



An Electronic News Database for Upper Primary School Students and Teachers in Hong Kong

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Abstract

The current research extended the pilot study and examined the use of an electronic news database by upper primary school students and their teachers in five local schools in Hong Kong. We used a mixed-methods design for data collection and analysis. We examined records of users' database activities for the usage patterns of students and teachers. Surveys and phone interviews were conducted to assess their perceptions of the usefulness of the electronic database for learning and teaching. The Revised Two-Factor Learning Process Questionnaire (R-LPQ-2F) was employed to assess students' learning approaches and their associations with news database use, and perceptions were examined. Findings revealed that younger students tended exclusively to browse, while older students and teachers used both browsing and keyword searching. Use patterns also confirmed that the news database provided accessibility to a vast amount of information. Both students and teachers perceived the electronic database to be useful for learning and teaching. Finally, we found that a deep learning approach was associated with frequency of use and positive perceptions of the usefulness of the electronic database. These results provide potentially important implications for teachers, school administrators, and system designers in developing an efficient electronic database to facilitate learning at upper primary school levels.

Introduction

The Internet, through electronic databases or digital libraries, has become an important source of academic information for secondary and tertiary students (Baildon and Baildon 2008; Hourcade et al. 2003). The literature has well established the educational value of these electronic databases for higher education (Atakan et al. 2008; Tenopir 2003; Vibert et al. 2007). In 2004, the Education Bureau (EDB) of the government of the Hong Kong Special Administrative

Region (HKSAR) suggested the extension of electronic database use to secondary and primary schools to empower teaching and learning at primary and secondary levels (EDB 2004). While substantial research has been conducted on the evaluation of digital libraries (Chowdhury, Landoni, and Gibb 2006), the use of such electronic databases by primary school students is relatively scarce. Previous studies have found that children are able to interact confidently with electronic sources, but their information-seeking behaviors are substantially different from those of adults (Bilal and Kirby 2002; Kafai and Bates 1997; Madden et al. 2006; Schacter, Chung, and Dorr 1998). Accordingly, the investigation of the use of electronic resources in primary schools is important in achieving a match between the learning needs of children and providing them the necessary resources.

A pilot study undertaken in a local primary school in Hong Kong has shown that an electronic news database can be useful for Primary 4 (P4) students for their inquiry-based learning (Chow et al. 2007; Chu 2009). In the HKSAR education system, P4 corresponds to Grade 4 in the American system. To further investigate the usefulness of electronic news databases in primary education, the present study expanded the pilot project and implemented the project in five local schools. This expansion also included other students from middle to upper primary levels (levels 3 to 6). This study aimed to examine the use and perceived efficacy of an electronic news database in primary education. We made a news database resource available to students and teachers and gathered objective data on their use patterns. We also obtained subjective information on the users' perceptions through questionnaires, and we examined the students' learning approaches as a related variable.

Review of the Literature

Electronic Databases in Education

An electronic database, or digital library, is an organized collection of digital information focused on one or more subject areas (Monopoli et al. 2002). Not only does it allow users to access a vast number of resources from different areas of knowledge, but it also enables users to retrieve those resources systematically and efficiently. Scholars and researchers have long discussed the potential utility of electronic databases in enhancing teaching and learning. For example, Marchionini and Maurer (1995) pointed out that the introduction of electronic databases to educational settings would benefit teachers and students because it would create opportunities for them to access information resources that have traditionally been inaccessible outside school. One of the benefits brought by these electronic resources is the availability to support classroom learning through the use of numerous books in a online digital collections (Hourcade et al. 2003). Furthermore, Wallace et al. (2000) suggested that the introduction of electronic databases enhances self-guided learning as information resources become accessible for students to explore questions of personal interest and as students are equipped with the tools to conduct browsing and creative discovery (Marchionini and Maurer 1995).

In recent years, various electronic databases have been used by academics, teachers, and students in higher education. To a certain extent, electronic versions have become preferable to print books and journal articles (Borrego et al. 2007; Monopoli et al. 2002). In an analysis of more than two hundred studies on the use of electronic databases in higher education, Tenopir (2003) noted that academic staff and students preferred electronic databases because of their relative convenience and relevance. The purposes for which electronic databases are used in the context

of higher education have been shown to include teaching, research, and keeping up-to-date in the development of interest areas (Monopoli et al. 2002). Borgman et al. (2000), through a series of case studies, have demonstrated the usefulness of electronic databases in supporting research and teaching undergraduates. Similarly, postgraduate students have confirmed the usefulness of electronic databases in research when they have acquired information search skills (Chu and Law 2007).

Electronic Resources in Primary Education

Different kinds of electronic resources, such as databases and search engines, have been adopted increasingly in primary school classrooms (Kuiper, Volman, and Terwel 2005). However, studies that have examined the use of electronic resources in the context of primary education are still limited, and the findings are far from consistent. A number of studies provide evidence that electronic resources offer benefits for students. For instance, Owens, Hester, and Teale (2002) found that the use of electronic databases enhances cognition in the areas of reading and writing among primary and junior secondary school students. Chow et al. (2007) found that an electronic news database boosts the quality of primary school students' inquiry-based projects.

On the other hand, research findings have also revealed that primary students experience difficulties in handling vast amounts of online information resources because they do not have the necessary information technology (IT) skills to search online effectively (Borgman et al. 1995; Chu 2009). Researchers have found that students have insufficient levels of information literacy (IL) to evaluate and analyze critically the information they acquire (Bowler, Large, and Rejskind 2001; Chow et al. 2007). In a series of studies, Bilal (2000, 2001, 2002) examined the use of a search engine "Yahooligans!" by seventh grade students. Bilal found that students have had trouble completing search tasks because they lacked adequate information-search skills. Bowler, Large, and Rejskind (2001) have also reported that many sixth graders lacked the basic IT skills to use web-based information in doing their school assignments.

