Abstract:
Distance Learning as Knowledge Building;
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Teaching for understanding is a desirable purpose for schools. The concept of understanding, however, is elusive and generally ignored in instructional design, and supplanted by observable and measurable objectives in conventional and distance education. Building on a description of everyday understanding, knowledge building pedagogy based on the "production and continual improvement of ideas of value to a community" is explored for implanting in a cross-cultural and international setting with college level ELT students. It appears that knowledge building is drastic enough to require assistance for satisfactory implication. The pilot study failed to collect sufficient data to compare it with another course taught by same pedagogy in a conventional face to face class, which revealed substantial student involvement and deeper inquiry and understanding by students. Probable causes are discussed and suggestions are made for improving further research.

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Teaching for understanding is a desirable purpose for schools. The concept of understanding, however, is elusive and generally ignored in instructional design, and supplanted by observable and measurable objectives in conventional and distance education. Building on a description of everyday understanding, Bereiter (2002) argues that the sort of understanding required in schools, that of theoretical understanding, can be treated as similar to understanding people and tools. He postulates that getting familiar and deepening relationship with conceptual artifacts is a functional definition of understanding, an abstract but sufficiently practical for the purposes of teaching for it.

Collaborative technologies that are based on suitable epistemological, social and pedagogical infrastructures may have significant effects on student learning and joint knowledge advancement skills. Students, who are engaged communal knowledge building based on problems of understanding, will collaborate not only in learning but also in producing knowledge as a product and learn how to work with knowledge as an abstract entity. They will offer theories or conjectures to advance their understanding about the issue at hand, constructively criticize theories of each others and advance not only their own personal knowledge but also the level of knowledge of their community. Similar communities of knowledge building can be formed between different cultures in order to investigate the limitations and constrains when cultural boundaries are expanded.

Bereiter and Scardamalia developed a pedagogy based on the "production and continual improvement of ideas of value to a community" (2002). Knowledge building is an epistemology and pedagogy where a student community collectively deals with problems of understanding about a topic in order to advance the groups knowledge and deepen their understanding with individual learning and understanding as a by product, working in an intentional learning environment. Dubbed as *learning as knowledge building*, the discourse is supported and sustained with an educational technology called "Knowledge Forum", designed as a computer supported intentional learning environment. KF and classroom discourse are complementary in conventional classroom.

A distinguishing factor amongst the best practices of distance education is collaborative learning of students who work together for a common instructional goal, as opposed to individual work or cooperation. Collaboration is a deep, goal-based, active and constructive learning for the participants. Tele and video conferencing and web-based environments are common technologies for such collaborations that connect distance learners with supportive instructors and staff. Converging knowledge building with distance education is conceptualized as having distance learning going beyond the best practice of collaborative learning, which is based on a sense of social climate and community with knowledgeable instructor and student services supporting the proper use of technologies for educational purposes. Convergence is expected to go beyond individual learning by enabling and sustaining group-level learning. A virtual environment can facilitate students' conceptual understanding of complex ideas and support the distribution of their expertise, collaborative organization of their knowledge and advance their communal understanding.

Bereiter and Scardamalia (2003) expound on this convergence as follows:

> "Theoretically it should be possible to get from distance learning to knowledge building. However, designs have not advanced in this direction. Courseware, for instance, has come to include administrative systems that facilitate the creation of course lists, presentation of course outlines, and compilation and reporting of grades. Users become increasingly dependent on these adjunct facilities to run their courses. This fine-tuning of environments for specific educational activities leads to the need for different online environments for different purposes. KBEs [Knowledge Building Environments], in contrast, aim to make explicit and support interactions that lead to knowledge advances across a broad array of contexts."

Bereiter (1990) argues that all learners develop "contextual modules" that are interdependent "complex of knowledge, skills, goals, and feelings" triggered when learners face a difficult task. Such modules provide a coherent response to most anything in that happens in school. "Schoolwork Module," for instance, treats all challenges as "work that is too hard." To cope, students use various stratagems such as "obstructive procedures" or "getting the teacher to take over the cognitively demanding parts of the task." "Intentional Learner Module," on the contrary, is organized around different goals; "goals of personal knowledge construction rather than goals of task performance" (p. 616). "Intentional Learner Module" accomplishment of difficult task enriches the students" self-concept, whereas "Schoolwork Module" seeks to complete, negotiate or evade the immediate task (Bereiter & Scardamalia, 1989).

Cross-cultural experiences can be most fulfilling and enlightening for all sides if it takes places in independent conditions of discussion which is free form all constrains of domination with equal chance to share and contribute by all. This is the ideal to strive for, hopefully, based on reasons that are more than only romantic.

