search	0.392	Slight	**
Use 'and', '+'	0.341	Slight	**
Use 'or', '/'	0.308	Slight	**
Use 'not', '-'	0.425	Moderate	**

Note: Spearman correlation is used and the classification of correlation levels is defined by Ravid R. (1994).

N - Not statistically significant ($p > 0.05$)

* - Statistically significant ($p \leq 0.05$)

** - Statistically significant ($p < 0.01$)

Table 4 shows that a correlation exists between students' familiarity with and their perceived importance of all aspects of information searching knowledge/skills. Yet, most of the correlations were low, ranging from 0.308 to 0.392, with two aspects having moderate correlations (Dewey Classifications and Use of 'not' or '-').

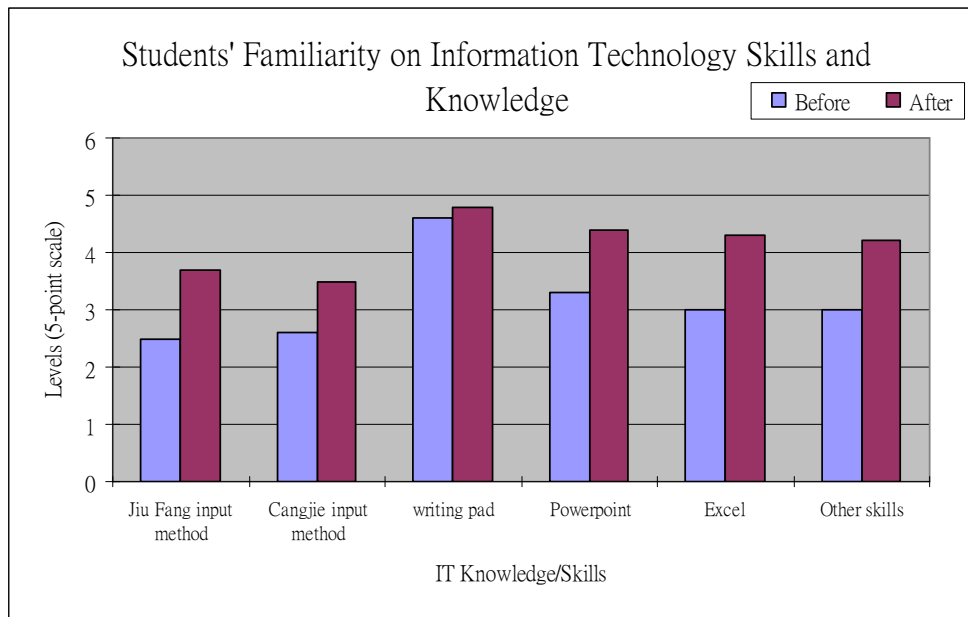
4.5 Students' familiarity with (and perceived importance of) IT knowledge/skills

IT skills are important for students to search information and prepare reports for their projects. In particular, Chinese inputting methods are especially important since they enable students to effectively use databases and search engines for locating relevant materials. Moreover, IT skills such as PowerPoint and Excel are significant for students in order to create effective presentations for their IBL projects. Therefore, this section will discuss students' improvements in various aspects of IT knowledge/skills.

4.5.1 Students' familiarity with IT knowledge/skills

Chart 10 shows students' familiarity with various IT knowledge/skills. Students thought that their IT skills in using Chinese inputting methods were particularly weak before the IBL projects (2.5 /5 for 'Jiu Fang' (九方), ; and 2.6 /5 for the 'Simplified Cangjie method' (簡易)). Other skills were moderate with generally a median around 3. Note that writing pad, due to its ease of use, is of the highest pre-IBL project score in this questionnaire (4.6 /5).

