ABSTRACTS
Summer Institute 2006 – Democratizing Society's Innovative Capacity
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(#16) Vodcasts: New Media for Professional Development. *James McGuire & Chris Teplovs*

Podcasts ("time shifted portable radio" is the common geek description) are well established in mainstream web culture. Video podcasts (vodcasts) hold tremendous promise for providing virtual glimpses of real teaching episodes. Whereas many current vodcasts focus on the "talking head" approach, we are more interested in capturing real teacher-student interactions and then using that video footage as the basis for instruction. We will focus on tools and techniques that enable teachers and lecturers to easily produce vodcasts. Specific topics that we will cover include: (1) workflow, (2) production, (3) post-production, (4) tagging, and (5) publication.

(#17) Patterns of Note Contribution in Online Medical Education Environments. *Don Philip & Zahra Punja.*

Online education is fast becoming a potent force in higher education, with a growth in online course offerings of 18.2% per year in the U.S. In 2004, there were 2.35 million U.S. students taking online courses. Courses with online content range from those that are basically face-to-face with some downloadable content to those run entirely online. While there are many forms of online delivery, many experienced instructors prefer asynchronous online learning environments using a learning community approach. Participation in such courses proceeds by means of communal discourse through note reading and note contribution. Knowledge Forum is an asynchronous online learning environment developed at OISE/UT and is unique in that it has a suite of analytic tools that can be used to track student interactions with the environment. These tools were used to examine the patterns of note contribution and delays in note contribution in four medical contexts. Findings show that note contribution rates can be modeled as linear curves and that the slopes of these curves give an indication of the average rate of note contribution over the specified period. Periods of non-contribution of notes (excluding planned inactive periods such as holidays) show a power-law pattern consistent with evidence that decision-based queuing processes are operating.

(#18) Complexity Theory and Education. *Don Philip.*

This paper discusses complexity theory as it applies to education. Starting with a simple experiment you can try at home, complex systems are discussed as the product of independent agents interacting in a rule-based manner. The nature of emergence is discussed and examples given. Bonabeau's four factors for fostering self-organization are presented, as are Bereiter's four levels of self-organization in human systems. This leads to a discussion of network science as a possible mechanism for self-organization and finally to a discussion of the knowledge building process in terms of complex systems.

(#19) Situating the Knowledge Building Principles in the Context of Alternative Views. *Don Philip.*

Beginning with an examination of the twelve knowledge building principles derived from observations of knowledge building communities, the paper then examines four other sets of principles arising from different disciplines and organizations. These include an interactive online forum, a perspective from business; a perspective from biology as applied to organizations, and a perspective from biology. All deal in some way with communities that self-organize to create novelty. Comparison of these principle sets reveals that the knowledge building principles align well with many of them, and that they are therefore not abstract, theoretical constructs, but rather a practical guide to the creation of knowledge building communities.

(#20) From Problem-based Learning to Knowledge Building in Science Classrooms – Authenticity, Learning, and Agency for Learning. *Ai-Choo Jennifer Yeo, Seng-Chee Tan & Kok Sing Tang.*

Recent views of science education advocate learning science by appropriating its practices and constructing meaning in context. From literature, we derive three conditions for science learning: providing authentic context, engaging students in science experience, and supporting interactions among students. This paper examines two problem-centered approaches that fulfill these three conditions – Problem-based learning and knowledge building. Our comparison of these 2 approaches shows differences in terms of authenticity, learning outcomes, and agency for learning.

(#21) Scientific argument in written discourse with task requirements triggering different epistemic agency. *Jun Oshima, Ritsuka Oshima, Isao Murayama, Shigenori Inagaki & Tomokazu Yamamoto*

The purpose of this study was to explore the possibility to improve elementary students' epistemic agency in their scientific inquiry by designing the task requirement with the socio-scientific debate. We hypothesized that the task requiring students of considering multiple perspectives on a scientific debate would trigger the higher level of agency than the ordinary task requiring their own positions. Students' arguments in their written discourse were compared in terms of their structure, grounds sufficiency, and epistemic operation in warrants. It was found that the structure, grounds sufficiency, and the epistemic operation were highly evaluated in arguments on the consensus making. We discuss the results in detail along with the task requirements and their educational implication for the science education curriculum.

(#22) Expertise as a knowledge object: Utilizing video expert teacher think-alouds to promote deep understanding among teacher candidates within a knowledge-building environment. *Latika Nirula, Joan Peskin & Earl Woodruff.*

This design research study evaluates the efficacy of bringing expert teachers into the Teacher Education knowledge-building classroom through the use of videos highlighting their insights on a case study. A composite video was developed, consisting of selected segments of expert teachers' "thinking aloud" as they read a case study that is used in teaching a course on Educational Psychology. The video served as an additional knowledge object as students worked towards deepening their understanding of teaching and learning and engaging in reflective practice. The goal was to evaluate the efficacy of students having access to expert teachers' modeling analytic thinking. The study examined whether this pedagogical tool fostered the development of students' deep understanding of ideas in their online discourse. Findings and implications for promoting deep understanding within knowledge-building environments will be discussed.

(#23) The role of motivational beliefs in personal conceptual change in collaborative knowledge building: A perspective of social cognitive theory. *Li Sha & Jan van Aalst.*

The purpose of this paper is to initiate an attempt among knowledge building researchers to explore the effect of individual student's motivational beliefs on personal conceptual change in collaborative knowledge building from a social cognitive theory perspective. This attempt is based on the assumption that knowledge builders are agents both as products and as producers of their knowledge building activities, and the understanding that the epistemic agency principle of knowledge building entails researchers to pay attention to the issues how the knowledge builders can be motivated and to the mediating role of student motivation in influencing their engagement in both personal conceptual change and collective knowledge advance. It is suggested to focus first on two motivational constructs: goal orientation and self-efficacy. The finding of this study will help us reveal the dynamics of collaborative knowledge building by theoretically and methodologically combining individual-level psychological processes with group-level collective behavior patterns. This study may also inevitably trigger a very fundamental epistemological thinking – individuals or group, who is the primacy of causation in knowledge building discourses. This attempt may eventually lead to a bridge across the two contemporary mainstream learning theories: self-regulated learning and collaborative knowledge building.

(#24) Self-Assessment for Knowledge Building in Health Care. *Leila Lax, Anita Singh, Marlene Scardamalia & Larry Librach.*

The 2002 Romanow Commission on the Future of Health Care recommended improvements in education and practice in end-of-life care for a growing and aging Canadian population. The aim of this study was to design, develop, and evaluate a continuing professional development program in end-of-life care for accreditation by the Ontario College of Family Physicians. The challenge was to provide a robust, interactive program easily accessible to busy family doctors distributed over a large geographic area. A comprehensive and collaborative knowledge building model, blending asynchronous Knowledge Forum® technology and synchronous interactive videoconferencing was created, to enable individual knowledge improvement and community advancement of ideas in clinical practice. The focus of this design research was a novel method of online, embedded and concurrent self-assessment. Results indicated gains in understanding and program satisfaction associated with knowledge building participation.