In order to explore distance learning as knowledge building in an international and cross cultural setting, a pilot study has been conducted between Japan and Turkey. Participants were college students studying ESL and they are taking courses with overlapping topics in their respective programs, one of which was considering the culture of the target language in respect to its role and extent of its inclusion. Their language of communication was English. Both instructors were not familiar with knowledge building epistemology and pedagogy and agreed to give credit to eight volunteering students for their collaboration. The pilot was conducted to evaluate the feasibility of such an international collaboration. The researcher employed knowledge building in his own teaching and researching KB in conventional college settings. One of the twelve knowledge building indicators is epistemic agency of students which is a personal sense of direction, power, motivation, and responsibility for his learning and understanding. Epistemic agency is generally taken over by instructors in instruction, which can be conceptualized as a joint cognitive process (Bereiter and Scardamalia, 1989).

Method

It was hypothesized that students will be likely to collaborate on the given problem of understanding, because such problems require getting "deeply into subject matter and into the cognitive developmental and instructional research in the various domains". On the

other hand, they are also likely to have their "Schoolwork Module" triggered in order to diminish the work for written performance.

Data sources are twofold: 1) The Analytic Toolkit for (ATK) Knowledge Forum (Burtis, 1998), which was used to obtain quantitative information about how students are using Knowledge Forum in a given time period. Such indices also provide some preliminary information on knowledge building activity. 2) The text contributed to the database by the participants. 3) The researcher who employs Knowledge Building pedagogy in his teaching and taught the course that is compared with the international collaboration.

Results

The results are summarized in tables in terms of general knowledge building criteria as generated by Analytical Tool Kit (ATK). The ATK results are supplied for a representative conventional course that is taught by knowledge building pedagogy.

Table 1: Selected Knowledge Building Indices for a collage course.

Student	# Notes Created				% Notes Linked				% Notes with Keywords				# Scaffold Supports Used				# Note Revisions				% Notes Read			
	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2	P3	P4
S1	3	3	0	0	*	*	*	*	*	*	*	*	2	4	0	0	0	0	0	0	38	61	49	3
S2	2	7	3	2	*	71	*	*	*	14	*	*	3	6	3	5	0	15	14	0	28	86	73	28
S3	0	7	0	9	*	86	*	78	*	0	*	78	0	8	0	13	0	0	0	2	25	46	0	54
S4	1	7	2	5	*	71	*	*	*	0	*	*	0	5	2	4	0	0	0	0	94	59	9	41
S5	1	2	12	4	*	*	100	*	*	*	25	*	0	0	4	0	0	0	1	2	10	24	47	45
S6	1	11	0	4	*	82	*	*	*	9	*	*	1	13	0	8	1	6	0	3	51	62	5	36
S7	0	4	0	7	*	*	*	100	*	*	*	43	0	6	0	8	0	1	0	1	0	38	4	39
S8	5	11	0	0	*	*	*	*	*	0	*	*	7	12	0	0	7	8	0	0	84	99	87	6
S9	2	11	0	0	*	*	*	*	*	0	*	*	2	16	0	0	1	2	0	0	53	85	16	5
S10	2	3	4	5	*	*	*	*	*	*	*	*	2	4	5	5	2	3	0	1	54	61	51	46
S11	4	3	5	4	*	*	*	*	*	*	*	*	4	3	4	4	1	0	1	0	21	17	25	13
S12	2	3	0	0	*	*	*	*	*	*	*	*	4	3	0	0	0	0	0	0	94	23	0	10
S13	3	3	3	4	*	*	*	*	*	*	*	*	3	2	4	4	0	1	1	1	72	61	62	21
S14	2	2	2	2	*	*	*	*	*	*	*	*	2	2	2	2	0	0	0	0	65	29	20	23
S15	6	11	8	16	*	91	88	100	*	9	25	31	7	13	6	18	2	5	8	38	82	71	91	90
S16	4	2	4	0	*	*	*	*	*	*	*	*	4	2	5	0	4	3	4	0	97	61	98	28
S17	5	10	0	10	*	*	*	70	*	0	*	10	8	9	0	10	1	5	0	8	82	64	7	43
S18	3	6	0	2	*	*	*	*	*	33	*	*	0	1	0	0	0	9	0	4	24	36	0	6
S19	5	4	3	0	*	*	*	*	*	*	33	*	5	5	3	0	1	1	1	0	69	30	89	19
S20	5	16	2	4	*	88	*	*	*	6	*	*	5	14	3	4	6	15	4	11	59	39	9	19
S21	3	8	4	2	*	75	*	*	*	13	*	*	4	8	2	4	0	0	0	0	22	100	85	36
S22	2	5	1	0	*	*	*	*	*	*	*	*	4	4	1	0	1	1	1	0	59	40	29	9
Mean	2,8	6,3	2,4	3,6		81,9	94,0	87,0		5,1	25,0	20,5	3,0	6,4	2,0	4,0	1,2	3,4	1,6	3,2	53,8	54,2	38,9	28,2

