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# **U**sing the Internet to Enhance Cross-Curriculum Learning

Jessie Wong Yuk Yong &  
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## INTRODUCTION

*The Net is for Everyone — Whether you're a student, working professional, parent, or hobbyist, the Net has something for you!*

*The Pacific Net Homepage*

The Internet offers a rich source of possibilities for cross-curriculum teaching and learning. Used appropriately, it enhances student interest, creativity, and thinking, and promotes written communication and reading within real-life contexts among interested communities of writers and readers. In addition, it is an easily accessible storehouse of information and ideas, constantly updated and generously shared, thereby helping to advance content knowledge in the arts and sciences, and enriching the whole learning experience.

This article first discusses the many possibilities that the Internet has to offer in cross-curriculum pedagogy, using actual examples of successful Internet projects. It then identifies steps involved in designing and organizing Internet projects.

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## INTERNET PROJECTS AND MODELS

Three major ways (or 'activity models') in which the Internet may be used in teaching and learning (Harris 1995) have been identified. These are: interpersonal exchange, information collection, and problem solving projects.

### INTERPERSONAL EXCHANGE

Interpersonal exchange, such as keypal projects, global classrooms, electronic appearances, electronic mentoring, question-and-answer

activities, and impersonations, are what teachers have used and found to be viable. Each of these is discussed as follows:

### *Keypal*

Keypal projects were among the first educational activities to be used online. Students in two or more locations are matched with one another so that they can communicate, using E-mail. One example is "The World at Our Fingertips" project, which was organized by a teacher named Brenda Yowell of Burleson High School in Texas, and posted to the KIDLINK discussion list. Students from thirteen countries (South Africa, Norway, Finland, Denmark, Peru, Russia, Estonia, Chile, Mexico, England, Iceland, Germany, and Canada) exchanged information about their experiences living in these countries via the Internet.

Keypal projects are an effective way of using the Internet to enhance cross-curricular learning. In communicating with individuals world-wide, students acquire first-hand and largely up-to-date information of what they need to know from their co-correspondents, which is of infinite value in content areas such as social studies and science. Even while they are gaining content knowledge, students are also honing their language skills. In writing and in reading one another's work, both language skills are developed naturally and within meaningful contexts. Writers' have real-life audiences and real-life purposes for writing. The audiences, on the other hand, have real purposes for reading the written text. Most efficacious of all — the learning experience is played within an international arena, rendering learning a literally borderless experience. These benefits may be gained by most Internet projects that involve the communication of information and ideas through writing and reading, and the creation and sharing of processes and products with international participants.

### *Global classroom*

The global classroom involves the connection of two or more classrooms through the Internet to study a common topic together, sharing what students are learning about that topic during a specified time period. One interesting example is from the "Sunset" project posted by students from Ipalook School, Barrow, Alaska in mid-November, 1994. The message is simple but fascinating:

*Greetings from Barrow, Alaska, USA. It is pretty cold in the Arctic. We live in a desert but tomorrow (Nov 18) when the sun dips below the horizon like a seal we will not see it again for 65 days. Sunrise is at 12:37pm and it sets at*

*1.46p.m. for a total of 1 hour, 9 minutes. The horizon will be a fiery orange. We will continue to ride on snowmobiles and go sliding and when we get cold we'll go inside.*

*Write to us and tell us something about the sun from where you live on this planet. How much sunlight do you get? Do you have a favourite sunset you remember?*

*From kids at Ipalook School*

Global classroom projects like the above, are often more topically focused than Keypal projects. Global classrooms also involve groups of students, rather than individual students as in Keypal projects. The structure of global classrooms may differ. While some projects are simple and short-lived, others are quite complex and can involve students for one or more school semesters.

### *Electronic appearances*

Internet facilities such as e-mail, newsgroups, electronic bulletin boards and Internet Relay Chat (IRC) can host special guests (usually subject matter experts), with whom students can correspond or participate. This kind of exchange allows students to communicate with local, national, or international personalities for a relatively short period of time. In some cases, the activity can be extended and developed into electronic mentoring (discussed below).

An example of an electronic appearance is the Asian Crisis Survival Kit at PI LiveChat channel which was launched by Brigadier General George Yeo on 20 March 1999, Saturday 10–11am. Many Singaporeans took this opportunity to ask the minister questions concerning Singapore.

### *Electronic mentoring*

Internet-connected content specialists from universities, businesses, governments, or schools can serve as electronic mentors to students wanting to explore specific topics of study in an interactive format and on an ongoing basis. For example, the HP (Hewlett Packard) E-mail Mentor Program creates one-on-one mentor relationships between HP employees and 12th grade students and teachers. This program motivates students to excel in mathematics, science, reading and writing, communication skills, and career planning and development. HP has also set up a special project for Singapore schools.