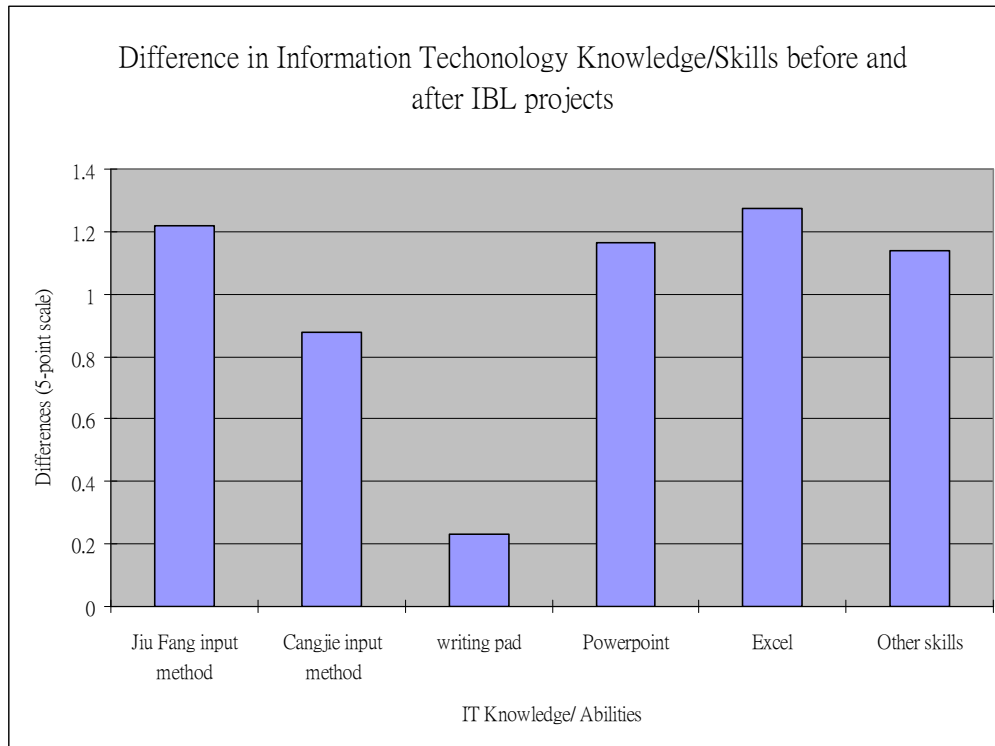
Chart 10. Students' familiarity with IT knowledge/skills



After the IBL project, students overall became good at the above mentioned IT related knowledge/skills. Students even became familiar with the two Chinese inputting methods. The results from Chart 10 suggest it is appropriate for students to learn all the above IT-related knowledge and skills at Primary 4 level for their IBL projects.

Chart 11 shows the change of students' familiarity with different IT knowledge/skills before and after the IBL projects.