(#25) Collaborative Knowledge Building and the Intentional Improvement of Ideas in a Medical Legal Visualization Course. *Leila Lax, Marlene Scardamalia, Ian Taylor & Meaghan Brierly*

Knowledge building theory and Knowledge Forum® (KF®) were initially integrated in 1999, in a second year master's course in Medical Legal Visualization, in Biomedical Communications (BMC), Institute of Medical Science, Faculty of Medicine, University of Toronto. Collaborative knowledge building in KF emerged through the iterative critique of knowledge, ideas and artifacts. In 2003, KF Analytic Toolkit measures were introduced as embedded concurrent quantitative feedback. Iterative critiques and concurrent feedback were used to address issues of inert knowledge, considered a barrier to conceptual change. In this course idea improvement is the goal; emergent outcomes result from individual or collective objectives.

Scardamalia (2002) indicates that deep knowledge building is analogous to how a scientist works. To advance knowledge one must work at the current edge knowledge. This distinguishes "expert from non-expert-like learners" (Berieter and Scardamalia,1993). We believe that students should work like knowledge researchers, instead of knowledge recipients, actively engaging in the intentional transformation of ideas.

Analytic Toolkit knowledge building measures were embedded as concurrent formative feedback to enable student and collective self awareness, comparative assessment and reflection on idea contributions; students explicitly indicated ways they intended to evoke change and improve on ideas.

Results indicate qualitative critique of ideas in combination with quantitative concurrent feedback supports students' efforts to work like knowledge researchers. Students' attitudes and opinions survey results strongly supported the use of KF and a knowledge building approach. The pedagogic culture of this course provides unique opportunities for combining emergent curriculum design with intentional and creative work with ideas.

(#26) The role of problematizing move in knowledge building. *Ming Lai.*

This paper describes an international collaboration between two classes of grade five students through an online discussion platform with one group more experienced in online knowledge building activities than the other. Using the methods of problematizing move (Koschmann yet al. 2005) and level of social construction of knowledge (Gunawardena et al, 1997), the analyses suggest that the more experienced group is better at discovering areas of disagreement in the discussion or problematizing the discourse. With the joint-discussion with the more experienced group, the discourse of the students in the novice class changed from more information-centered towards meaning negotiations.

(#27) Developing methods of studying knowledge practices. *Kai Hakkarainen.*

Traditional methods of learning research are usually individually oriented, focus on the participants' *beliefs* and other *discursive entities* rather than their *practices (*Giddens, 1979), and provide a frozen picture of participants' behavior, rather than help to address sustained processes of individual and

social transformation. Several prominent learning researchers, such as Engeström (1987), Marton (Marton & Trigwell, 2000), Säljö (2000), and Wegner (1998), argue, by contrast, that *social practices* play a central role in learning and instruction. Routine, everyday practices of working with knowledge – taking courses, reading, writing, presenting, interacting with other students, as well as structuring students' activity in space and time, by the curriculum – appear to determine, to a great extent, both students' conceptions and practices of learning. Collective practices of learning and studying appear to interact with students' personal dispositions in complex ways related to their history of cognition, socialization, and learning.

(#28) Inter- subjectivity and 'the other' in knowledge building. *Ola Erstad.*

Classrooms in many countries are increasingly becoming multicultural in the sense that children with different cultural backgrounds are working together to achieve common goals in their learning activities. Theoretical perspectives for this paper will draw on the development of dialogism. It will also discuss some of the key principles of Knowledge Building. In this paper I will draw on research I have done with two schools at the lower secondary level. The background for the activities reported in this paper is an interest from the two schools to collaborate and to develop increased understanding among the students for similarities and differences in experiences and views on issues of great concern for both of them. That is socio-cultural issues about living standards, cultural activities and what it means to grow up in very different communities. One objective of this paper has been to open up some questions about inter-subjectivity and conceptions about 'the other' in knowledge building. The other objective is related to the activities of the students in this project with a focus on social science issues.

(#29) Knowledge Building in Elementary Mathematics. *Ambika Dayal.*

Academic literature and data from a small-scale design experiment have enabled me to explore how the principles of knowledge building may inform my teaching of mathematics, and how the use of Knowledge Forum with my students may support teaching and learning based on these principles. I hope to implement the notions of knowledge building and computer-mediated discourse (through Knowledge Forum) into my own Mathematics classroom, and share my ideas with my colleagues when I return to my full-time teaching position in September 2006.

(#30) Gender Differences in Vocabulary Use in Knowledge Building Discourse. *Yanqing Sun, Jianwei Zhang, & Marlene Scardamalia.*

To investigate whether sustained knowledge building practice can help both boys and girls develop their vocabulary, this study analyzed the online knowledge building discourse of a class of 22 students (11 boys and 11 girls) over two years from Grade 3 to 4. The results revealed that both boys and girls accomplished a substantial and increasing amount of writing and reading work. They increasingly used less frequent words in their discourse, suggesting that they had significantly increased their productive written vocabulary. Boys outperformed girls on a number of indicators, suggesting that knowledge building practices has the potential to help boys overcome their weaknesses on literacy performance.

(#31) Sustained Improvement of Knowledge Building Practice at an Elementary School. *Jianwei Zhang & Marlene Scardamalia.*

This study analyzed 34 knowledge building projects facilitated by nine teachers at an elementary school in seven years, focusing on the levels of individual contribution and collective cognitive responsibility in knowledge building communities facilitated by the teachers. The results demonstrated significant advances of knowledge building practice among the teachers. As they proceeded with the knowledge building pedagogy, they were able to continually improve their practice by increasing individual contribution rates as well as collective responsibility for knowledge advancement.

(#32) Cognitive conflict resolution as a design strategy for one-to- one classroom activities. *Sung-Bin Chang, Ia-Ming Ching, & Yu-Fen Chen.*

Since the advance of personal, portable, wireless-networked technologies in education has performed potentially a great impact in technology-enhanced learning, peer interaction will be the important issue for designing learning activities in one-to-one classroom. This paper describes a design strategy, called PER, for one-to-one classroom activities. PER includes three steps, 'producing' cognitive conflict, 'exposing' cognitive conflict, and 'resolving' cognitive conflict, for a series of processes to resolve cognitive conflicts emerged from the learning activity. A class of learning activities are proposed to demonstrate how the PER strategy is presented in their design. Moreover, the common features are also discussed further.

(#33) Digital Classroom Environments: Profile Enhanced Classroom Learning. *Hercy N.H. Cheng, Yi-Chan Deng, Tak-Wai Chan.*

The era of 1:1 educational computing environment where each student has one mobile computing device is not far away. When such technology designed for individuals is applied to group learning, several student grouping problems could be encountered. The Digital Computing Environments (DCE) system is a platform designed to help teachers and students interact and learn in a classroom. This paper elaborates the Digital Computing Environments system for 1:1 computing, and beyond, to address collaborative arrangements.

