As planned outreach in connection with this effort, the PSLC is sponsoring an Internship Program in Technology Supported Education (http://www.cs.cmu.edu/~cprose/winterschool/index.html), with the goal of building bridges between institutions of higher learning in India and top ranking universities in the United States, beginning with but not limited to Carnegie Mellon University. This program will begin in December 2009 with a Winter School in which 130 undergraduates from around India will come together for an intensive two-week program to learn about research in the Learning Sciences and participate in short-term projects related to the LearnLab India effort.

As an example of planned research, drawing both from cognitivist and socioculturalist learning traditions, we propose to use language technologies to study the learning process itself as well as important social processes connected with that, which play a key role in second language learning, identity formation and commitment to a lifelong learning path. We will build on our prior work, where text mining and speech processing technologies are developed and used to track key patterns in the interaction between students in learning groups (Gweon et al., 2009; Joshi & Rosé, 2007). We will target patterns that are predictive of how much students are learning from the interaction or how well or poorly project teams are functioning together. The research will also draw on earlier research on how videogames can create more engaging learning experiences. Currently an effort is in progress to deploy a collaborative vocabulary building game built on top of the Basilica framework (Kumar et al., 2009).

A current comparative effort in progress is focused on an information literacy unit that will be shared by students at RGUKT and students at Carnegie Mellon University. Two initial pilot studies, one with 10 students and the other with 300 have already begun to reveal differences in information seeking behaviors between students from highly developed areas in India and those of the target user population that suggest principles for needed scaffolding support, which differ from those previously proposed within the mainstream information retrieval literature.

The RGUKT campuses have an annual intake of 6,000 students. The magnitude of the size of the student population available in the research partnership with RGUKT would provide invaluable insights to inform continued research on the effective use of language technologies to support instruction. This partnership would not only greatly accelerate the effort to develop highly effective computer supported instruction because of that magnitude. It would also allow fine grained and finely controlled international comparison studies such as has never before been possible, which holds the potential to transform the field of international comparative education research.

Knowledge Building International Project (KBIP): a Nested Network of Learning and Knowledge Creation

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The Knowledge Building International Project (KBIP 2007-2009) operates on the basis of locally based networks of innovation distributed around the globe. Catalunya (Comconèixer), Hong Kong (KBTN), Quebec (RNS), and Toronto (IKIT) are currently the four main sites. Similar to the Rosé and Kam abstract above, this work represents work primarily within a formal, classroom learning context. Nevertheless, while this work is connected with classroom learning, this work is unique in that it reaches beyond activity within individual classrooms or campus communities to build digital bridges between classrooms in different countries.

Pedagogical and research activities within this international effort are conducted within local university-school-government partnerships connected to one another. Much autonomy is left to the participants (students, teachers, graduate students, and researchers) for the designs of what works within their respective socio-cultural contexts, but they come together as they share a common understanding of knowledge building, and use the suite of tools available (knowledge building principles, Knowledge Forum® software, applets for specific analysis measures to be taken on the fly by researchers, teachers, and students).

As part of the applied cognitive sciences, Knowledge Building (KB) has its own epistemology, and it has become a pedagogical approach focusing on developing classrooms as communities for progressive problem solving and knowledge creation (Scardamalia & Bereiter, 2006). Unlike learning organized in traditional classrooms, the KB process is necessarily an intentional community effort, and is simply not possible as an individual enterprise. Learning takes place as a "by-product" of the knowledge creation process as learners tackle significant problems of understanding. Designing curriculum units for implementation as knowledge building experiences for school age children that can, at the same time, satisfy mandatory curriculum requirements is a challenge that has to be tackled to realize the vision of Education for Knowledge Creation in schools.

Agents (students, teachers, school principals, school district personnel, ministry personnel, university teacher educators and researchers) use Knowledge Forum as a "collaboration space" (asynchronous online

discourse). For synchronous discourse, a multi-user web-based videoconferencing system is used. The focus of the students' KB activities in KBIP has been on understanding and tackling issues related to climate change, energy and sustainable development. Typically collaboration at the classroom level is organized in clusters of 2 to 3 classes of students from different countries. Students from these classes engage in KB around a common theme and identify questions and problems. Working on them over a period of several months they contribute hundreds of notes on Knowledge Forum®. In 2008-2009, over twenty videoconferences were held among collaborating classrooms. Additional videoconferences for professional development among teachers from the different sites are also organized throughout the year. School personnel and ministry officers provided guidance and encouragement regarding curricular requirements, university teacher educators and researchers conducted onsite and online professional development workshops. One highlight of the year was the three-day onsite summer institute conducted in Mallorca (Spain), which provided an opportunity for the 30+ participating teachers, teacher educators and researchers to collaborate on designing, facilitating, analyzing and reflecting on the KB work of the 45 primary and secondary students who attended to work on the problem of the sustainability of caves (e.g. tourism effect, cave ecology, installing light in the caves and its impact) as well as visited two famous Mallorcan limestone caves.

Despite the challenges of differences in language, culture and time zone, there have been high levels of motivation shown by teachers and students to participate in KBIP. Implementing KB as a pedagogical approach is an innovation and a challenge, both for teachers and learners. Curricula and facilitation design, as well as classroom practices and culture are necessarily different in the different sites. KBIP forces teachers, learners as well as teacher educators and researchers to make explicit their ideas and assumptions and to learn from each other during the process of collaboration and knowledge building. We will report on specific research results obtained in Hong Kong and Quebec regarding student motivation, online discourse patterns, and students' depth of understanding of critical questions facing our world today.

Supporting and Measuring Global Information Literacy Through Cross-cultural Studies of Web Search

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In contrast to the earlier two abstracts, this work takes us into an informal learning environment within the developing world. Nevertheless, it is connected with the work in progress discussed in connection with Rosé and Kam's abstract above in its focus on information literacy skills. It connects also with the work discussed in the Laferriere and Law abstract in its focus on the internet as an environment to support knowledge sharing and knowledge construction.

Web search is a timely and imperative skill for citizens in information economies or those who participate in interconnected knowledge work regardless of their country. Moving beyond the traversal of digital libraries and into general knowledge acquisition it is a skill that crosses the boundaries between formal and informal learning environments and the developed and developing worlds. While we tend to think of web search as information retrieval rather than learning, much of lifelong learning in modern societies takes place during information seeking on the web, and increasingly internet penetration, and web based technologies, are growing into less developed regions.

Unlike many traditional school disciplines, the topic of web search (part of the broader topic of information literacy) does not belong to any one country or tradition. The technologies involved are culture-agnostic and there is little historical precedence of curricula, learning mechanisms, or best practices. We argue that these factors conspire to make web search an ideal topic to study as a means of integrating global perspectives and expertise in the learning sciences.

Among the sub-skills involved in being information and media literate (i.e. as discussed in Jenkins et al., 2006; Enochsson 2005), the ability to effectively and efficiently find, assess, and synthesize credible and authoritative information on the Internet combine to transcend cultural boundaries. We discuss reasons why Web search (herein referred to as 'search') is an ideal topic of study and alongside planned and ongoing research in a global context.

Academics, instructors, and policy makers have worked to study how search practices are learned in recent years, but much remains unknown. Computer experience, developmental stage, exposure to experts, formal instruction, accurate mental models of search engines and the Internet, and peer interaction each play a role. We plan to focus on *social* factors in particular and study them across cultures as they emerge in distributed and collocated environments.

We have designed and developed tools to support search learning and plan on giving them to schools in different areas in exchange for anonymous usage data that will provide us with the ability to take the global 'pulse' on global information literacy expertise.