Chart 11. Student's improvement in IT knowledge/skills

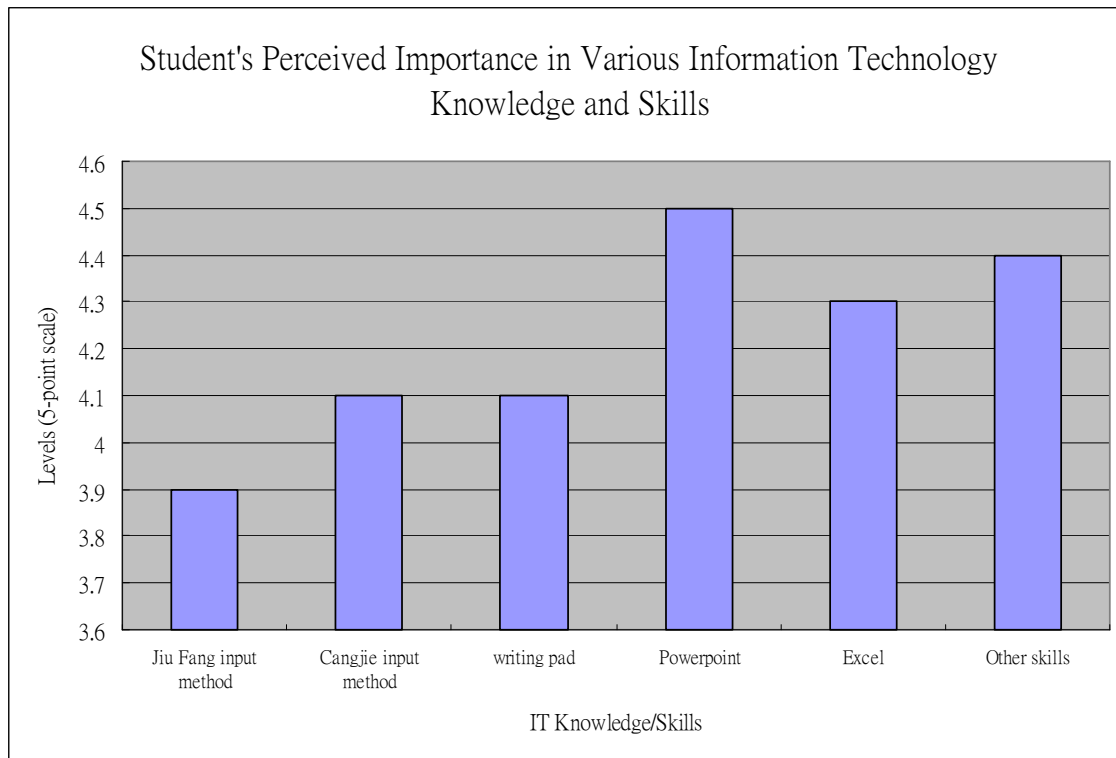


Students gained the most in their learning from ‘making Excel spreadsheet’ (improvement of 1.16 /5), ‘making PowerPoint presentations’ (improvement of 1.28), and ‘Using Jiu Fang method’ (improvement of 1.22). This reflects that the training scheme did have considerable positive effects on the improvements of primary students’ general IT levels. The fact that students learned the least with ‘writing pad’ might be due to their high familiarity with it before the IBL projects.

4.5.2 Students’ perceived importance of IT knowledge/skills

To understand students’ perceived importance of various IT skills, the relevant findings from the questionnaire for students are presented in Chart 12.

Chart 12. Student's perceived importance of IT knowledge/skills



Students generally thought IT skills were quite important to them. Of the six areas concerned, five areas score over 4.0 on a 5-scale. The most important areas perceived were the use of the office productivity software (PowerPoint and Excel). This is in line with the improvements for students in familiarity levels on these skills.

However, although students improved more in Jiu Fang method than in Simplified Cangjie (Chart 11), they tended to see ‘Simplified Cangjie method’ as more important than Jiu Fang method (4.1 vs. 3.9 /5). This may be due to the fact that Simplified Cangjie is offered as a free bundle in Microsoft Windows while Jiu Fang is only available at school. Before the IBL projects, some students might have already had some experience with Simplified Cangjie at home, while they started to learn Jiu Fang during the IBL projects. Since Simplified Cangjie is available at home, but not Jiu Fang, it is reasonable for students to find Simplified Cangjie more useful.

4.5.3 Correlation between student’s familiarity with and perceived importance of IT knowledge/skills

To examine the possibility of a relationship between students’ improvements in the familiarity with

and their perceived importance of various IT skills, a Spearman correlation test was conducted (See Table 5 for results).

Table 5. Correlation of students' familiarity with & their perceived importance of IT knowledge/skills

Paired questions	Correlation Coefficient (r)		Statistical Significance
Using 'Jiu Fang' input method	0.590	Moderate	**
Using 'Cangjie' input method	0.601	Substantial	**
Using writing pad	0.272	Weak	**
Using PowerPoint	0.163	Weak	N
Using Excel for Spreadsheet	0.415	Substantial	**
Other skills	0.132	Weak	N

Note: Spearman correlation is used and the classification of correlation levels is defined by Ravid R. (1994).