Research has shown that electronic news databases have important teaching potential, and their use in primary school classrooms has improved the quality of teaching and learning in language, communication skills, and critical thinking (Trillo 2003). Such databases also attract and motivate young people to learn through news articles that are relevant to their daily lives (Chow et al. 2007).

Learning Approaches

Students undertake learning for a variety of reasons, and those reasons determine how they proceed with their learning and hence influence their academic performance (Biggs 1993). Biggs (1987a) identified two approaches to learning—surface and deep—with corresponding motives and strategies. A surface approach is characterized by the fear of failure and the aim for qualification, whereby the students perceive school learning as a means toward some other ends, such as obtaining a well-paid job, pleasing parents, or just keeping out of trouble (Biggs 1993). The strategy arising from this approach is to invest minimal time and effort to meet the requirements. Thus rote-learning and memorization of content within the syllabus without understanding is one of the commoner ways of doing this. In contrast, a deep approach is based on intrinsic interest in the subject matter of the task, such that students perceive the task as interesting and are prepared to work hard and commit time to their study. They use strategies to seek in-depth understanding by relating ideas to constitute a more integrated view of knowledge

(Kember, Biggs, and Leung 2004). Webber and Johnston (2000) have suggested that pedagogical approaches that facilitate learning experiences and involve IL must emphasize the enhancement of a deep learning approach among students.

Research has shown that online learning environments affect students' learning approaches (Cleveland-Innes and Emes 2005). As such, the concept of learning approaches, which provides a framework for understanding the dynamics between learning context and learning processes for individual students (Garrison and Cleveland-Innes 2005), may be relevant to the use of electronic databases in education. The Learning Process Questionnaire (LPQ), which measures students' approaches to learning, has been used and tested in numerous studies, yielding high validity and reliability across cultures (Biggs 1987b, 1992; Watkins 1998; Wong, Lin, and Watkins 1996).

Research Gap

While teachers and students have used electronic resources in primary education, evidence that supports the usefulness of these databases is far from conclusive. Limited research has examined the actual use of such resources by teachers or students. To pave the way toward an appropriate and effective use of electronic databases in primary education, we desire a better understanding of the context and experiences related to their use. This present study aimed to examine the use of an electronic news database in primary school learning and teaching. This expands on an earlier pilot project using P4 students (Chow et al. 2007), extending the implementation to include middle to upper primary school levels. Besides offering relevant insights into how primary school teachers and students use an electronic database to support teaching and learning, the findings of this study show the relationship between students' learning approaches and their use of an electronic database. This study thus contributes to the growing body of research that provides the basis for using electronic resources in primary education.

Method

Research Questions

The main objective of this study was to examine the use and efficacy of an electronic news database for upper primary school students and teachers. We asked the following research questions:

- How do students and teachers interact with the electronic news database?
- How do students and teachers perceive the usefulness of the electronic news database?
- Are the students' use and perceptions of the efficacy of the electronic news database related to their learning approaches?

Participants

Participants were upper primary school students ($N = 561$), including levels P3 ($n = 90$), P4 ($n = 127$), P5 ($n = 141$), and P6 ($n = 203$), and the teaching staff ($N = 99$) in five local primary schools in Hong Kong. The participating schools ranked as average in academic standing when compared to the Hong Kong local school population.

Procedure

At the beginning of the school year 2008–9, we introduced an electronic news database called WiseNews to students and teachers in the five participating schools. WiseNews draws information from myriad sources, such as newspapers, magazines, journals, and newswires, and is updated every day with content direct from about one thousand content providers and five hundred websites (Wisers Information Limited 2010). Containing such a vast range of information, we assumed that WiseNews would be a useful database to enhance teaching and learning at the primary education level. We negotiated with the server provider of WiseNews to provide one-year free trials of the WiseNews database to the schools for educational purposes. Informed consent was obtained from the participating schools to allow the recording of database activities. The service provider then recorded automatically the activities of the students and teachers on the online database throughout the year. Individual informed consent was obtained to conduct surveys and interviews at the end of the academic year to collect students' and teachers' perceptions of the usefulness of the news database.

Data Collection

We collected data using the following strategies:

- *Automatic records of online database activities.* The service provider of WiseNews automatically recorded all online activities by the users. These were collected to characterize the participants' use pattern of WiseNews. The information included the mode of information retrieval, document management, sources of information, and the headlines viewed.
- *Surveys.* We used a questionnaire with a four-point Likert scale (1 = strongly disagree to 4 = strongly agree) to examine the participants' perceptions on the usefulness of WiseNews (see **Appendixes A and B**).
- *Interviews.* We conducted semistructured interviews using open-ended questions with students and teachers to obtain in-depth information regarding their perceptions of using WiseNews to assist their learning and teaching.
- *Revised Two-Factor Learning Process Questionnaire (R-LPQ-2F).* We used the Chinese version of the two-factor LPQ (R-LPQ-2F) by Biggs, Kember, and Leung (2001) to assess students' learning approaches, which were their predominant motives and strategies for learning. Students were asked to respond to the questions on a five-point Likert scale, with response options ranging from 1 ("never or rarely true of me") to 5 ("always true of me"). An option of 0 ("I do not understand the meaning of this item") was provided (see **Appendix C**).

Findings and Discussion

Research Question 1: How Do Students and Teachers Interact with the Electronic News Database?

The service provider of WiseNews monitored the participants' interactions with the electronic database. We characterized these interactions in terms of the methods of information retrieval, information management, temporal parameters associated with use, and the sources of retrieved information.

Methods of Information Retrieval

There were two major methods for information retrieval in the news database: browsing and keyword searching. **Table 1** shows the proportions of different user groups (i.e., students at different grade levels and teachers) using browsing exclusively, searching exclusively, or both browsing and searching in retrieving information. A Chi-Square test (method of information retrieval crossed with user group) showed that there was a significant relationship between the user groups and the methods of information retrieval ($\chi^2(8, n = 659) = 89.375, p = 0.000$).

