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The roles of teacher librarians in collaborative inquiry project-based learning

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Abstract

During the second term of the school year 2010, primary 4 students at Cheung Chau Sacred Heart School completed an inquiry learning project. This project adopted an innovative teaching approach called the collaborative inquiry project-based learning (IPjBL) for which 4 kinds of teachers, including General Studies (GS), Library, Chinese, and Information Technology (IT), worked collaboratively to guide the students. During the project period, library classes were designed to further enhance students' familiarity about information sources and information search techniques, which is essential to students in finding relevant information for the project. Improvements in information literacy such as higher familiarity of book classification and the use of more diverse and trustworthy sources were observed by the teachers. These observed improvements are confirmed with the statistical analyses of the data obtained from students' self-ratings on various aspects of information search and information sources.

1. Introduction

Cultivating a reading atmosphere and maintaining a healthy variety of book collection in the library seem to be the major roles of library teachers perceived by many people. In addition to these general perceptions, library teachers also take on the mission to promote information

literacy, to provide means for students to do their research, and to support the teaching and learning of different subjects. Such roles are particularly clear in the current research project, which promotes the collaboration between different subject teachers, including library, to guide Primary 4 students to complete an inquiry-based learning project under the GS curriculum.

As one of the participating schools from the underlying research project, primary 4 students of Cheung Chau Sacred Heart School completed a GS group project which adopted an innovative teaching approach. With the assistance from some education experts, the GS, librarian, Chinese, and IT teachers collaboratively provided support and designed lessons to equip students with the knowledge and skills necessary for the project. In this 8-week long inquiry-based learning project, students needed to work in groups to research on a topic decided by the students. The GS teachers were responsible for overlooking the project and teaching subject knowledge. The Chinese teachers were responsible for enhancing student's reading and writing abilities. The IT teachers were responsible for providing training in IT techniques. The library teacher was responsible for equipping students' information literacy and research skills. The purpose of this paper is to discuss the roles of the library teacher in the project and the project's impact on students' information literacy.

2. Literature Review

2.1 Collaborative inquiry project-based learning

The benefits of inquiry-based learning (IBL) and project-based learning (PjBL) have long been discussed in the literature (Donham et al., 2001; Railsback, 2002; David, 2008). Various studies have suggested that the integration of PjBL and IBL could lead to an even more promising learning approach (Wilhelm, Sherrod, & Walters, 2008; Chu, 2009; Harada & Yoshina, 2004). Another body of research has shown the importance of collaborative teaching practices in promoting effective learning (Thousand, Villa, & Nevin, 2006). The current study has undertaken a collaborative inquiry project-based learning approach which is in line with these studies. Extending Kuhlthau, Maniotes and Caspari's (2007) recommendation of a flexible three-member core team of two subject teachers and a teacher librarian, a partnership of four kinds of teachers formed the center of this collaborative inquiry learning projects. This 4-

member collaboration was first suggested by Chu (2009). Figure 1 presents the overall framework of the collaborative IPjBL approach.