Notes. P1 = Weeks 1-3, *P2* = Weeks 4-6, *P3* = Weeks 7-9, *P4* = Weeks 10-12. Percentages in parentheses are based on small note numbers (<7) and have not been included in the means.

The indices of database usage by individual students in two courses, obtained with the Analytic Tool Kit include: 1) The number of notes created; 2) the percentage of notes with links to other notes; 3) the percentage of notes that have keywords; 4) the number of uses of

scaffold supports; and 5) the percentage of notes in the database that a student has read. Keywords allow participants in the database to search for notes depending on the keywords identified in each note. Scaffold supports are flags that can be used to mark up a piece of text within a note. Scaffolds such as "My Theory" or "I Need to Understand" can assist students in communicating the purpose of their contribution. The table has data for four periods of three weeks out of total twelve weeks. Students were introduced to knowledge building pedagogy in the P1 and were encouraged to contribute in the remaining periods.

Note that S15 have created the most number of noted evenly distributed over the periods. Qualitative analysis showed that many of these notes were of high quality, making reference to specific statements in earlier notes and the literature. S21 has high quality notes even though the number of notes created is much less. Most students commented that their written work does not really do justice to how much they were mentally engaged about the problems of the course both in and off the meetings. One student commented in English that "my mind started to question everything suppose[ly] it knows", and many others felt that the KB discourse influenced their perception of other courses they were taking at the moment. So much so that one student commented that "my wanting to discuss with my friends everything I read so that it becomes more meaningful has discouraged them from studying with me".

Table 1: Selected Knowledge Building Indices for a the international collaboration.

Student	# Notes Created	% Notes Linked	% Notes with Keywords	# Scaffold Supports Used	% Notes Read	# Note Revisions
S1	0	0	0	0	76	0
S2	0	0	0	0	0	0
S3	1	0	100	0	24	0
S4	1	0	0	0	76	0
S5	8	8	50	13	94	11
S6	4	0	75	50	82	0
S7	0	0	0	0	6	0
S8	1	0	0	0	100	0
S9	0	0	0	0	65	0
S10	0	0	0	0	0	0
S11	0	0	0	0	6	0
S12	0	0	0	0	6	0
S13	0	0	0	0	0	0
S14	0	0	0	0	0	0
S15	0	0	0	0	0	0
S16	0	0	0	0	6	0
S17	1	1	100	0	41	2
S18	0	0	0	0	0	0
Mean	0,9	0,5	18,1	3,5	32,3	0,7

Conventional KB class shows an apparent decline of participation in the third and fourth periods, which are periods for the midterms and approaching finals. Most students

commented that those were the times they spend most of their KB time mostly reading and either postponing or giving up on written contribution even though they felt that they should contribute. It is likely that the challenge of writing and knowledge building had triggered their schoolwork module.

As for the collaboration of Japanese and Turkish students, the following table shows only the totals and percentages per student due to the lack of contributions made (see the discussion section for probable reasons). In fact, there was only one area (view) that contributions were made in an effort for knowledge building.

In addition to knowledge building indices supplied by ATK, selective student comments are deemed as relevant under pedagogical and practical principles transformed from twelve the knowledge building principles or "determinants" by Scardamalia (2002) into four in order to make principles more articulate and easer for teachers in their instructional actions (Oshima, 2005).

Student ideas should always be at the center of their practice: KB is based on students working on problems of understanding that progresses through knowledge advancement based on their ideas. Even though student ideas are valued in conventional classrooms, they are not at the center, usually incorporated as an element to get to preordained instructional goals. Neither students not teachers are not used to idea centered pedagogy. In KB, Knowledge Forum (KF) provides an environment for classroom community to present, organize and work on their ideas, represented as notes.

- "we mostly contribute our own ideas, we revise our collected effects and impressions about the topic under the light of our current thought and expressions as we form our ideas."
- "the course was in such a format that we were directed to what needed to be learn not only from our own writing but also from our friends" and from the classroom discussions."