Electronic mentoring, if properly used, is an effective method for enhancing learning among students of varying backgrounds, proficiencies, and interests. Mentoring can be established, for example, between postgraduate and undergraduate students, or between undergraduate and prospective college students, or primary and secondary school students. At the University of Illinois, for example, undergraduate geology students serve as mentors to pre-college students as part of their requirements for the History of Life course. Similar requirements could be built into specific course modules at the National Institute of Education (NIE), thus giving student teachers opportunities to participate as subject mentors to primary and secondary schools students.

### *Question and answer service*

This is a service provided by specialists to help answer students' questions. Institutions of higher learning, for example, could provide this service to students through student learning centers. Another possibility would be for tuition centres to provide this service as an extension of their involvement in education.

### *Impersonations*

Impersonation projects are those in which students correspond with a 'real' person 'in character'. For example, an English tutor at NIE can communicate with primary and/or secondary school students who want to improve their language via the Internet. Students are accorded personalized attention, thereby enabling them to explore and learn in a dynamic, interactive context.

## **INFORMATION COLLECTION**

Information collection is a collective strategy which includes information exchange, database creation, electronic publishing, tele-fieldtrips, and pooled data analysis.

In an information collection project, the activities set should not only encourage students to collect and share information, but more importantly, should provide opportunities for them to use it to create complex, higher order ideas. It is therefore an effective technique for enhancing thinking skills.

### *Information exchange*

Many examples of thematically related information exchange appear as popular and fun-generating Internet activities. One example is as follows:

*From: Patricia A. Weeg at [pweeg@source.asset.com](mailto:pweeg@source.asset.com)*

*Subject: Multi-cultural Calendar: Valentine Names*

*The Salisbury KIDCLUB kids searched for names of places that capture the Valentine spirit. Please add any other names of cities, towns, mountains etc. We know there must be similar names in other countries but we just can't recognize them. You'll translate them for us?*

*Here's part of their list:*

*Darling Range Mts, Australia*

*Darlington, England*

*Darlington, South Carolina,*

*Friend, Nebraska*

*Friendship, New York*

*Heart's Content, Newfoundland à*

*Many thanks!*

*Kristi, Kelli, Hickory, Maggie, Mickey, Karen and Nada*

In educational settings, information exchange can involve many classes without presenting an overwhelming management task for teachers. It is particularly motivating because students become both creators and consumers of the information that they are sharing. Sharing information that is intrinsically interesting to children on an international scale is an excellent way to engage them in an authentic cultural exchange experience.

### ***Database creation***

Some information exchange projects involve not only collecting, but also organizing information into databases that project participants and other students can use. Successful information exchange activities can grow into database creation activities. This kind of project can be more freely and widely shared with new information access and organization tools like the World Wide Web.

### ***Electronic publishing***

Electronic publishing of popular publications such as newspapers, literary magazines, or electronic journals, is mostly done by their being posted on the Internet. Similarly, information related to school curriculum, for example, can be shared by numerous people around the world through electronic publishing.

### ***Tele-Fieldtrip***

Tele-fieldtrip is a method of sharing fieldtrip information through the

Internet. Organizers for the Global SchoolNet Foundation, for example, encourage Internet-connected teachers and students to share observations and experiences made during fieldtrips with teachers and students from other cities, states, and countries. An example is one by Erica Rogers (*erogers@bonita.cerf.fred.org*), who maintains and distributes a monthly schedule of international fieldtrip information that is posted by participating teachers. In this way, if an upcoming fieldtrip will yield information pertinent to a particular class curriculum, questions can be sent to the children before the outing so that they are prepared beforehand to search for the answers during the fieldtrip.

### *Pooled data analysis*

Information exchange is particularly effective when data are collected at multiple sites through the Internet. The shared data can then be analyzed and the results sent back to participants for further response. This type of project holds much promise for involving students in large-scale research efforts, including the use of mathematics and scientific methods to answer complex questions.

## **PROBLEM-SOLVING PROJECTS**

Problem-solving projects include information search, electronic process writing, parallel problem-solving, and sequential creation. Problem-solving projects are the best examples of how the Internet can be used to enrich school curricula. The least pursued among Internet projects, they are, however, gaining popularity as more teachers become aware of their potential to enhance learning.

### *Information search*

In information search, students are provided with clues, and must use reference sources to solve problems. A good example is "What's in a Name?" project at KIDLINK. The challenge to different groups of participating students is to research particular sets of related names of people, and examine categories of names according to particular aspects such as mythological connections, and cultural differences in naming practices. Participating students then take the results of this collaborative research and analysis, and share them electronically through written reports of their findings. In this way, students are motivated to learn and, at the same time, improve their language and communication skills.