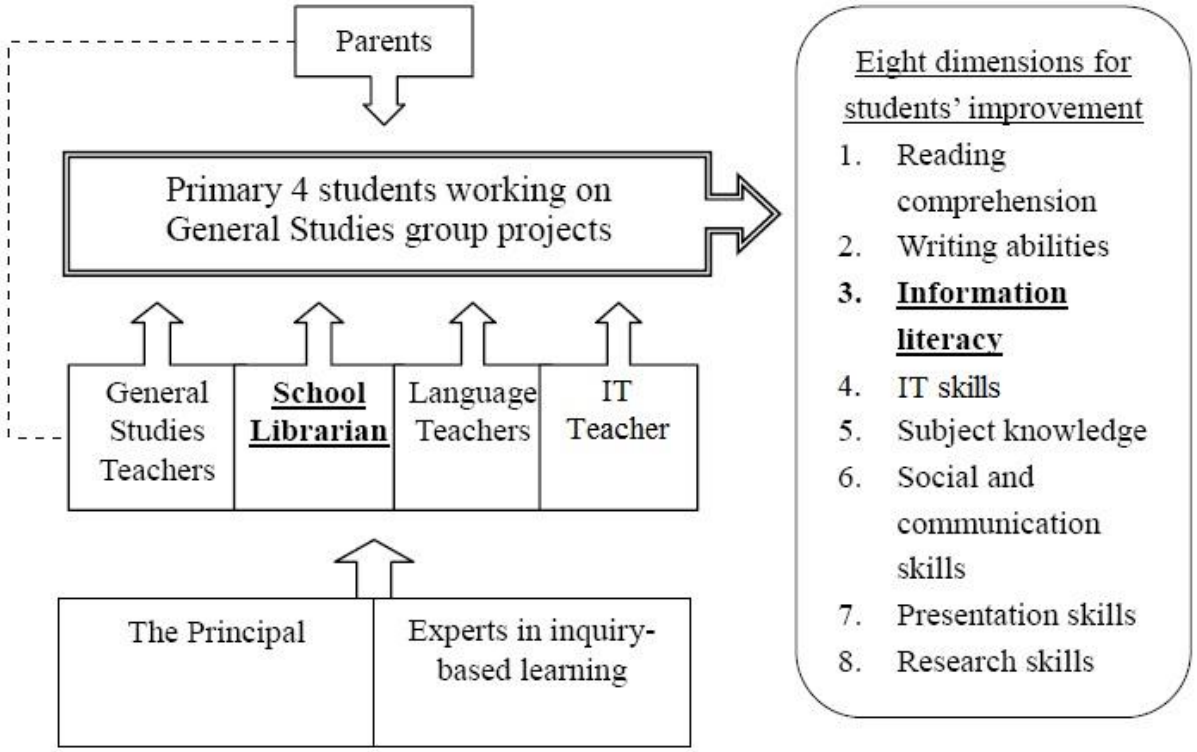

Figure 1. The overall framework of Chu (2009)

2.2 Information literacy and project learning

Information literacy has gained emerging importance in the knowledge-based society (American Association of School Libraries, 2007). However, various studies pointed out that the next generation is yet equipped with the necessary information literacy needed to find and critically evaluate information. (Livingstone & Lynch, 2000; Salovaara, 2005; van Aalst, Fung, Li & Wong, 2007). Students' engagement in inquiry-based learning projects could possibly facilitate the acquisition of the necessary information literacy and research skills (Silen & Uhlin, 2008). On the other hand, adequate level of information literacy (Chu, Chow & Tse, 2011) and research skills facilitate the process of inquiry learning (Chu, Chow, Tse & Kuhlthau, 2008), as students needed to search and find answers to their own questions through a systematic method of collecting and analyzing information (Chu, 2009). The study of Chow et al. (2007) evidenced improvements in the information search and critical thinking skills of Primary 4 students through the use of WiseNews, an electronic news database, during their inquiry projects (Chu, Mak & Tsang, 2011).

With their expertise in information literacy and research skills, teacher librarians take an important role in the framework of the collaborative IPjBL approach to equip students with relevant information search skills in completing their inquiry projects. The teacher librarian

could contribute in the collaborative IPjBL framework by ensuring that "students were well equipped with the necessary information literacy skills to search, locate, and make use of relevant information sources." (Chu, 2009)

3. Method

3.1 Participants

Sixty-two primary 4 students (29 females) from two classes of Cheung Chau Sacred Heart School participated in the current study. Parental consents were obtained prior to the study.

3.2 Design of library lessons based on the collaborative IPjBL approach

The teacher librarian actively assisted students in acquiring various knowledge and skills related to information searching. Biweekly library lessons were introduced as a structured curriculum. Seven substantial themes as shown in table 1 were set for the library lessons.