P3 and P4 students showed preferences for using general browsing exclusively, while P5 and P6 students showed the capacity to use both browsing and searching functions. These findings are consistent with a number of earlier studies that have shown younger children favoring browsing over keyword searching (Bilal and Kirby 2002; Hirsh 1997; Large and Beheshti 2000; Schacter, Chung, and Dorr 1998). It is worth noting that students in the current study used the news database for a variety of purposes throughout the school year. Students' preferences could be different when they are asked to perform specific information-searching tasks (Chow et al. 2007). Another interesting finding is the increasing trend in using searching only—the proportions of students that used searching only were higher at higher levels. Students at higher levels may be more experienced and familiar with IT (e.g., Chinese keyboarding) and information-search skills.

Table 1. Modes of Information Retrieval Used by the User Groups

| | Primary 3 <i>N</i> = 90 | Primary 4 <i>N</i> = 126 | Primary 5 <i>N</i> = 141 | Primary 6 <i>N</i> = 203 | Teacher <i>N</i> = 99 |
|-------------------------------|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|---------------------------------|
| Browsing Only | 63 (70.0%) | 86 (68.3%) | 78 (55.3%) | 67 (33.0%) | 43 (43.4%) |
| Searching Only | 0 (0.0%) | 6 (4.7%) | 7 (5.0%) | 44 (21.7%) | 5 (5.1%) |
| Browsing and Searching | 27 (30.0%) | 34 (27.0%) | 56 (39.7%) | 92 (45.3%) | 51 (51.5%) |

Information Handling

Users may handle the information that they find on the news database by viewing and archiving. Archiving actions include downloading, e-mailing, and printing. Since no participant used archiving exclusively, we segregate the methods of information handling into two categories: “viewing only” and “both viewing and archiving.” **Table 2** shows the proportions of participants the information management actions for each user group. The Chi-Square test (information handling x user group) showed that there was a significant relationship between the user groups and the methods of information handling ($\chi^2(4, n = 659) = 14.139, p = 0.007$). The proportions of users using viewing only are much greater

than the proportions of users using both viewing and archiving for all user groups. The users tended to restrict their information management to viewing and rarely did they perform any archiving action. Even for these recorded “viewing” activities, whether the users actually viewing or processing the information remains uncertain.

Table 2. Information Handling by the User Groups

| T a b l e | Primary 3 N = 90 | Primary 4 N = 126 | Primary 5 N = 141 | Primary 6 N = 203 | Teacher N = 99 |
|----------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|---------------------------|
| Viewing Only | 84 (93.3%) | 119 (94.4%) | 132 (93.6%) | 197 (97.0%) | 85 (85.9%) |
| Viewing and Archiving | 6 (6.7%) | 7 (5.6%) | 9 (6.4%) | 6 (3.0%) | 14 (14.1%) |

Temporal Parameters Associated with Use

As shown in **Figure 1**, the peak hour for WiseNews use was 11:00–11:59 a.m., followed by 12:00–12:59 p.m. and 3:00–3:59 p.m. With the official school hours running from 8:00 a.m. to 2:59 p.m., it appears that students used the news database slightly more after school (52 percent) than during school hours (48 percent). The use during school hours most likely reflects the training or class activities on the database as instructed by teachers. On the other hand, the considerable amount of use outside school hours indicated that students made use of the database on their own. The peak hours of use by teachers were 3:00–4:59 p.m. (see **Figure 2**). Given the official working hours for teachers are between 8:00 a.m. and 4:59 p.m., it appears that teachers used the news database mostly during working hours (76.6 percent), indicating that they used the database primarily for teaching-related purposes. The proportion of use outside official working hours was much lower when compared with students (23.3 percent).

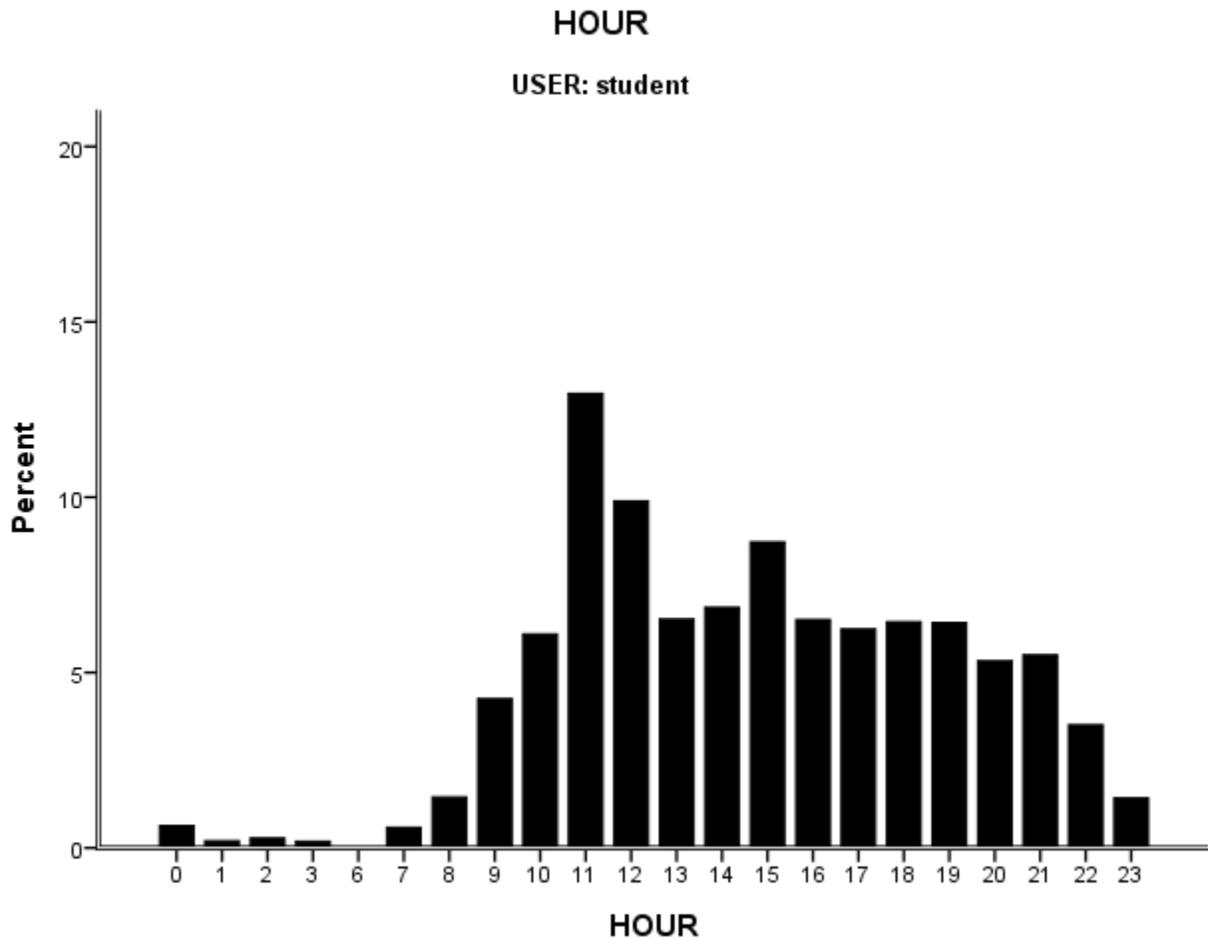
One of the more commonly proposed benefits associated with electronic databases is their accessibility (Marchionini 1989). Remote access means that information is available in classrooms, libraries, and even homes. As such, according to Marchionini and Maurer (1995), electronic databases can help promote learning beyond the classroom. The finding that students had substantial use of the WiseNews database outside school hours appears to confirm that students made use of the greater accessibility to resources.