(#34) Unpacking our intuitions of development: A hands-on introduction to assessing cognitive development. *Theo Dawson, Kurt Fischer & Zachary Stein.*

Effectively supporting the development of knowledge, in individuals or groups, entails an understanding of cognitive development. The Lectical™ Assessment System (LAS) specifies scoring criteria that are used to identify cognitive developmental levels as they are defined in Fischer's (1980) dynamic skill theory. The LAS has been validated through growth modeling (Fischer & Biddel, 1998) and Rasch analysis (Dawson, 2003). Dawson (in press) claims that the LAS functions as a ruler for measuring cognitive development. The goal of this workshop will be to introduce participants to the LAS by appealing to the untutored ability we all possess (especially educators) to differentiate more developed reasoning from less developed reasoning. Through a series of activities, under the guidance of two Master Lectial™ Analysts, participants will gain an understanding of some of the most basic developmental patterns evidenced in linguistic performances. They will be provided with the tools needed to assess cognitive performance on the fly, and the materials needed to continue building competence in this area.

(#35) Modeling learning and representing development: On a methodology for mapping meaning making. *Zachary Stein & Theo Dawson*

The aim of this paper is to expose the power of a methodology for assessing learning as micro-development in educational settings. This methodology is based on a domain general and content independent measure of cognitive development known as the Lectical™ Assessment System (LAS) (Dawson, 2004b). The LAS specifies scoring criteria that are used to identify cognitive developmental levels as they are defined in Fischer's (1980) dynamic skill theory. The LAS has been validated through growth modeling (Fischer & Biddel, 1998) and Rasch analysis (Dawson, 2003). To employ the LAS in educational assessments and micro-developmental research we have supplemented it with various forms of conceptual analysis, one of which is concept mapping. The process of concept mapping exposes the relations between the structure and the content of reasoning processes. This methodology has recently been employed in a series of investigations into conceptual learning. Comparisons across maps over time reveal the precise forms of conceptual development taking place, providing powerful insights into learning processes.

(#36) When Collaboration Falls Short of Knowledge Building. *Olivia Robertson & James Hewitt.*

The information and communication technology is said to lend itself to interaction and

collaboration, which is viewed as beneficial to student learning and knowledge building. As such, instructors of graduate distance courses tend to promote seminar style discussion and group collaborative projects, built on constructivist principles. This grounded study explored the experience of graduate students in an effort to understand how they relate group collaboration and knowledge building at a distance to their learning goals. The data was collected through interviews where students discussed their experience within two types of group collaboration (Issue-Based discussion and Project-Building groups). The data suggests that the software and the present model of learning may not support collaboration and knowledge building.

(#37) How can online communication help facilitate collaboration? *Kerry Armstrong.*

This action research study examined the use of a computer-supported asynchronous environment to support collaboration within a department in a high school. The goal was to learn more about the use of an online environment to critically reflect and collaborate. The participants were two student teachers, one new teacher, and four experienced teachers. They used Knowledge Forum ™ (KF) software to discuss a proposal for change over a period of six weeks. The data consisted of individual interviews, KF data, participants' personal narratives after discussions online, personal reflections from my research journal, and responses to a survey. The findings indicated that online discussion helped to address diverse learning needs in relation to professional development and collaboration, KF provided a venue for formal collaboration and an opportunity for critical reflection, and participants were motivated to use KF to look at questions that matter and that affect their daily work.

(#38) Building capacity in the use of KF by identifying different types of discourses. *Christine Hamel, Marie-Hélène Croteau-Bouffard, Stéphane Allaire, Thérèse Laferrière & Sandrine Turcotte*

Students and teachers of sixty primary and secondary schools engaged in the Remote networked schools initiative (ÉÉR) are invited to use Knowledge Forum (KF) to build knowledge collectively while addressing problems, phenomena, stakes or events. A single question in KF can be used in one classroom as well as in many at the same time as the EER initiative wants to provide additional opportunities of interaction between students of small rural schools. After a preliminary reading of the different views developed (a total of 113 views for the period of September to December 2004), we observed that groups were producing different types of discourses on KF. As a matter of fact, the knowledge building discourse, which is the aim of this written practice (Scardamalia & Bereiter, 1994), is not the only kind of discourse that can be identified in the views developed. Having in mind the goal of increasing the knowledge building capacity of students and teachers, we have defined four types of discourses that have emerged from this written collective practice.

(#39) L'appropriation du principe de coélaboration de connaissances «Idées réelles, problèmes authentiques» par des enseignants et des élèves d'écoles en réseau. *Stéphane Allaire, Marie-Hélène Croteau-Bouffard, Christine Hamel, Thérèse Laferrière*

Au Québec, la situation précaire entourant les petites écoles rurales sert actuellement de contexte authentique à la recherche et au déploiement de pratiques qui valorisent une culture du savoir. Au cours des deux dernières années, l'initiative de l'École éloignée en réseau a mené une soixantaine d'écoles et 13 commissions scolaires à s'inscrire dans cette dynamique de travail au bénéfice d'une problématique spécifique à leur milieu, soit l'accès à une qualité de ressources éducatives semblable à celle des écoles des centres urbains. Dans un tel contexte, en classe, la valorisation d'une culture du savoir passe en majeure partie par le travail collaboratif en réseau supporté notamment par le Knowledge Forum. Un principe de base de la pédagogie qui fonde cet outil a trait à l'ancrage de la démarche dans des idées réelles et des problèmes authentiques (Scardamalia, 2002). Or, une telle façon d'amorcer les activités d'apprentissage et de les faire progresser représente un défi pour les intervenants et les élèves. Une appropriation graduelle de cette démarche d'investigation collective a lieu et nous proposons d'en rendre compte en documentant l'évolution des types de questionnements formulés par les enseignants et les élèves sur le Knowledge Forum.

(#40) City Plan, Home and Users – Children as Architects. *Pirita Seitamaa-Hakkarainen, Kangas Kaiju, Iivonen Marjut, & Kai Hakkarainen.*

The purpose of the present article is to introduce the design of the "City Plan, Home, and Users – Children as Architect" project. The project was organized for a 6th grade classroom at Laajasalo Elementary School, Helsinki, Finland. The students were guided to take part in the expert-like practices of designing apartment buildings. They worked under the guidance of a professional interior architect and of their teacher. The Knowledge Forum environment was used to support the participants' collective inquiry and collaborative design activities. A special aspect of the project was to integrate conceptual and material activities. In parallel with building knowledge within the KF environment, the participants visited the building site, created a shared environmental model (1:500), produced a large number of sketches, and constructed scale models (1:20) of the selected apartments being designed. The KF environment allowed the participants to use scanned drawings and digital photos to organize and structure their productions. Results of the project indicated that conceptual and material artifacts may productively be integrated to support learning by collaborative design (LCD).

(#41) Systematic formation of reading comprehension in visually impaired children. *Kari Kosonen & Kai Hakkarainen*

The focus on the present work-in-progress was to develop and test intervention method for facilitation of reading comprehension by blind teenagers. The study relied Vygotsky's theory of internalization, and specifically on Piotr Gal'perin's theory of planned stepwise formation of mental actions. The participants were helped to generate what Gal'perin called the 'orienting basis' (abstract representation) through providing them with a external physical model to structure the their comprehension activities. Theory and methods are described and results of the first case study provided.