Lesson	Theme	Content
1	Book classification	Dewey book classification system facilitating book search
2	Library's online catalogue	Book search using author's name, title, or keywords in the school library's OPAC (online public access catalogue), utilizing resources in public library's online catalogue
3	Wisenews and pathfinder	Training concerning the use of the Wisenews database
4	Keywords search	Using keywords and symbols during information search
5	Boolean operators skills	Using boolean operators ("and", "or", "not") in search engines
6	Newspaper sections	Knowing how to read different sections in newspaper
7	Reference book classification	The classification of the reference books in public libraries and school library

Table 1. The teaching schedule of library lessons

In addition to arranging library lessons, some relevant books were purchased and around 200 books were borrowed via the block loan service provided by the public library. Worksheet teaching students how to log in the online resources of the public library (OPAC) and use various methods to search for book was prepared. The Assistant Chief Librarian of the public libraries was also invited to introduce other databases provided by the public libraries. Wisenews accounts were registered for students and tutorials on Wisenews database were arranged. Last but not least, information and pathfinder have been provided for students to sharpen their research skills concerning electronic resources.

3.3 Data collection

A self-reported questionnaire was designed to investigate students' 1) familiarity with and 2) perceived importance of information literacy in two aspects: a) information sources, such as school library, WiseNews, and Google/Yahoo; and b) information search skills, which included the use of Dewey classification system, Boolean operators, reference books, newspapers, and keyword search. Students were asked to fill out the same questionnaire before and after the collaborative IPjBL project. All questions were anchored on a 5-point scale. For questions asking familiarity, 1 referred to "not familiar" and 5 referred to "very familiar". For questions regarding importance, 1 referred to "not important" and 5 referred to "very important". A copy of the questionnaire was included in the Appendix.

4. Results

4.1. Students' familiarity with various information sources

Figure 2 depicted students' familiarity with various information sources before and after the collaborative IPjBL project and table 2 summarizes the rating by students. Students were found to be more familiar with using the School library online catalog ($t = 3.48$, $p = .001$) and WiseNews ($t = 6.55$, $p < .001$) after the collaborative IPjBL project. The most significant improvement was observed in the domain of Wisenews. It is reasonable that students' familiarity with WiseNews was substantially lower than all of the other information sources prior to the IPjBL project because free access was not available from the school library or the Internet. The

pattern of data echoes the teacher librarian's observation that the school library online catalog (OPAC) had been more frequently used and the borrowing rate had increased.