Sources of Retrieved Information

The contents of the WiseNews database included news articles in Chinese publications, mostly from Hong Kong, Mainland China, Macau, Taiwan, and Singapore (97 percent). A limited number of news articles in Chinese and English were from publications in other parts of Asia and North America (3 percent). Students mainly retrieved articles from local publications as shown in **Figure 3**, indicating that they generally chose to use local

sources with which they were familiar. While teachers retrieved information mostly from local sources as well, they were more likely to retrieve information from overseas countries, including North America (see **Figure 4**).

Figure 1. Percentage Distribution of News Database Use Frequency by Students over 24 Hours



Electronic databases may be able to offer vast amounts of information, much more than any individual or school could easily acquire and maintain at one time (Marchionini and Maurer 1995). WiseNews made news articles from publications across the world available to the registered users. However, it seems that users in this study did not fully explore this wide variety of available information. We identified individual differences that might influence users' actions with online resources. For instance, children's information needs relate to schoolwork and imposed questions rather than self-generated queries (Gross 1995). On the other hand, teachers use electronic resources to support their teaching needs (Tenopir 2003). Considering that the user groups' needs might be intrinsically related to the local Hong Kong setting, it seems natural that they mainly chose local sources of information.

Figure 2. Percentage Distribution of News Database Use Frequency by Teachers over 24 Hours