(#42) - The Mega Rule for All Patterns in One Super Mega Note - Grades 4, 5 and 6 students develop algebraic understanding through collaborative discourse. *Ruth Beatty, Joan Moss, Lisa Sweetman, Sonia Satov, & Susan Martin.*

As part of our on-going study of children's understanding of mathematical functions through patterns, we have been invesigating the potential of Knowledge Forum to support Grades 4, 5 and 6 students' early algebraic understanding. In Year 3 of the project, 250 students from 8 classrooms in four schools were involved. Students in six of the classrooms were electronically linked via Knowledge Forum to solve complex generalizing problems. Preliminary results suggest the inclusion of Knowledge Forum as a collaborative discourse platform fostered students' ability to engage in high levels of mathematical discussion and problem solving.

(#43) A Technological Tool for Scaffolding Social Metacognitive Reflection. *Huang-Yao Hong, Richard Messina, Chew Lee Teo & Jianwei Zhang*

The purpose of this poster is to report results from testing the effects of a newly developed knowledge-building tool—the Network tool—on enhancing students' knowledge-building capacity. The results revealed a potential use of the tool is to prompt students' socio-metacognitive awareness of community knowledge-building. Further research will continue exploring the tool's other potentials for expanding individual and community's knowledge-building capacity.

(#44) Demystifying Knowledge-Building Practices in Teaching. *Huang-Yao Hong, Jianwei Zhang, Chew Lee Teo, & Marlene Scardamalia.*

This paper explores knowledge building in a community identified by Bielaczyc and Collins (in press) as a "hotbed community" in which knowledge creation has taken on a life of its own. The practices of six elementary schoolteachers are analyzed to inform the development of teachers' knowledge-building practices and to better understand how teachers develop and sustain innovative knowledge-building practices.

(#45) Strong Ties, Weak Ties: Exploring Patterns of Collaboration and Knowledge-Interaction for Knowledge Advancement in the Knowledge Society Network. *Huang-Yao Hong, Marlene Scardamalia, & Jianwei Zhang.*

The Knowledge Society Network is a bold design experiment that takes advantage of new knowledge media to maximize society's knowledge resources and the effective and equitable mobilization of knowledge. This study documents the growth of the KSN from 2002 to 2005, and explores the relationships between network structures and knowledge advancement in the KSN. Four major sub-network structures of the KSN were identified through network analysis on intensity of collaboration and knowledge-interaction. Strengths and weaknesses of each sub-network structure for knowledge advancement and suggestions as to how to refine the design of the KSN for the next phase of design experiment will be discussed.

(#46) A Longitudinal Analysis of Inquiry Threads in the Knowledge Society Network. *Chew Lee Teo, Jianwei Zhang, Huang-yao Hong, Yongchen Gang & Marlene Scardamalia*

The Knowledge Society Network (KSN) is a bold design experiment that takes advantage of new knowledge media to maximize society's knowledge resources and the effective and equitable mobilization of knowledge. The network is interdisciplinary (representing at least 20 disciplines), intersectorial (from kindergarten to higher education, health care, small businesses, advocacy groups, community enterprises), cross-age (from 4-year-olds to 70+), and cross-cultural (with participants from 12 nations). This poster reports descriptive findings from a longitudinal analysis of inquiry threads (notes in common problem space) to investigate the process through which the KSN serves as a platform for sustained knowledge advancement. Participation patterns are also analyzed to explore the underlying premise that KSN supports collective effort to advance the frontiers of knowledge.

(#47) Creating a Professional Development Model for Knowledge Building Practices. *Chew Lee Teo & Krista Raun.*

What structures and supports are needed for teachers to build communities for knowledge advancement for their own work and for the work of their classes? The current research aims to develop a professional development model for knowledge building communities, with focus on communities engaging knowledge building principles and a Knowledge Society Network, supported by an online environment known as Knowledge Forum®, to support knowledge building discourse (Scardamalia, 2002).

(#48) Une réflexion d'élèves coélaborée – L'apprentissage individuel et collectif de l'algèbre dans une classe Protic 2e secondaire. *Mélanie Tremblay & Christine Hamel.*

Cette étude s'inscrit dans un contexte particulier où la classe est considérée comme une communauté d'apprentissage. Chaque élève y possède son propre ordinateur portable. L'étude s'inscrit dans le prolongement d'un projet de recherche doctoral qui investigue le point de vue d'élèves alors qu'il porte un regard réflexif sur son apprentissage de l'algèbre. Alors que la recherche doctorale s'est davantage attardée au discours individuel de l'élève, la présente étude désire rendre compte du point de vue de la communauté d'apprenants. Ainsi, l'objectif est de comparer le fruit du discours issu d'une réflexion de coélaboration entre les apprenants aux réflexions qui ont été rédigées de manière individuelle. Le WebKF, jumelé à des discussions orales en classe, a été l'outil retenu comme lieu de partage et de négociation de sens, afin de tendre vers une coélaboration commune sur 1) ce qui définit l'algèbre en 2e secondaire, 2) la manière dont l'apprentissage a été vécu par les élèves, et finalement, 3) ce que l'acquisition de l'algèbre pourrait être alors que les élèves se projettent en 3e secondaire.

(#49) Decolonizing cyberspace: Collaborative knowledge-building support for an MEd program for Inuit educational leaders in Nunavut. *Sandy McAuley, Fiona Walton & Joanne Tompkins*

Canada's far north presents interesting challenges for the design and implementation of

bilingual/bicultural knowledge building programs. This session explores the development and design of knowledge building support for a new MEd program for Inuit educators in Nunavut in which Inuit and non-Inuit ontologies and epistemologies can engage and reshape each other in a true democratization of knowledge.

(#50) Fosbury-in-the-making: Knowledge Building in Physical Education. *Richard Messina, Benjamin Peebles & Chew Lee Teo.*

In this project, we aim to foster deep understanding and knowledge advancement through students initiating and working on their class' ideas and self-navigating between the content and experience in both their physical education class and Science class. To achieve this, it is important that teachers do not pre-define an 'ideal' discovery mode for such progression to emerge among students. Their learning trajectory should include divergent and convergent thoughts, ideas and discourse, both on the learning content (body systems), scientific principles, (making hypothesis, introducing control etc) and athletic techniques (students' physical movements, skills and techniques) in both Science classes and Physical Education classes. This relation hopes to bring about the fact that knowledge building should pervade all aspects of the curriculum, both in and out of classrooms as well as school through the use of real and authentic problems (Scadarmalia, 2002).

In this video poster, we present such attempt to connect Knowledge Building activities in Science (Human Systems) and Physical Education (Long Jump Technique) through innovative integration of two technological affordances, Knowledge Forum 4.6 (KF4.6) and Measurement In Motion (MIM) through a montage of video and audio clips.