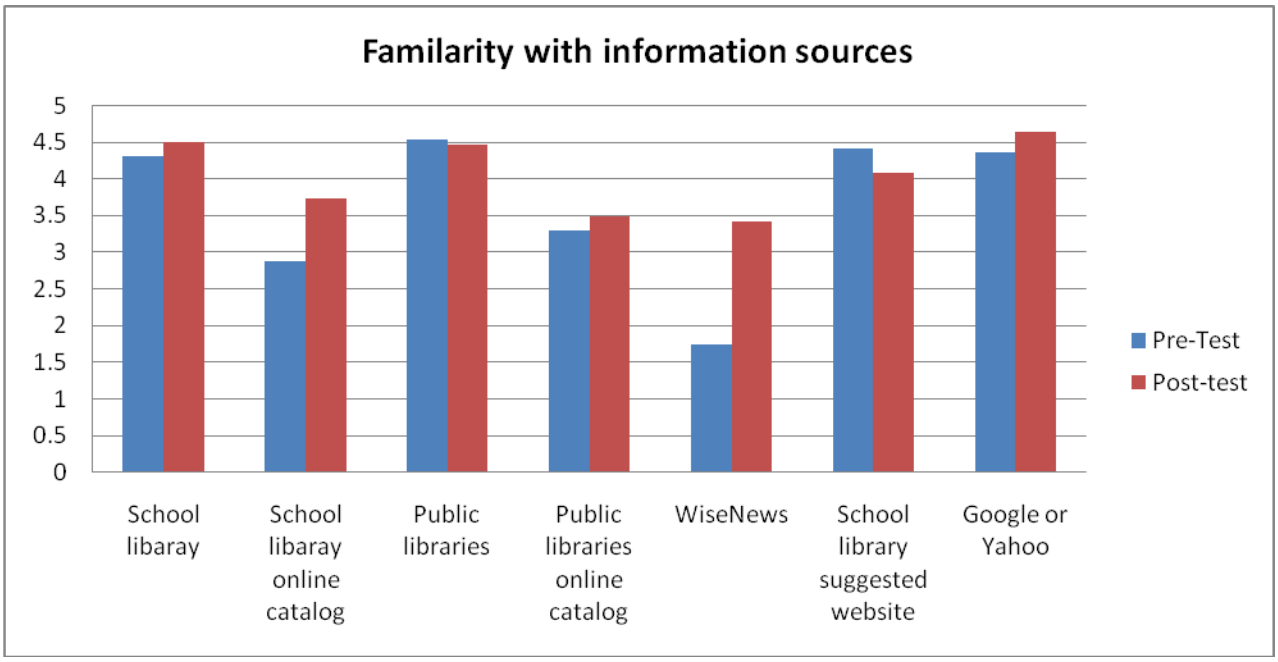

Figure 2. Students' perceived familiarity with various information sources before and after the collaborative IPjBL project

Item	N	Mean (SD) before project	Mean (SD) after project	t	*p* value
The use of the school library	52	4.31 (.90)	4.50 (.83)	1.15	.255
School library online catalog**	52	2.89 (1.49)	3.73 (1.17)	3.48	.001
The use of public libraries	51	4.53 (.97)	4.47 (.92)	-0.31	.762
Public libraries online catalog	50	3.30 (1.43)	3.48 (1.43)	0.72	.475
WiseNews**	51	1.75 (1.25)	3.41 (1.43)	6.55	.000
School library suggested website	52	4.42 (.96)	4.08 (1.13)	-1.75	.086
Google or Yahoo	52	4.37 (.93)	4.63 (.86)	1.68	.099

** p<.01

Table 2. Students' ratings on familiarity with various information sources before and after the collaborative IPjBL project

4.2. Students familiarity with various information searching skills

Figure 3 compares students' familiarity with various information searching skills before and after project. Table 3 summarizes the ratings given by students. The results indicated that students perceived an overall improvement on Dewey classification system (t = 2.20, p = 0.03), reference books (t = 2.89, p = 0.006), and keywords (t = -2.40, p =.02). This echoes the view of teacher librarian that students were able to use keywords and symbols in search engines.