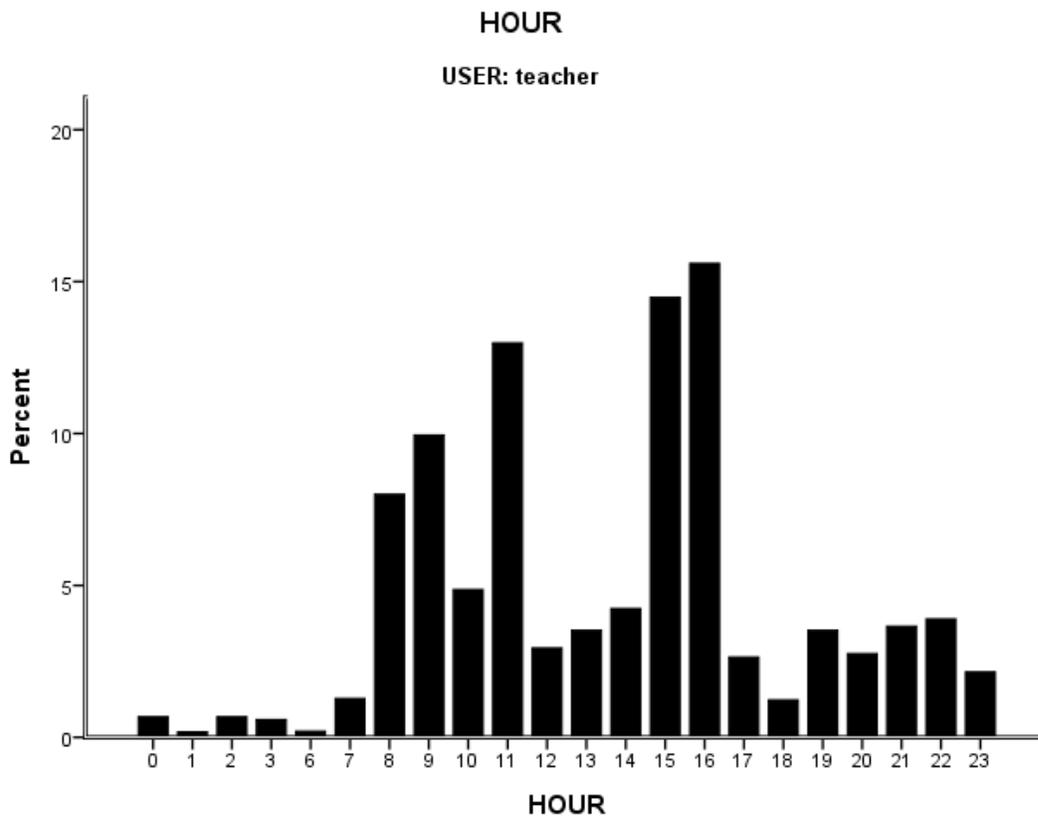


Figure 3. Location of the Publications Retrieved by Students

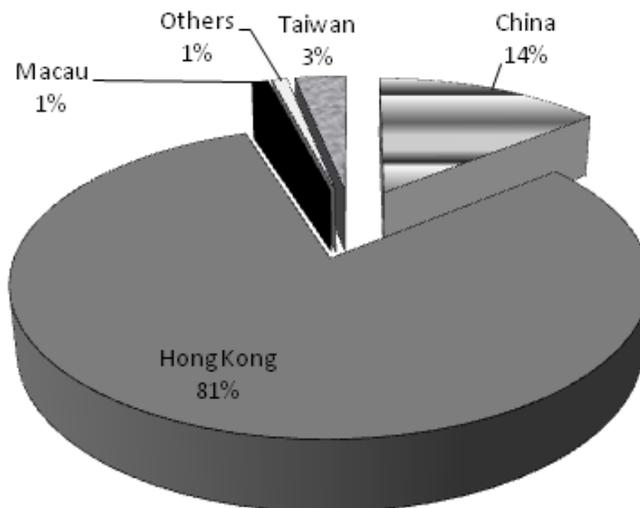
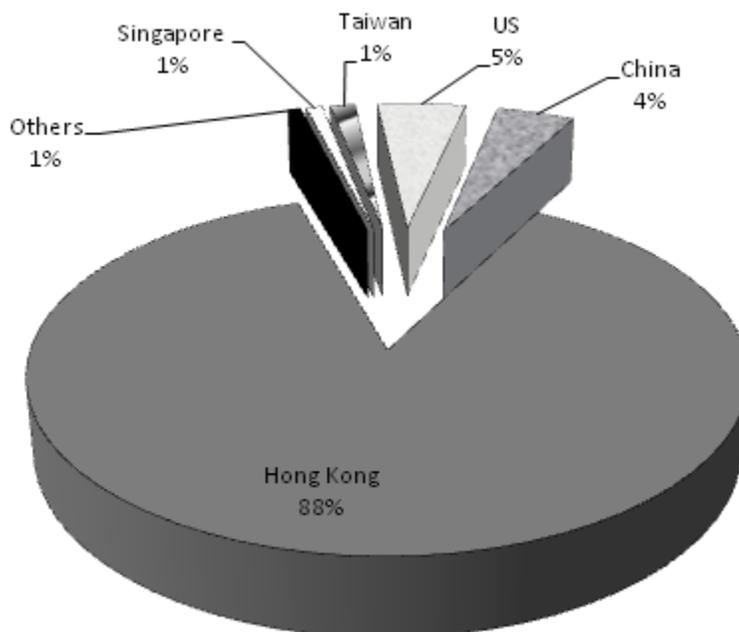


Figure 4. Location of the Publications Retrieved by Teachers

“8” Represents the Time Period from 8:00 to 8:59 a.m. “3” includes the time period from 3:00 to 5:59 a.m.

Research Question 2: How Do Students and Teachers Perceive the Usefulness of the Electronic News Database for Teaching and Learning?

To examine the users’ perceptions of the usefulness of the WiseNews electronic news database for teaching and learning purposes, we obtained quantitative data through questionnaires and qualitative data through interviews.

Quantitative Measure of Perceptions

A number of students ($n = 161$) and teachers ($n = 30$) gave their informed consent to respond to questionnaires and interviews. Separate sets of questionnaires obtained the perceptions of the students and teachers on the usefulness of WiseNews, and both groups of participants had generally positive perceptions of the usefulness of the news database for their learning and teaching. The students’ ratings for the different aspects related to using WiseNews are summarized in **Table 3**. The ratings—based on a four-point Likert scale—were all within the range that corresponds to positive perceptions in terms of usefulness ($M = 3.24$, $SD = 0.69$), ease of use ($M = 3.05$, $SD = 0.58$), relevance to schoolwork ($M = 3.17$, $SD = 0.60$), and helpfulness of training in the use of a news database ($M = 2.95$, $SD = 0.70$). Independent sample t-tests confirm that these observed mean ratings are statistically different from the midpoint of the scale ($p < 0.05$).

In the pilot study, P4 students also reported positive perceptions of the usefulness of the electronic news database in their inquiry-based projects (Chow et al. 2007). The findings of this expanded study confirm a similar perception of the usefulness and relevance for

schoolwork among a more diverse group of primary school students. While the use of the Internet in school has been growing (Bilal 2002), children have also had difficulties in searching for information and finding relevant results (Bilal 2001; Large and Beheshti 2000). Students in this study found the electronic news database easy to use. Using the database might have been similar to using web search engines, which are used with minimal difficulty by primary school students (Wallace et al. 2000).

Table 3. Students' Ratings on Various Aspects Relating to the Use of WiseNews

| | Mean (SD) | n | t | p-value |
|--------------------------------|-------------|-----|-------|---------|
| Overall Usefulness | 3.24 (0.69) | 155 | 13.25 | 0.00 |
| Ease of Use | 3.05 (0.58) | 158 | 11.95 | 0.00 |
| Relevance to Schoolwork | 3.17 (0.60) | 154 | 13.89 | 0.00 |
| Helpfulness of Training | 2.95 (0.70) | 143 | 7.73 | 0.00 |

Teachers' ratings on the different aspects related to the usefulness of the WiseNews electronic news database were generally positive as well. **Table 4** shows that teachers had positive perceptions of the news database's usefulness ($M = 2.98$, $SD = 0.33$), ease of use ($M = 2.96$, $SD = 0.43$), relevance to teaching ($M = 2.82$, $SD = 0.46$), and reliability of information ($M = 3.06$, $SD = 0.59$). Independent sample t-tests confirm that these observed mean ratings are statistically different from the midpoint of the scale ($p < 0.05$). Atakan et al. (2008) have shown that electronic databases are heavily used by academics in higher education, particularly for research. The findings in this study provide evidence that primary school teachers perceive an electronic database as useful, particularly for teaching purposes. It may be worth considering that the electronic resource used in this study is a news database, and its nature may have made it more usable for primary school teachers.