(#51) Knowledge Building and Metacognition: Dialogue between Two Frameworks. *Oscar Hernández Lopez, Javier Sánchez Diaz de Rivera & Angela Durana Espinosa.*

This paper focuses on the second phase of research carried out at the Universidad Iberoamericana Puebla. The objectives of this study were: to orient students toward collaborative knowledge building, following Knowledge Building (KB) principles and supported by Knowledge Forum (KF); and to promote metacognition, or critical thinking using Bernard Lonergan's Transcendental Method that consists of four levels of consciousness: experiencing, understanding, judging and deciding.

This proposal of combining the principles of KB and TM allows for the reinforcement of the process of knowledge building and metacognition, achieving mutual feedback from both processes and advancement in individual thinking, as well as the building of the conceptual artifact to which the students are dedicated. The research demonstrates that the KF support can be used to apply pedagogical models which favor the consciousness of the students of their own educational process by building knowledge collaboratively.

(#52) Understanding knowledge-building in history: A requirements-gathering analysis using in-class and online exchanges. *Kevin O'Neill & Mark Weiler.*

This paper presents a comparative study of in-class and online exchanges directed at developing students' understanding of the knowledge-building practices of historians. The Knowledge Forum exchanges took place in 2004 between 10th grade social studies students and volunteer historians. The face-to-face exchanges took place in the same classroom, between students and a participant-observer who was also attempting to support them in carrying out historical research.

We style our comparative analysis of these exchanges as a form of requirements gathering, which is intended to feed into future design-based research in knowledge-building classrooms. Our analysis puts into relief some important limitations of primarily text-based telementoring, and suggests new ways in which telementors might be better enabled to support students and teachers in interpreting the unique knowledge-building practices of historians. Two particular avenues for improvement suggested by our analysis are a) furnishing classrooms with additional evidence of historians' practices and b) making use of Knowledge Forum video notes in a way that has not yet, to our knowledge, been attempted.

(#53) Interpersonal Dynamics in Online Courses: Challenges to Knowledge Building. *Vanessa Peters.*

This research reports the result of a study that examined the participation habits of 57 students enrolled in graduate level online courses. Using a questionnaire and interviews as data sources, the study revealed that students adopted practices that may be problematic in terms of fostering knowledge building. An analysis of the data found that while students do value the opportunity to work together with their classmates online, they do not necessarily consider their interactions to be true collaboration. Moreover, students reported that they often felt there were instances of peer competition within their online course. Implications for knowledge building are discussed.

(#54) How to improve supportive learning in teacher competence based education by a knowledge building community? *Bert Reijnen & Frank de Jong.*

In this session we want to interact with others about how we can use a knowledge building community of teachers, students and teacher-educators to improve our concept of 'supportive learning'. We invite people to share with us their experience about how to the start, facilitate etc. these kind of communities.
 Supportive learning is a method we use at Stoas Professional University in our competence based teacher education. Students can participate the curriculum as a full time, part time student or even already as a full time working teacher (workplace learning). In those three different educational contexts 'supportive learning' is a didactical and educational way our teacher education support the development of the students. After one year of experience divers dilemma's turned up and are a need for a process of improvement.
 This process of improvement we want to initiate by bringing teachers and students together. We are thinking of using the approach of Cultural Historical Activity Theory and the 'change labs' (Engeström) to facilitate the process of learning community. The ultimate goal however is improving the concept and practice of 'supportive learning' by knowledge building among the participants. So actually we want to interact with you about how to initiate and facilitate these kinds of learning communities in our Professional University in the context of teacher education.
 This interaction will take place in a way that ideas, and experience op participants in this session will be explicated in a short time so that sharing, discussion and learning from each other will be optimal.

(#55) Participation in Knowledge Building: An analysis of Online Discussions. *Hui Niu & Jan van Aalst.*

Questions about the suitability of cognitively-oriented instructional approaches for students of different academic levels (i.e. achievement levels) are frequently raised by teachers and researchers. Therefore, this study examined participation in knowledge-building discourse in two implementations of a short inquiry unit focusing on environmental problems. Participants in each implementation consisted of students taking one mainstream and one honors version of a tenth grade social studies course. We used server-log data to examine participation as individual actions in Knowledge Forum™ and conducted a verbal analysis of the total discourse by each collaborative group using knowledge building principles. We suggest the findings provide cause for optimism about the scalability of knowledge building across academic levels: – There was strong evidence of knowledge building in both classes by the second implementation. However, we failed to detect a strong relationship between individual actions in Knowledge Forum and knowledge building at the group level. Some suggestions for focusing online work more directly on knowledge building are offered.

(#56) A survey on Intelligent Agents for Learning Objects. *Dorian Stoilescu.*

The paper investigates how e-learning systems use learning objects and how are they designed using multi-agent strategies to explore opportunities to improve the teaching performances. The paper shows the functionality of different intelligent tutorial systems based on learning objects (LOs). Reusable LOs might constitute a foundation for large scale collaboration in education between different organizations. In order not only to have efficient and automate processing of LOs but also efficient social interactions and collaborative learning, Intelligent Agents (IAs) are highly

recommended. This paper investigates how these e-learning systems are designed, how student differences are explored, and, also, how are able to improve teaching performances.

(#57) Making Thinking Visible: Towards the Graphical Literacy Growth in Knowledge Forum. *Yongcheng Gan.*

It is inevitable in many ways that graphical literacy will have a greater weigh in a digital age, but few schools have paid enough attention to cultivating students' abilities of graphical literacy intentionally at an elementary level. This paper presented an effort to offer some ways of how to assess graphical literacy abilities of elementary students in grade 3 and 4. The progresses made by students were evaluated from quantitative and qualitative aspects. A coding scheme was also designed to measure their graphical literacy growth from eight perspectives. The results of varied analyses showed that students indeed made a great progress in graphical literacy after 2 years' learning, and it also confirmed that Knowledge Forum as a cognitive tool and learning environment could foster graphical literacy growth at elementary classroom, and graphical literacy is a by-product of knowledge building.

(#58) - Activity Theory for Assessing Progress in the Integration of Knowledge building Discourse into University Teaching. *Clare Brett, Thérèse Laferrière, Stefano Cacciamani, Nobuko Fujita, & Mercè Bernaus*

This interactive symposium will explore the application of Engestrom's activity theory framework (1987, 1998) for assessing progress as university teachers integrate online collaborative tools to support classroom-based knowledge building discourse in undergraduate and graduate courses and practica. To this end, four such activities and their concrete settings will be described and analyzed along this framework. In all four activities, Knowledge Forum was the tool of choice for achieving the agent's (the university teacher) object-outcomes within each community (classroom). Emerging roles will be identified as well as new rules and routines (patterns), including those that manifested themselves within the online classroom discourse. Following the ten-minute illustrative presentations, participants will focus the conversation on assessment, and identify issues pertaining to the study of the relationships between agents (users), tools (knowledge building conceptual and technological tools), and outcomes at knowledge building sites.