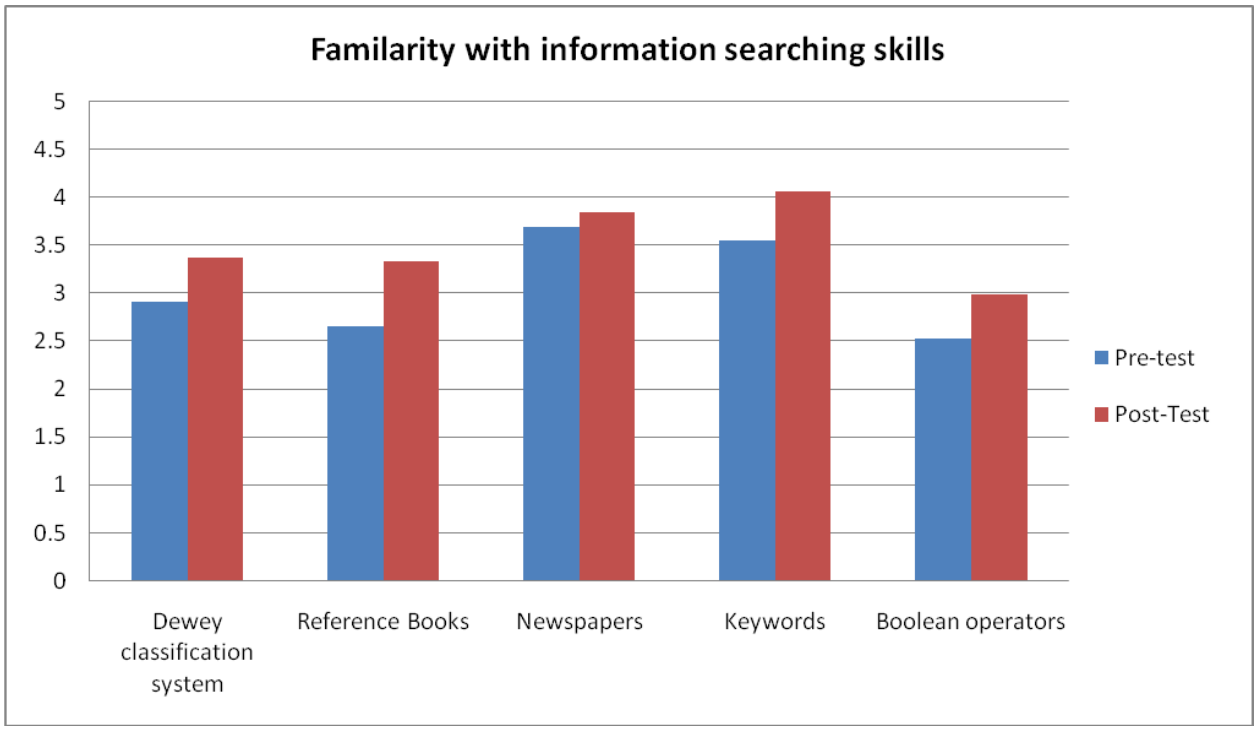

Figure 3. Students perceived familiarity with various information searching skills before and after the collaborative IPjBL project

Item	N	Mean (SD) before project	Mean(SD) after project	t	*p* value
Dewey classification system*	52	2.90 (1.27)	3.37 (1.27)	-2.20	.033
Reference books**	52	2.65 (1.34)	3.33 (1.26)	-2.89	.006
Newspapers	49	3.69 (1.19)	3.84 (1.16)	-0.76	.453
Keywords*	51	3.55 (1.47)	4.06 (1.29)	-2.40	.020
Boolean operators	50	2.52 (1.43)	2.98 (1.44)	-1.95	.057

*p<.05; **p<.01

Table 3. Students' ratings on familiarity with various information searching skills before and after the collaborative IPjBL project

4.3. Students' perceived importance of various information sources

Figure 4 showed students' perceived importance of various information sources for the completion of their projects. All the information sources were initially perceived by students as generally important as evidenced by the about midpoint ratings (3/5). One-sample *t* test was used to compare whether the rating after the project was higher than 3. Table 4 showed that six out of the seven information sources were perceived as more important after the project. The most important sources of information perceived by students were Google/Yahoo, followed by the use of the public libraries and school library. It is interesting to note that now the library is open in recess times and even after school as students use library more frequently. This suggests that traditional forms of information seeking such as school library and public libraries still appeared to be important, even though searching on the web is the most convenient.