We used one-way, between-subject analysis of variance (ANOVA) to examine students' ratings on the usefulness of the WiseNews database. The findings revealed that grade level had a significant effect on the variance of ratings ($F(2, 154) = 4.18$, $p = 0.017$, $\eta^2 = 0.05$). Post-hoc tests confirmed that the mean rating given by P4 students ($M = 2.98$) was significantly lower than that given by P3 ($M = 3.33$) and P5 ($M = 3.34$) students ($p < 0.05$). This finding implies that P4 students considered the news database to be less useful in supporting their learning in comparison with students in other grades. While there were no differences in the database that was used by the students, interview findings revealed that some P4 students were given an assignment in their visual arts subject that required historical information. These students reported that they felt disappointed at being unable to find relevant resources, but the limitation in their retrieved information may have been due to the nature of the electronic database (i.e., current news) used in this study.

Table 4. Teachers' Ratings on Various Aspects Relating to the Use of WiseNews

| | Mean (SD) | n | t | p-value |
|-----------------------------------|------------------|----------|----------|----------------|
| Overall Usefulness | 2.98 (0.33) | 30 | 7.92 | 0.00 |
| Ease of Use | 2.96 (0.43) | 29 | 5.74 | 0.00 |
| Relevance to Teaching | 2.82 (0.46) | 30 | 3.79 | 0.00 |
| Reliability of Information | 3.07 (0.59) | 29 | 5.16 | 0.00 |

Qualitative Information on Perceptions

We conducted phone interviews with a randomly selected group of students ($n = 30$), and all teachers ($n = 30$) who responded to the questionnaire. Students reported three main purposes for their use of the news database: news reading, doing homework, and searching for information for inquiry-based projects. More than half of the students (17 of 30) indicated that the news database was helpful in terms of their becoming more aware of local and world issues because they were able to read a lot of news online. A number of students (12 of 30) also reported that the WiseNews helped them expand their knowledge, and they appreciated the easier access and faster process that online searches entailed relative to print materials. This information from students complements the finding discussed above (see "Temporal Parameters Associated with Use"), which showed that students were able to take advantage of the greater accessibility provided by the news database, as evident in their substantial use after school hours. Earlier studies on the use of electronic resources have shown similar perceptions by users (Fidel et al. 1999; Large and Beheshti 2000). A few students also found the news database useful for preparing for examination questions about current news in their general studies (GS) subject. Some students also indicated that they had expanded their Chinese vocabulary by using the news database.

Teachers reportedly used the news database for more diversified purposes, such as finding relevant materials for teaching, news reading, searching for information for inquiry-based projects, preparing examination questions, doing in-class activities, and self-learning. This finding highlights the difference between the user groups. As expected, teachers used WiseNews in relation to their work tasks. It was most popularly used by GS teachers, most likely because of the nature of the subject they were teaching. Nevertheless, librarians and computer studies teachers also perceived the usefulness of WiseNews to extend to teaching students IT and information-search skills.

Despite the generally positive perceptions of the teachers of the usefulness of the news database, a number of them (10 of 30) noted that while the news database was a convenient platform for students to perform research for projects, its effectiveness

depended on the project topic. For instance, a teacher librarian (T-HOS)¹ said that “the news database is not that useful for projects about Exploring Science, which emphasizes doing experiments in laboratory.”

Difficulties in searching the news database were also reported by students, who appeared to have engaged in a “cumulative and reiterative” search process. This strategy involves the users entering a term, scanning the results, and then modifying the search (Foster 2004). Students typically recognized the need to refine the keywords for searching. For example, one P3 student (S-CLL)² changed the keyword from “dirty water” to “water pollution” and “polluted water” to find the desired information. However, many students reported difficulty in formulating keywords for searching, which previous studies (Borgman et al. 1995; Hirsh 1997; Large and Beheshti 2000; Moore and St. George 1991; Marchionini 1989) have observed as typical for young information seekers. This consistent observation about the information search strategies of children shows the important role of adults in providing guidance for keyword formulation. Teachers in this study appear to recognize such a role, as is apparent in remarks such as the one made by a GS teacher (T-HWK): “After designing the project topic, it is better for teachers to do a preliminary searching on the news database, then narrow down the date range for students to do the searching effectively.”

Students also had trouble dealing with the vast amounts of information. They reported spending considerable time selecting appropriate information from the large number of news articles produced by keyword searching. Inevitably, some irrelevant articles were encountered in the students’ search results. For instance, one P4 Student (S-LWN) recalled that “when I typed in ‘East Asia Olympic,’ some irrelevant news about regular sports competitions was found.” Besides the concern about the volume and relevance of information search results, previous studies have also shown that children do not tend to question the validity of their retrieved information (Hirsh 1999; Watson 1998; Large and Beheshti 2000). The participants in the present study reported the same finding. For instance, a P4 student (S-LCY) reported, “my teacher pointed out that a piece of information I found from the news database about Picasso was indeed inaccurate.”

Both students and teachers also gave several suggestions for the redesign of the electronic news database to be more effective and efficient for primary school students. The most common suggestion given by the participants was to have a search interface that is designed particularly for children. Such an interface might employ a more colorful platform with graphic icons that can arouse children’s interest. Also, a brief summary of the news article might be provided so that it is easier for children to read. Lengthy articles could be shortened, with words not so densely packed and with enlarged font size. Teachers also suggested modifications in the organization of information for search purposes. One Chinese language teacher (T-KYW) suggested that “it would be easier for students to search for news if they only needed to type in the topic instead of keywords for searching.” Finally, some teachers also suggested enlarging the database to include more children’s magazines that met the needs of primary school children. Finally, a GS teacher (T-KWK) also recommended that some discussion questions be added to the news database to stimulate students’ critical thinking after reading the news articles.