N - Not statistically significant ($p > 0.05$)

* - Statistically significant ($p \leq 0.05$)

** - Statistically significant ($p < 0.01$)

Table 5 shows that for the five identifiable IT knowledge/skills, three of them had a moderate to substantial correlation between students' familiarity with and their perceived importance of these knowledge/skills. This suggests that as students became familiar with these IT knowledge/skills, they also found them important. The correlation for 'Using PowerPoint' was found to be insignificant. It is perhaps due to the fact that students had substantial prior knowledge of the tool before the IBL projects and hence the subsequent improvement in the knowledge about the tool (and thus the correlation) was low.

4.6 Intra- and inter-relationship between information literacy and IT knowledge/skills

To examine the intra- and inter-relationship among various elements of information literacy and IT knowledge/skills, a blanket correlation test was performed among all the examined elements of information resources/services, information searching related knowledge/skills and IT knowledge/skills. Results with moderate to substantial correlations between the variables are reported in Table 6.

Table 6. Correlation of students' familiarity with and their perceived importance of various information literacy and IT knowledge/skills

Tested elements	Condition	Correlation Coefficient (r)		Statistical Significance
Between Boolean operators ('and' and 'or')	Post-project familiarity	0.754	Substantial	**
Between Boolean operators ('and' and 'not')	Post-project familiarity	0.784	Substantial	**
Between Boolean operators ('or' and 'not')	Post-project familiarity	0.725	Substantial	**
Between PowerPoint & Excel	Post-project familiarity	0.619	Substantial	**
Between school library use and keyword search	Perceived importance	0.467	Moderate	**
Using 'links via school website' and the use of 'or'	Perceived importance	0.464	Moderate	**
Using public library and school library	Post-project familiarity	0.523	Moderate	**
Using public library OPAC and using public library	Post-project familiarity	0.464	Moderate	**
Jiu Fang and ChangJie	Post-project familiarity	0.431	Moderate	**

Spearman correlation is used and the classification of correlation levels is defined by Ravid R. (1994).

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** - Statistically significant ($p < 0.01$)

Some interesting interpretations can be drawn from Table 6. For example, the substantial correlation among the three Boolean operators suggests that when students became familiar with the use of one Boolean operator, they also became familiar with the other Boolean operators. This implies P4 students were capable of becoming familiar with the use of Boolean operators. Besides, it is desirable to teach all three when introducing the idea of searching with Boolean operators to them.

The moderate correlation between the use of school library and keyword search is also interesting. The keyword search is the most powerful search skill in a library catalog and also for databases and search engines such as WiseNews. The moderate correlation between the two in terms of students' perceived importance implies that when students found the use of the school library important, they will also find the electronic search in a library (via the catalog or a database/search engine) important or vice versa.

5. Conclusion and implications

This paper shows that primary 4 students are capable of learning a wide variety of IT (e.g., PowerPoint, Excel, and simplified Cangjie Chinese inputting method) and information literacy (e.g., WiseNews and the use of Boolean operators) related knowledge and skills that will greatly enhance their abilities in carrying out the inquiry-based learning projects. It is also noted that the school librarian and the IT teacher play essential roles in equipping students with these knowledge and skills in the way they design their instructional content and in arranging exercises for students to practice in-class and at home.

Although many of these IT and information literacy related knowledge and skills have proven to be useful and important in helping to bring about an enjoyable and attainable environment for students to engage in their self-directed inquiry-based learning group projects, it is unfortunate to see that many local schools are not at present equipping the students with these knowledge and skills at the P4 level. There are various reasons for this. First, databases like WiseNews, though highly relevant for students' inquiry learning and with a low cost, are still a budgetary concern for primary schools. This is why only a few primary schools are subscribing to this database at the moment. Second, many teachers do not understand the usefulness of teaching students these IT and information literacy related knowledge and skills at P4 level. Besides, many schools still leave the responsibility of guiding students through the General Studies inquiry learning group projects to the General Studies teachers. They do not realize that the integrative approach that involves a collaboration of various kinds of teachers (including the school librarian and the IT teachers) is an effective way to equip students with the knowledge and skills needed for their projects. This suggests that professional training for teachers in the area of self-directed inquiry-based learning group projects might be desirable.

6. Acknowledgement

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