(#59) Identification of Potential Constraints Associated with Accessing and Participating in Knowledge Forum® Using Handheld Computers: A Pre-service Education Context. *Kim MacKinnon.*

This poster will summarize interview data from a case study, which is part of a larger doctoral research project, exploring the use of handheld computer technology to support student use of Knowledge Forum®. Four students were selected to participate in a short interview in which they were asked about their experience using the handheld computers as part of their pre-service course. Data analysis suggests in particular there may be psychological factors (Vicente, 2003), such as expectations related to perceptions of self ability, level of difficulty and the potential utility of the handhelds that may be of particular significance.

(#60) Pre-service teachers' online discourse in an hybrid environment: Student teaching, collaborative reflective practice and knowledge building. *Thérèse Laferrière & Stéphane Allaire*

The goal of this case study was to identify pre-service teachers' online reflective discourse patterns in a classroom-based community supported by an electronic forum during a four-month long practicum over a six-year period. All participating pre-service teachers went to the same professional development school (PDS) in their last year of their four-year degree in Secondary Education. This university-school partnership applied the professional development school model. The school had a student-owned laptop program. For six consecutive years, pre-service teachers' online discourse was analyzed, and discourse patterns identified. Socio-cognitive discourse dominated over socio-affective discourse, was deliberate rather than spontaneous, focused on problems or ideas, and was lightly devoted to the becoming of the networked community itself. Results indicate that, under such circumstances of use, electronic forums support collaborative reflective practice. Moreover, the online

discourse shows signs of an emerging knowledge building community on the networked classroom one-to-one laptop classroom.

(#62) Design Study Groups: Professional Development to Support Innovative Implementation. *Richard Reeve.*

To initially implement and subsequently to improve the Knowledge Building Communities approach teachers must themselves function as a Knowledge Building community (Reeve, 2002). This paper presents a version of professional development support referred to as a "design study group" where a small group of teachers and a researcher work together on one or more focused design goals during the implementation and refinement of the Knowledge Building Communities approach (Scardamalia, 2001). Data for this paper is drawn from a larger study that involved design study groups in 3 separate schools. The data for this paper focus on the design work done by one Design Study Group who worked on the implementation of the KB Communities approach in a public school setting over a 6 week period. Analysis of portions of the discourse indicates that there is a "design frame" that the group gets into that leads to discussion of new design solutions to aid the implementation of the KB theory in the specific setting. In addition the interview data indicates how important the teachers felt the interaction with the theory through the participation of the design researcher was to the resulting implementation.

(#63) Potential For Knowledge Building In Large Size Undergraduate Pharmacy Classrooms. *Debra Sibbald.*

University educators choose from a growing expanse of varied classroom and technological learning formats. This interactive presentation explores how face to face vs online resources fit effectively in course structure, addressing practices that support knowledge building. It will present preliminary findings in an exploration of the potential for knowledge building in large size undergraduate pharmacy classrooms.

As students, these participants represent the health professional adult learner. As a context for exploration, the situation characterizes the real world of curriculum refinement, progressively blending classroom, social and technological supports. As a lens for exploring outcomes, the setting offers a rich canvas of quantifiable measures. As a knowledge building community, this interactive ecology of researcher, teachers, observer/raters and participants affords multiple perspectives to assess perceptions of feasibility and acceptability of design modifications that may be of importance to broader knowledge society sectors.

This study examines outcomes related to the goal of collective responsibility for knowledge advancement. In what sense do classroom interventions and technological and social supports address issues of knowledge creation? Where is the room for student agency in a highly scripted context for classroom work? What indications are there of a link between student perceptions and knowledge advancement?

A set of iterative design enhancements of a constrained environment aligned to theory and computer technology will be presented. They include student input and innovative classroom dynamics for a group of 200 students. The lecture hall is converted to virtual patient-practitioner interactions through randomly selected panels where individual students solve gradually unfolding therapeutic cases combining Socratic discussion with role-playing moments. Pre and post class participation and assessment of student created testing are extended through a web-based discussion forum designed to support knowledge building.

Data linked to knowledge building indicators will include quantitative measures and qualitative survey results from student and teacher/observer participants. Two online student surveys compare design changes to traditional constructivist tasks; and classroom vs KF supports in Likert comparisons and free-response commentaries. Preliminary analysis of goals, knowledge building advancements and limitations will be reported.

(#64) Fostering Collaborative Knowledge Building Using Concurrent, Embedded and Transformative Assessment. *Eddy Lee & Carol Chan.*

We describe the design of a knowledge-building environment and examine the roles of knowledge-building principles as scaffolds for scaffolding collaborative inquiry. In particular, we aimed to examine the roles of assessment with knowledge building principles for students of different abilities Students were engaged in concurrent, embedded and transformative assessment – they assessed their own Knowledge Forum contribution using (a) rubrics of depth of inquiry and they wrote (b) group reviews and (c) portfolios to assess both individual and community progress. Four classes of 9th grade students in Hong Kong used Knowledge Forum (KF) participated: (a) Kb principles high-ability; (b) KB principle low-ability, (c) No Kb principle high ability, and (d) No kb principle low-ability. Results showed (1) Students scaffolded with knowledge building principles showed more participation and conceptual understanding than students working on KF with no principles, (2) Both high- and low-ability students using knowledge building principles improved over time but the effects were more pronounced with students in low-ability classes; (3) Students' participation on Knowledge Forum (ATK) was significantly related to their conceptual understanding, and (4) Analyses of knowledge building discourse and students' group review and portfolios illustrated collective knowledge advances -- Students extended their collective understanding by analyzing the discourse, and the portfolios scaffold the complex interactions between individual and collective knowledge advancements.

(#66) Content Analysis Tools for Knowledge Forum Discourse: Towards Intelligent Support for Knowledge Building Facilitation. *Nancy Law & Rong-Huai Huang, Huanglingzi Liu*

This poster describes work in progress in the development of some content analysis tools that will be continuously improvable with usage to help researchers and teachers to gain a better understanding of students' growth of knowledge, the extent of knowledge building and patterns of social, cognitive and metacognitive interactions. These tools will have the potential of becoming an integral part of knowledge building platforms to become online tools that extend the affordance of the platform, not only in social and socio-metacognitive affordance, but particularly in providing intelligent pedagogical support to teachers to teachers in the facilitation process.

(#67) Functional Affordances for Research and Developments in Knowledge Building. *Johnny Yuen & Nancy Law*

Computer-supported collaborative learning (CSCL) is getting increasing attention in formal education practices from elementary to tertiary and professional education around the world as a pedagogical approach of choice in the 21st century. Knowledge building is one of the CSCL theories that focus on knowledge construction as the collaborative intentional learning efforts of a community, and that learning at any level can also take place as knowledge building. This paper examines the kinds of functional affordances a technology platform for knowledge building should provide, reviews the availability of the identified functional affordances in some common CSCL environments and concludes by proposing an agenda for the development of a technology platform for knowledge building that will support pedagogical and research explorations in knowledge building.