RQ 3: Are the Students' Use and Perceptions of the Efficacy of the Electronic News Database Related to Their Learning Approaches?

A sample of students ($n = 161$) completed the R-LPQ-2F, which is a 22-item self-reported inventory to assess their learning approach (Biggs, Kember, and Leung 2001). The items in the questionnaire were dichotomized into indicators for deep and surface learning approaches. Good internal consistency of the R-LPQ-2F data was found, with Cronbach $\alpha = 0.87$ and 0.79 for the items of deep and surface approach, respectively. Students' mean score of deep approach was 37.52 ($SD = 8.89$), while that of surface approach was 30.95 ($SD = 8.84$). Univariate ANOVA tests examined the influence of grade levels on the variance of the scores in each learning approach scale; no significant main effect was found for both scales ($p > 0.05$).

We found a positive association between students' frequency of use of the WiseNews news database and scores in the deep learning approach scale ($r = 0.29$, $p < 0.001$); however, there was no significant association between students' use of the database and surface learning approach scale scores ($p > 0.05$). Students who used the news database more frequently appeared to be those who also had a higher level of engagement in deep learning. Similarly, we found a positive association between students' ratings on the perceived usefulness of the news database and scores on the deep learning approach scale ($r = 0.39$, $p < 0.001$). Students' perceived usefulness ratings for the news database did not have a significant association with their scores on the surface learning approach scale ($p > 0.05$).

Deep approach learners have an intrinsic interest in learning, and their strategies are aimed at maximizing meaning (Biggs, Kember, and Leung 2001). As such, our findings showed that a greater tendency toward a deep approach to learning is associated with greater efforts in terms of time given to exploring the electronic database. Student motivation may also be a relevant factor that leads to a more positive perception of an online learning resource that offers a huge amount of information with greater accessibility. While our findings are based on associations and do not determine a cause–effect relationship, it might be logical to explore in further studies whether the use of online resources contributes to promoting deep learning approaches among primary school students. Newble and Clarke (1986) have shown that problem-based learning facilitates an increase in deep learning among students and a decrease in surface learning orientations. As primary schools adopt such learning strategies, electronic databases could provide a form of supportive learning tools.

Practical Implications

A number of educational practice implications may be derived from the findings of this study. Considering the reported difficulties of students in information searches, teachers and librarians might need to ensure effective information-literacy and IT-skills training to primary school students. The level of a person's IT skills is expected to influence his or her online searching process (Fidel et al. 1999). The implications of the findings of this research support earlier suggestions that students need supervision and support in acquiring both web searching skills and IL, which is the ability to critically assess the information they find (Hirsh 1999). Chu (2009) suggested that an electronic database might benefit students by promoting effective information-search skills and critical thinking. Accordingly, librarians and teachers should collaborate in providing training support for students to acquire the necessary information-literacy and IT skills that will enable them to effectively use electronic databases for information-search processes.

Study implications in relation to domain knowledge may also be discussed. Domain knowledge, which is the knowledge of a specific subject, affects searching processes (Hsieh-Yee 2001; Wildemuth 2004; Fidel et al. 1999; Hirsh 1997). It influences the formulation of suitable keywords and the evaluation of the relevance and reliability of retrieved information. Accordingly, teachers might find it useful to elaborate on project topics during lessons to equip students with relevant vocabulary and understanding to facilitate their search process.

Limitations of the Study

While access to the WiseNews database was provided free of charge to all the participants in this study, not all students had equal access to the Internet at home. This could have influenced their amount of use after school hours. Furthermore, the users might also have varied levels of IL and IT skills, which may have affected their methods of information retrieval. This study did not include any assessment of the levels of IL and IT skills of the users. Finally, the five participating schools were recruited on the basis of convenience sampling, which might limit the generalizability of the findings to other schools in Hong Kong.

Conclusion

This study addressed questions concerning students' and teachers' use patterns of an electronic news database, their perceptions of its usefulness, and associations with students' learning approaches. Findings showed that younger students tended to exclusively browse through the electronic database, while older students and teachers tended to engage in both browsing and searching. While there were substantial logs of viewing news articles, all the users appeared to have engaged in limited information-management activities as shown by the low percentages of users who downloaded, e-mailed, or printed the materials they viewed. Temporal patterns and locations of retrieved information appear to differ between students and teachers, but both parameters of use confirm that the electronic news database provided the users with greater accessibility and volume of information. Further research may continue to explore the use of electronic databases to determine what happens after users have viewed and archived the information that they have retrieved.

Both user groups viewed the use of the news database positively in terms of supporting learning in various aspects. Other measures of usefulness may be explored in further studies, such as effects on the quality of schoolwork and learning outcomes. Finally, the findings of this study indicate that students' use frequency and usefulness perception were positively associated with the degree to which they exhibited a deep learning approach. This provides some evidence for the potential usefulness of electronic databases in supporting teaching approaches that aim at increasing students' deep learning. The findings offer some basis for further studies that examine a cause-effect relationship between learning approach and the use of electronic databases. In sum, this study provides evidence to support the view that electronic databases can be useful in primary educational settings. As teachers' and students' use patterns are better understood, school administrators might gain more insights into selecting appropriate electronic databases to facilitate learning and teaching. In addition, database service providers may use this information to design databases that better suit students and teachers at primary levels.

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Notes

1. “T” stands for teacher.
2. “S” stands for student.