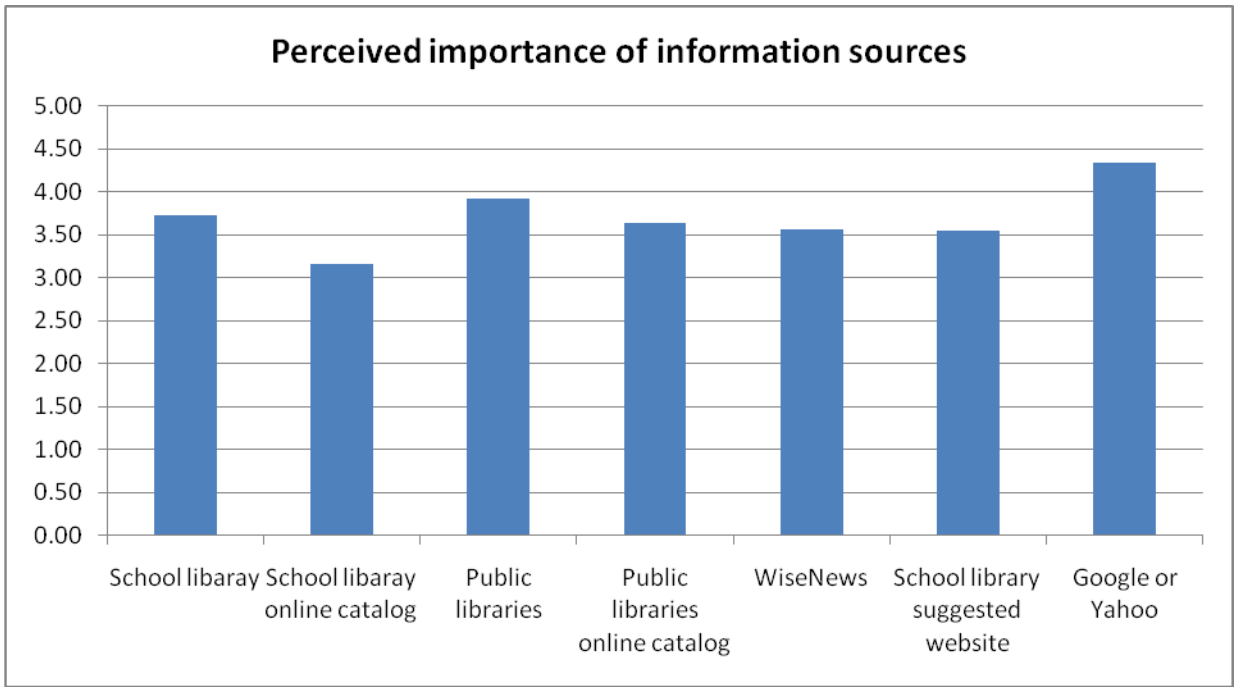

Figure 4. Students' perceived importance of various information sources for completing the collaborative IPjBL project

Item	N	Mean	SD	*t*	*p* value
The use of the school library**	55	3.65	1.16	4.19	.000
School library online catalog	55	3.13	1.29	.73	.468
The use of public libraries**	55	3.82	1.32	4.60	.000
Public libraries online catalog **	54	3.56	1.33	3.08	.003
WiseNews*	52	3.50	1.41	2.56	.013
School library suggested website**	55	3.49	1.27	2.86	.006
Google or Yahoo**	55	4.25	1.14	8.15	.000

*p<.05; **p<.01

Table 4. Students' perceived importance of various information sources for completing the collaborative IPjBL

4.4. Students' perceived importance of various information searching skills

Figure 5 showed students' perceived importance of various information searching skills for the completion of their projects. Four out of five information searching skills were perceived by students as generally important as evidenced by the about midpoint ratings (3). One sample *t* test was used to compare student's ratings after the project with the rating 3. Table 5 indicated that three information sources were perceived as more important after the project. The most important sources of information perceived by students were keyword search, followed by the use of newspaper and reference books. The improvement has been confirmed by library teacher that students start to appreciate using keywords after the library lessons. For instance, it has been observed that now they appreciate using author's name, title, or keywords to search for books. These findings are also consistent with previous studies indicating that knowing how to use the right keywords is crucial to obtaining more accurate information. (Chu & Law, 2007; Chu & Law, 2008).