### *Electronic process writing*

In electronic process writing, participants may be given a situation to

write about for other participants to read and to provide feedback. The participants may be asked to concentrate on specific aspects of the writing process, such as the contents of each other's writing, or the forms through which the content is communicated. In both cases, content rich, process-driven, and constructively critical exchanges can occur.

### *Sequential creations*

An intriguing kind of artistic problem-solving has emerged on the Internet, in which participants progressively create a common written text, a shared visual image, or a collaboratively-constructed computer program. For example, Yvonne Andres (*andresyv@cerf.net*) and Mary Jacks, from Oceanside High School in California, helped their students to start a sequential text by encouraging them to write the first few stanzas of a poem about world peace. They then sent their work to students in a different school, who read the stanzas and added their own, thus putting into action an activity that supported collaborative creativity in writing.

### *Parallel problem solving*

In parallel problem solving, a problem is presented to students in several locations via the Internet. They solve the problem separately and then share their problem solving methods. In this way, students can compare the multiple methods used to solve the same problem. One good example is the 'floating boats' activity designed by Barbara Leonard, a teacher in Michigan. In this activity, elementary school students shared designs of floating boats, made out of 15cm squares of aluminum foil, which would hold as many pennies as possible. They also shared their problem solving procedures and experiences.

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## DESIGNING AND ORGANIZING INTERNET PROJECTS

The following steps for designing and organizing effective Internet learning projects have been identified by internet project facilitators:

### *Step 1: Decide on aims/objectives*

Make sure that the aims and objectives are clearly spelt out and are relevant to the curriculum. When deciding on the aims and objectives, consider not only what students will be doing on-line, but also what they will be learning and achieving through the project.



### *Step 2: Choose the activity model*

As discussed earlier, there are many ways in which Internet assisted learning can be structured. The 'activity models' that were discussed above are usually amenable for use in any curricular area and at any grade level. During the model selection process, it is recommended that teachers find out how other educators have organized and completed similar projects.

### *Step 3: Determine the details of the project*

A detailed and well-focused project description is essential for success (Rogers, Andres, Jacks & Clausen 1990). The following items should be included in the project description:

- The project title
- The project objectives
- The organizer/contact person and e-mail address
- The curricular areas covered
- The grade levels
- Number of collaborators required
- A summary of the project plan
- Directions for registration
- A detailed timeline for the project, including specific tasks to be completed and all interim deadlines
- Detailed procedures for participants
- A sample of student work that the project will generate
- How the project will end, including plans for how project results will be shared with all participants

### *Step 4: Invite collaborators*

Post your invitation and the details of the project on the educational websites that are frequented by teachers. The following are some well-known websites:

- Intercultural E-mail Classroom Connections
- KIDLINK Projects
- KIDLINK Project Forum
- Kidsphere Discussion Group for Adults
- Kidsphere Discussion Group for Kids

### *Step 5: Form the tele-collaborative group*

When a teacher receives responses from potential collaborators, reply as soon as possible and add their names to the list of participants.

### *Step 6: Communicate*

Information can be put on the facilitator's website, which needs to be updated constantly. It is, however, more advisable to form a distribution list of all project participants and to communicate with them by e-mail.

### *Step 7: Create closure*

All Internet projects must end with a final, tangible product such as a report, public presentation, short videotape, or display. The product needs to be completed according to schedule and shared with all participants. It could then be made available to a larger, interested community, for example, by posting it on the website.

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## CONCLUSION

The authors of this article agree with findings by Andres, Jack & Rogers (1991) concerning the benefits of using the Internet in teaching and learning:

- Students enjoy writing more when they are able to write for a distant audience of their peers.
- Students are more careful about their spelling, punctuation, grammar, and vocabulary when they are writing for a distant audience.
- Students enjoy communicating with schools from different geographical locations.
- Students are given opportunities to understand different cultures.
- Students begin to consider issues that are of global concern.
- Teachers are provided an opportunity to exchange ideas and resources with many other teachers very quickly and efficiently.
- Tele-computing (The Internet) prepares students for a world in which electronic communication will increasingly become an essential component.

Since the launching of the Masterplan for IT in Education in 1997, much has been done in schools, and at higher institutions of learning to promote the use of IT in order to enhance teaching and learning. Schools are rapidly being equipped with computers. In July 1998, a pupil-computer ratio of 6.6 : 1 and a teacher-computer ratio of 2 : 1 for 'Demo' schools (primary) and Phase 2 schools (primary) have been achieved. For 'Demo' schools (Secondary and JC) and Phase 2 schools (secondary), a pupil-computer ratio of 5 : 1 and a teacher-computer ratio of 2 : 1 have been achieved. Now that the hardware and infrastructure for IT use have been established, it is timely that teachers maximize the use of the Internet to enhance teaching and learning across the curriculum.

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