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Appendix A. Sample Questions in the Survey and Interview for Students

Please select the one that best represents your opinion of WiseNews for the following items.

| | No Opinion | Strongly Disagree | Disagree | Agree | Strongly Agree |
|--|------------|-------------------|----------|-------|----------------|
| | 0 | 1 | 2 | 3 | 4 |
| Resources in WiseNews are useful for my project-based learning (PBL) | | | | | |
| Resources in WiseNews are useful for my homework (other than PBL) | | | | | |
| I can search for relevant resources in WiseNews easily | | | | | |
| WiseNews is useful for my news reading | | | | | |

What are the major difficulties you encountered, if any, when using WiseNews?

Appendix B. Sample Questions in the Survey and Interview for Teachers

Which subject do you mainly teach? _____

Which class(es), if any, that you are teaching use WiseNews? _____

Please select the one that best represents your opinion of WiseNews for the following items.

| | No Opinion | Strongly Disagree | Disagree | Agree | Strongly Agree |
|--|------------|-------------------|----------|-------|----------------|
| | 0 | 1 | 2 | 3 | 4 |
| Resources in WiseNews are relevant to my lesson planning | | | | | |
| Resources in WiseNews are relevant to my self-learning | | | | | |
| I can search for relevant resources in WiseNews easily | | | | | |
| WiseNews is useful for in-class activities | | | | | |
| WiseNews is useful for my news reading | | | | | |
| Resources in WiseNews are reliable | | | | | |

Are there any other activities that you think WiseNews is useful for? If yes, please specify:

Appendix C. Revised Learning Process Questionnaire (R-LPQ-2F)

What the LPQ is About

This questionnaire has a number of questions about your feelings about schools and how you go about learning in school. Remember, there is no *right* way of going about your learning. It depends on what suits you and the things you are learning. It is accordingly important that you answer each question as honestly as you can. If you think your answer to a question would depend on what you are learning, give the answer that would apply to your most important subject.

How to Answer

Alongside each item (on following page) there is a row of numbers ranging from one to five. A response is shown by circling the number which is closest to the way you want to respond.

The numbers stand for the following responses:

- 0—I do not understand the meaning of this item
- 1—this item is *never* or *only rarely* true of me
- 2—this item is *sometimes* true of me
- 3—this item is true of me about *half the time*
- 4—this item is *frequently* true of me
- 5—this item is *always* or *almost always* true of me

Circle the number that you think of *first*—don't spend a long time thinking about any one question. It is important that you answer each question.

Do not worry about what you think your teachers or anyone else might want you to say.

Your answers are CONFIDENTIAL.

| | | | | | | | |
|------|--|---|---|---|---|---|---|
| (1) | I find that at times studying makes me feel really happy and satisfied. | 0 | 1 | 2 | 3 | 4 | 5 |
| (2) | I try to relate what I have learned in one subject to what I learn in other subjects. | 0 | 1 | 2 | 3 | 4 | 5 |
| (3) | I am discouraged by a poor mark on a test and worry about how I will do on the next test. | 0 | 1 | 2 | 3 | 4 | 5 |
| (4) | I see no point in learning material which is not likely to be in the examination. | 0 | 1 | 2 | 3 | 4 | 5 |
| (5) | I feel that nearly any topic can be highly interesting once I get into it. | 0 | 1 | 2 | 3 | 4 | 5 |
| (6) | I like constructing theories to fit odd things together. | 0 | 1 | 2 | 3 | 4 | 5 |
| (7) | Even when I have studied hard for a test, I worry that I may not be able to do well in it. | 0 | 1 | 2 | 3 | 4 | 5 |
| (8) | As long as I feel I am doing enough to pass, I devote as little time to studying as I can. There are many more interesting things to do. | 0 | 1 | 2 | 3 | 4 | 5 |
| (9) | I work hard at my studies because I find the material interesting. | 0 | 1 | 2 | 3 | 4 | 5 |
| (10) | I try to relate new material, as I am reading it, to what I already know on that topic. | 0 | 1 | 2 | 3 | 4 | 5 |
| (11) | Whether I like it or not, I can see that doing well in school is a good way to get a well-paid job. | 0 | 1 | 2 | 3 | 4 | 5 |
| (12) | I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra. | 0 | 1 | 2 | 3 | 4 | 5 |
| (13) | I spend a lot of my free time finding out more about interesting topics which have been discussed in different classes. | 0 | 1 | 2 | 3 | 4 | 5 |
| (14) | When I read a textbook, I try to understand what the author means. | 0 | 1 | 2 | 3 | 4 | 5 |
| (15) | I intend to get my A Levels [or equivalent qualification] because I feel that I will then be able to get a better job. | 0 | 1 | 2 | 3 | 4 | 5 |
| (16) | I find it is not helpful to study topics in depth. You don't really need to know much in order to get by in most topics. | 0 | 1 | 2 | 3 | 4 | 5 |
| (17) | I come to most classes with questions in mind that I want answering. | 0 | 1 | 2 | 3 | 4 | 5 |
| (18) | I learn some things by rote, going over and over them until I know them by heart even if I do not understand them. | 0 | 1 | 2 | 3 | 4 | 5 |
| (19) | I find I am continually going over my school work in my mind at times like when I am on the bus, walking, or lying in bed, and so on. | 0 | 1 | 2 | 3 | 4 | 5 |
| (20) | I find the best way to pass examinations is to try to remember answers to likely questions. | 0 | 1 | 2 | 3 | 4 | 5 |
| (21) | I like to do enough work on a topic so that I can form my own conclusions before I am satisfied. | 0 | 1 | 2 | 3 | 4 | 5 |
| (22) | I find I can get by in most assessment by memorising key sections rather than trying to understand them. | 0 | 1 | 2 | 3 | 4 | 5 |

Note: The questionnaire was translated into Chinese for primary school students in Hong Kong to fill in.

* J. Biggs, D. Kember, and D. Y. P. Leung, "The Revised Two-Factor Study Process Questionnaire: R-SPQ-2F," *British Journal of Educational Psychology* 71 (2001): 133-49.



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