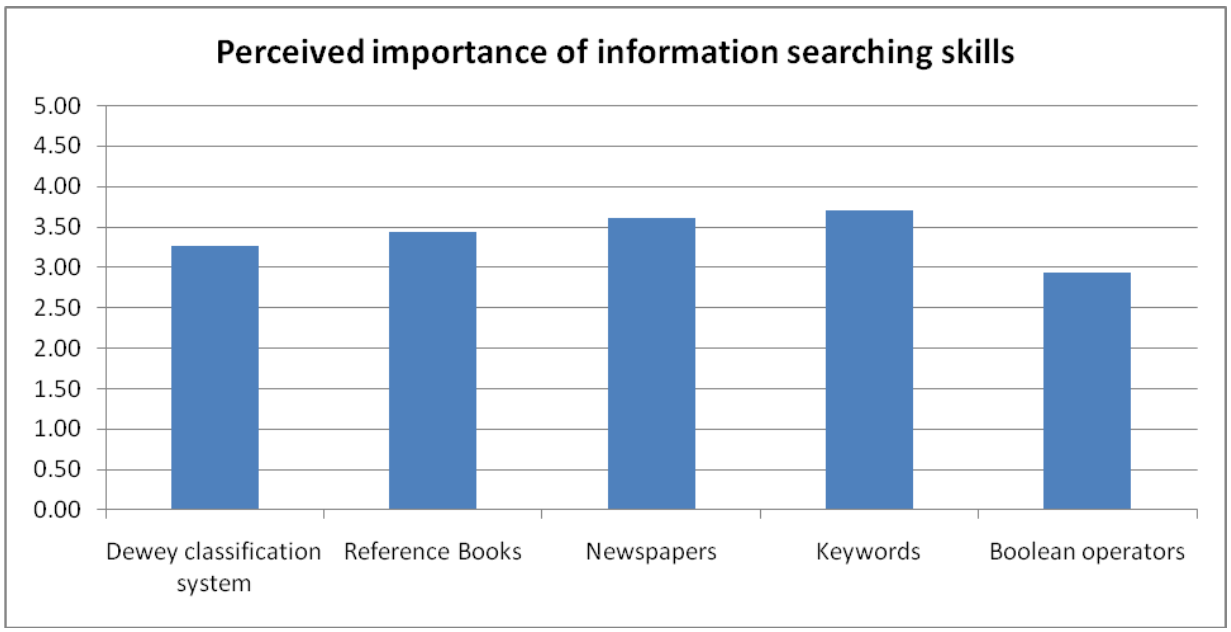

Figure *5.* Students' perceived importance of various information searching skills for completing the collaborative IPjBL

Item	N	Mean	SD	*t*	*p* value
Dewey classification system	52	3.27	1.43	1.358	.180
Reference books*	51	3.43	1.37	2.241	.030
Newspapers**	49	3.61	1.27	3.370	.001
Keywords**	48	3.71	1.40	3.509	.001
Boolean operators	50	2.98	1.42	-.100	.921

*p<.05; **p<.01

Table 5. Students' perceived importance of various information searching skills for completing the collaborative IPjBL

5. Discussion

This research first investigated the roles of the library teacher in the IPjBL model. Library departments are important providers of resources which can facilitate teaching and learning in all subjects to maximize their contribution. Therefore library departments should actively cooperate with other subjects departments to maximize their potential contribution. In the current collaborative IPjBL, the teacher librarian worked closely with General Studies teachers, IT teachers and language teachers to design a comprehensive teaching plan. As such, the teacher librarian did not only contribute by keeping the library and cultivating a reading atmosphere, but also promoting information literacy and means for students to do their research.

Effectiveness of the new teaching model was also evaluated in the current study. Concerning the information sources, the improvement on the familiarity with WiseNews, an important source of newspaper articles, is inspiring. It is infrequently used before the project; now students feel more comfortable in using such tool. Yet students seem to appreciate traditional sources like libraries and online search engine like Google/Yahoo more than the newly learnt WiseNews. Regarding information searching skills, students valued keyword search and the use of reference books as important techniques, and the collaborative IPjBL can exactly promote both of the skills. Such finding is particularly delighting because perceived importance and familiarity complement each other. A student equipped with the necessary skills in using a tool will not be motivated to do so if the tool is perceived as worthless. Whereas a student cannot be fully benefited by important information source if he or she lacks the skills. The optimal teaching outcome is therefore to provide skills that are identified as meaningful by students. Here we can see the collaborative IPjBL model can possibly achieve such goal.

The improvements of students on various qualities were not only shown by the results of the survey, but also supported by teachers' observation. Library use and borrowing rate have increased. Students were able to diversify in both data sources (e.g. from booklets and brochures) and information searching techniques (e.g. site visit, questionnaire and interviews). On top of its benefits to students, the collaborative IPjBL can also bring teachers new insights and teaching experiences. As mentioned above, teacher librarians can break though their traditional duties and utilize their expertise to help students cope with the overwhelming amount of information nowadays.