(#68) - The quest for scaling up and sustaining the knowledge building approach in Hong Kong schools. *Nancy Law, Carol Chan, Allan Yuen, Johnny Yuen & Nicol Pan*

In this interactive session, teachers from Hong Kong will share their experiences in implementing the knowledge building approach in their teaching and their personal developmental trajectories from novices to knowledge building to experienced practitioners. The LCP team members will introduce the design and structure of the online course and reflect on their experiences and challenges over the past five years. Finally, the audience will be invited to share their experience and views on scaling up and sustaining knowledge building in schools.

(#69) Networked Foreign Language Acquisition: A Way to Increase Intercultural Communicative Competence by Knowledge Building Pedagogy and Technology. *Yingping Chen & Mingyu Ji.*

With the popularity of the Internet technology, Computer-Assisted Language Learning (CALL) has entered into the phase of network-based language teaching and learning (NBLTL), in which more synthetical language teaching approaches and network multi-media tools are employed at the same time to facilitate the process of foreign language acquisition; in which more intercultural contacts take place in the virtual learning communities consisting of world-wide learners from linguistically and culturally diverse background. In consideration of this complexity of networked language learning environment, the paper proposes that there is a need to increase foreign language learners' intercultural communicative competence by knowledge building pedagogy and technology.

(#70) Students activity in on-line University course: toward a Knowledge Building Community. *Stefano Cacciamani.*

This research concerns the participation of 5 students in a University on line course designed according to Knowledge Building Community Model's principles, that foresee to create a community of inquiry oriented to build new knowledge. The main goal was to verify if the students progressively undertake an active role in their study activity, turning effectively from a learning community into a community of inquiry. A method combining quantitative and qualitative analysis of interaction in the on-line environment was used. The results show, from the beginnings to the end of the course, with regard to the "knowledge building activity", an augmentation of notes written and of the exploration of problems. Also, the "co-operation" among the participants moves from a "teacher centred" structure to one "distributed within the community".

(#71) Motivation Types in Knowledge Building Project Settings. *Angela Chow & Nancy Law.*

This study aimed to identify possible motivation types in knowledge building projects settings. Cluster analysis on three independent data sets (n=258, 256 & 160) repeatedly identified five motivation types, ranging from most motivated Collaborative Inquirers, Project Achievers, Task Learners, Ambivalent Students, to Amotivated Students. Quantitative comparison on the Knowledge Forum usages as well as the qualitative comparison on the online notes of these five motivation types indicated the validity of this classification.

(#72) Exploring the Application of Information Skills (Big6) in Project-Based Learning of Form 3 Students. *Helen Wong, Pui Man Cheung, Tajan Wong & Bik Man Kwok*

Because of the rapid growth of information technology, information literacy becomes an important ability in the knowledge age. In the knowledge age, teacher librarians now have to change their roles from simply caring the libraries and catering for library users to teaching students information skills. In this research, we explored Form 3 students' ability to apply the information skills (Big6) in Project-based learning. We interviewed 20 Form 3 (Grade 9) students doing project after teaching them the Big6 skills see how these help them complete their projects. Findings suggest that most students relied heavily on the Web information when doing their project work. However, they lacked the knowledge in finding relevant information via on-line encyclopedias such as the online Encyclopedia Britannica. All students agreed that the Big6 skills assisted them in problem solving in their daily lives. They applied these skills mainly in doing homework. In addition, some students thought that the skills were useful for solving daily problems, such as finding the weather forecast or bus route, looking up vocabularies from the on-line dictionary, and getting some animations when making posters or cards.

(#73) How systematic introduction of knowledge building principles affects children's understanding of knowledge building and of scientific concepts. *Zoe Donoahue & Richard Reeve*

Our overall project goal was to explore the effect of systematically introducing six of the twelve Knowledge Building (KB) principles (Scardamalia, 2001). Knowledge Building is a technology supported educational approach that allows students to work collaborative to build knowledge. The

approach is defined through twelve core principles. The six focal principles for this study were introduced through an inquiry-based science unit entitled, "The Ways of the Earth". This study determined that three KB Principles (Improvable Ideas, KB Discourse and Rise Above) seemed most important to address explicitly, and the other three (Read Ideas, Authentic Problems, Constructive Uses of Authoritative Sources and Idea Diversity) could be dealt with in an implicit way, arising from work on the other three. Addressing the principles of Improvable Ideas and KB Discourse explicitly would seem to be most important for a teacher and students beginning to work together in a KB classroom. Our hope in doing this study was to begin to develop a model for how teachers new to Knowledge Building could begin to introduce this innovation in their classrooms.

(#74) A study of Collaborative Information-Seeking Behaviour of Hong Kong Form Six Students. *Wai Hing Fung, Siu May Li & Pui Yan Wong.*

   We report a qualitative exploratory case study of collaborative information behaviour (IB) by Form 6 (Grade 12) Hong Kong students who were engaged in project-based learning. As information-seeking process is an important part in project learning, we examined students' information-seeking behaviour through project learning activities, using Kuhlthau's (2004) Information Search Process model as a conceptual framework. The participants were 18 Form 6 (Grade 12) students taking Liberal Studies. Data sources included a questionnaire, search logs and search diaries, and interviews with five of the students. The analysis examines students' movement through the six stages of Kuhlthau's model. We discuss Implications for the changing role of teacher-librarians as information specialists.

(#75) Audio-visual Documentary about COMconeixer Project (Catalonia). *Mireia Montane & Nicole Denayrolles.*

   The audio-visual documentary presents the educational project COMconèixer that is developed in 10 schools in Catalonia; it promotes knowledge building and creation in a collective and collaborative way ("co-elaboration of knowledge"). Its objective is learning how to go into real questions in depth and how to build theories together, so that one can explain those questions and new knowledge. The project includes the use of Knowledge Forum. It started off in 2005, the participant teachers are now in their second school year of practice. The audio-visual documentary have been made following students and teachers in their experiences.

(#78) Why the Spiral Moved? – Seeking for Knowledge Building. *Aik Ling Tan, Seng Chee Tan & John Ow.*

   This paper tracks the learning experiences in science of three students using Knowledge Forum. We examine the interaction process, in particular the seeking patterns that result as the three students explore and build the knowledge of convection current. Using micro-analysis of contribution on Knowledge Forum and principles of analysis of electronic interaction and discourse proposed by Zhu (1989), this paper analyses the forms of participation a student can assume, focusing mainly on the different forms in which students seek information as they navigate through the sea of information posted online. Using a grounded approach, we characterize two different ways in which students seek for information in an online environment, which we labeled as interpersonal seeking and collaborative seeking. We believe that the seeking behavior, albeit subtle, is instrumental in directing learning and directing the courses of 'discussion' and the quality of the knowledge that is built.

(#79) Online Assessment Tools to Evaluate and Drive Knowledge Building: Technical challenges, solutions and progress. *Eero Uusitalo, Ann Russell & Kirsti Lonka.*

   Understanding the sociocognitive dynamics of knowledge creation (Scardamalia, 1993) is a significant challenge for educational researchers and the INE research theme addressed by this poster. A hallmark characteristic of a knowledge building communities is collective cognitive responsibility for idea improvement (Scardamalia, 2003). In this research, we used an online assessment tool to evaluate how and if a group of health care professionals took responsibility for idea improvement in their daily work. Since knowledge building is not an end state, we contend that

what is needed are tools that better evaluate the trajectory of knowledge building over time (Russell, 2005), especially for novice and beginning communities. A major consideration in our choice of the social network analytic tool called TeCFlow (Gloor& Zhao, 2004) was its ability to visualize the temporal dynamics of knowledge creation. Rather than presenting snap shots of change over time, TeCFlow is able to visualize the ever changing social landscape of actors and ideas in text based databases. This poster reports on the challenges, solutions and progress to date using a temporal SNA tool to evaluate knowledge building. The main challenge reported in this poster is the data conversion problem. The solution provided and major deliverable of this research, is the script authored by Eero Uusitalo which converts Knowledge Forum data to format compatible with TeCFlow's architecture. Next, we describe the progress made in our analytic understanding of the sociocognitive dynamics of knowledge building in this health care context. Finally, we conclude with some design recommendations for embedding online assessment tools in knowledge building environments to provide concurrent feedback and drive knowledge building.

(#80) Using Pre-Compiled Keyword Lists for Keyword Extraction in Knowledge Forum. *Kateryna Zolotkova & Chris Teplovs.*

Automatically extracting keywords from notes in Knowledge Forum has various applications. For example, it is useful if one wishes to know what topics a note or a group of notes covers, or to compare the content of notes with other notes or with non-Knowledge Forum texts such as textbooks or curriculum guidelines.

This paper examines what kind of keywords need to be extracted to be able to reflect the content of the note accurately, and the methods of extraction. It is proposed to search the target text for topic-specific keywords that will be contained in pre-compiled word lists. If a particular keyword is found in the target text, it will be extracted. Advantages and drawbacks of this method are discussed, as well as methods of integrating keyword lists into Knowledge Forum.

(#81) Knowledge Forum and the Dynamic Education Plan. *Judith Kimel & Richard Reeve*

This poster reports how a traditional Individual Education Plan (IEP) can be managed using a collaborative on-line learning environment (see bottom left). In this particular case study the 'Dynamic" IEP (DIEP) was placed inside a Knowledge Forum database (see bottom left for details) to encourage team collaboration on the common and shared goals. At the bottom of the poster you can see a sample of the communication that passed between team members in the DIEP database.

The objective of this research was to determine how frequent communication in a shared problem space would impact practice and whether it would allow the team to function as a more holistic unit, thus impacting the IEP program and the child's progress (see the graphic in the center of the poster). Evaluation of this objective can be seen in Perspectives Chart and the Database Statistics (right side of the poster) that offer information regarding participants' engagement with the Dynamic IEP database. Team members' personal thoughts and impressions are also presented in the Perspectives Chart (far right). Findings and future plans are discussed in the upper right portion of the poster.

(#82) Mobile Knowledge Forum. *Max Karlin & Chris Teplovs.*

Knowledge Forum is a tool for knowledge-building. It is a collaborative effort that facilitates and encourages learning and deeper levels of understanding. This growing body of information and new knowledge created through sharing and collaboration is accessible by anyone with a personal computer. The logical next step is to further the reach of this tool. Mobility is more than a buzzword, it is the freedom to participate in and benefit from knowledge-building without being confined to a desk. A mobile client is being developed that aims to do just that: make the Knowledge Forum accessible to anyone with a mobile device.

Mobile devices differ from personal computers in processing power, display size and input methods. The current version of the mobile client for the Knowledge Forum enables a user to login, select a view and read/edit/create notes. A 2-dimensional graphical interface is used to navigate the notes, see connections between notes and select individual notes for viewing and editing. The mobile application is currently being developed for PDAs. Because of the cross-platform nature of Java, the effort required to enable this application's use on cell phones and other mobile devices will be

minimal.

Access to knowledge has enabled advancements in collaborative knowledge-building. The existence of a mobile application provides the freedom to choose where and when you want to access a Knowledge Forum to contribute, learn, work or just browse the existing body of knowledge.

(#84) What does it mean to be a knowledge builder?: Understanding how students come to understand new modes of inquiry. *Katerine Bielaczyc & Peter Blake.*

As new models of teaching and learning are introduced into classrooms to address the demands of 21st century education, students are asked to engage in new modes of inquiry. Such modes of inquiry may be very different from the ways in which students learn in more traditional classrooms. We are interested in the ways in which students navigate such changes, and their implications for how students come to understand new modes of inquiry and themselves as learners. Over the past few years, we have been studying one well-known model of collective learning with new computational media, the Knowledge Forum classrooms of Scardamalia and Bereiter (1991; 1994). Creating a Knowledge Forum classroom typically involves students in shifting from more traditional classrooms focused on individual learning to classrooms that function as knowledge building communities. The work reported in this paper specifically focuses on a group of students and teachers who implemented the Knowledge Forum model over the course of two years. Student interviews and survey data collected in both years are used to investigate students' change processes. For example, one analysis focuses on what we term "epistemological shifts." Three epistemological changes identified as critical in the Knowledge Forum model are investigated: a shift from teacher-directed activities to student epistemic agency, a shift from right and wrong answers to the notion of improvable ideas, and a shift from individual to community knowledge and collective responsibility. There are indications that shifts are indeed taking place in students' views toward their own agency in the learning process, the dynamic nature of knowledge, and the importance of community. Another analysis focuses on conceptions students develop of epistemic agency, knowledge, and community within Knowledge Forum classrooms. The analysis is based on what diSessa (2006) describes as a distinction between the *coherence view* and the *fragmentation view* of conceptual change. We identify students' conceptual fragments of knowledge building, contributing a new view of student conceptual change in Knowledge Forum classrooms. In addition to informing educators about student change, the work also identifies challenges faced by teachers in implementing new models of learning that can inform teacher pedagogy.

(#83) Suggested Methods of Automatic Literacy Assessment in Knowledge Forum. *Kateryna Zolotkova.*

This article discusses methods of automatic evaluation of literacy of note contributors in Knowledge Forum. In particular, several lexical, syntactic and discourse features are introduced. These features can be used to reflect the change in literacy over time. Methods of measuring these features are shown. Most of the features are adopted from studies done in automatic and manual literacy evaluation and essay grading, as well as language acquisition. Some measures are adjusted to accommodate the specific properties of notes in Knowledge Forum which are different from essays.

(#85) A five-year longitudinal study examining conditions that advance self-directed professional development among novice elementary mathematics teachers. *Suzanne De Froy.*

Findings are presented from a five year longitudinal study that follows a group of self-declared math anxious teachers inducted in a two year program (N=20 from a total cohort of 57) and their first three years as elementary teachers when they agreed to participate in a self-directed professional development design experiment known as The MathForum Group. Two conceptual frameworks have been developed which holds promise for future research, illustrating how teachers work with knowledge and ideas based on Knowledge Building research (Scardamalia & Bereiter, 2003). For a number of participants in this study, mathematical ideas, questions and problems progressed to deeper levels of complexity and resolution creating conceptual movement. Implications for design research, and building community are presented.