In conclusion, the new collaborative IPjBL had provided promising results. The involvement of teacher librarians gave students the necessary knowledge concerning information sources and skills for successful information searching. The growth of the students can be observed by teachers and themselves.

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References

American Association of School Libraries (2007). Standards for the 21st century learners. Retrieved from: http://www.ala.org/aasl/standards

Chu, S. K. W., Chow, K. & Tse, S. K. (2011). Using collaborative teaching and inquiry project-based learning to help primary school students develop information literacy and information skills. *Library & Information Science Research*, 33, 132-143.

Chu, S.K.W., Mak, M.Y.K. & Tsang, K. (2011). An electronic news database for upper primary school students and teachers in Hong Kong. *School Library Media Research*, 13. Retrieved from http://ala.org/ala/mgrps/divs/aasl/aaslpubsandjournals/slmrb/slmrcontents/volume13/contents.cfm

Chu, S. (2009). Inquiry project-based learning with a partnership of three types of teachers and the school librarian. *Journal of the American Society for Information Science and Technology, 60*, 1671-1686.

Chu, S., Chow, K., Tse, S.K. & Kuhlthau, C.C., (2008). Grade Four Students' Development of Research Skills through Inquiry-based Learning Projects. *School Libraries Worldwide*. 14(1):10-37.

Chu, S. & Law, N. (2008). The Development of Information Search Expertise of Research Students. *Journal of Librarianship and Information Science,* 40(3): 165-177

Chu, S. & Law, N. (2007). Development of information search expertise: postgraduate students' knowledge of search skills. *portal: Libraries and the Academy,* 7(3): 295-316

Chow, C.K.K., Chu, S.K.W., Ng, S.H., Fong, C.S.J., Kwan, W.Y., & Leung, A.A.T. (2007). WiseNews database for Primary Four inquiry-based learning projects. *Conference on Integrated Learning.* The Hong Kong Institute of Education, Hong Kong, 14-15 December 2007.

David, J. (2008). What research says about project-based learning. *Educational Leadership, 65*, 80–82.

Donham, J., Bishop, K., Kuhlthau, C.C., & Oberg, D. (2001). Inquiry based learning: lessons from library power. *Worthington, Ohio: Linworth Publishing*.

Harada, V. H. & Yoshina, J. M. (2004). Inquiry learning through librarian-teacher partnerships. Worthington, *OH: Linworth Publishing.*

Kuhlthau, C.C., Maniotes, L., & Caspari, A. (2007). Guided inquiry: Learning in the 21st century. *Westport, CT: Libraries Unlimited.*

Livingstone, D., & Lynch, K. (2000). Group project work and student-centered active learning: two different experiences. *Studies in Higher Education, 25*, 325-345.

Railsback, J. (2002). *Project*-based instruction: Creating excitement for learning. *Portland, Oregon: Northwest Regional Educational Laboratory.*

Salovaara, H. (2005). An exploration of students' strategy use in inquiry-based computer suported collaborative learning. *Journal of Computer Assisted Learning, 21*, 39-52.

Silen, C. & Uhlin, L. (2008). Self-directed learning – a learning issue for students and faculty! *Teaching in Higher Education, 13*, 461-475.

Thousand, J.S., Villa, R.A., & Nevin, A.I. (2006). The many faces of collaborative planning and teaching. *Theory into Practice, 45*, 239-248.

Van Aalst, J., Fung, W.H., Li, S.M., & Wong, P.Y. (2007). Exploring information literacy in secondary schools in Hong Kong: A case study. *Library & Information Science Research, 29*, 533-552.

Wilhelm, J., Sherrod, S., &Walters, K. (2008). Project-based learning environments: Challenging preservice teachers to act in the moment. *The Journal of Educational Research, 101*, 220–233.