Student learning should be structured in such a way that every student should have their cognitive responsibility: each member of a KB community should contribute to knowledge advancement by exercising their cognitive responsibility. Unlike experts at other communities, students cannot relate their own learning to the learning of other students. Authentic problems, however, that are stimulated by their own questions lead to inquires that really matters for the students.

- "There are other changes in my life due to this lesson: most generally I am no longer accepting the facts as they are given to me, I am judging the events and the given. Via this lesson I realized that I can the right of building my own knowledge and this gave me joy of learning really. In the past I was more concerned about the solving the problems in exams. But now, maybe still I am concerned with the solving the questions but I also begin to try to create my own perception for the subjects that I study. This gave me the joy of doing something for myself as I am studying with my subjects or dealing with other things such as reading, writing or even watching films."

- "Producing…to me that is the most proper term to describe this course. We are so used to consume in the system we live and grew up with that we expect to be given everything ready for immediate consumption, and that includes knowledge as well. I think this course raises the consciousness to produce in us, again. We produce our theories by thinking, researching and discussing about them. That must be why we were perplexed at the beginning. Now we know better, as we advance in building knowledge and meetings become more interesting each and everyday."

Communication in different group sizes should be encouraged and supported with different media: conventional classroom work is either small groups or as a whole class activity. KF provides students to work as intra and inter-group with no restrictions, providing a structure to work from individual ideas into more collective ones.

An example discussion was about placing the KF in the often used quadrant for distance learning which included time and place dependent instruction, such as conventional ones, time independent but place dependent, like booking for a video to be watched in a library, place independent but time dependent, as that of TV broadcast of lectures, and time and place independent instruction, the occasion that it can be accessed from different locations at different times. (Since student comments were made in Turkish, a short account is provided below).

- KF was accessible through internet during the total course period. Several students engaged in this discussion and one commented that KF was time and place independent. Another argued that KF was "elastic like a rubber band" showing all the characteristics. Two others confirmed that it was the case. Final two contributions put their knowledge together that far. One argued that ideally KF was time and place independent but was also capable and employed in other occasions. The last note summarized how discussion had evolved as they build their knowledge about it, and that all understood the flexible character of KF.

Students have opportunities to think of their problems, organize ideas, and reflect on their progress towards what they want to understand: students rarely influence the process of what to learn and how in conventional classrooms where teachers assume the metacognitive role and reflect those decisions in their instruction. This epistemic agency is gradually taken over by students in KB as they collectively elicit, organize and work on improving their own ideas, as well as monitor and reflect on their own learning. Teachers become more of a participant in the community with a supervisory role on the activities.

- "there were moment when I felt like I was rediscovering the wheel. As well as moments that a new path was suddenly revealed before me."
- "I must admit that these questions are really good-quality stuff ("Why do I have to learn this?" and "What is education good for?"). However, these questions are very DİFFİCULT to give an answer. These are so good questions that I am even afraid to try to give an answer of mine because I think that it would be INADEQUETE and simple. I have begun to realise that answers to these questions are more difficult to give than an answer to any of memorization related course. In other courses in books the right answer is given and we need to memorize but here we are required to do

more than that; much more than that. I am not complaining but I think this course will not be so easy; it is HARD.THINK THINK AND THINK…"

- "Via class discussion, in which everyone has equal chance to say what s/he thinks about, each student is provided to learn what others believe in or think about the facts. In addition via the discussion we are not limited and bored with only one subject, any moment in the lesson a new point may appear and you can learn something about it, as well. I think this is main reason why the lesson is so fluent."

Conclusions

Initially it was hypothesized that students will be likely to collaborate on the given problem of understanding and they were also likely to have their "schoolwork" module triggered in order to diminish the work for written performance.

In conventional classroom settings with an integrated knowledge building discourse of classroom meetings and participation through Knowledge Forum, students regularly collaborate to advance the classroom knowledge along with their personal understanding about the problems they work on. In the pilot study, however, there was not enough participation that could be accounted for through the KF database to support a community-wide collaboration. Among the likely reasons for such lack of participation can be suggested as follows:

- Both instructors were not familiar with knowledge building pedagogy
- Instructors were not able provide support for KB, as both had employed other conventional pedagogies
- Both instructors have pushed participation only when they assigned it
- Participants took on their affair as an assignment for course credit that was about 10 % of their grade with no net criteria but just participating.
- Participants were not given an initial training on how on KB as well as how to work in KF, each was provided by the researchers as text on the KF.
- It is possible that the distance knowledge building by collaborating through Knowledge Forum was not an significant part of the classroom culture
- A few of the notes were written as letters in response to a contribution by another participant; either they did not apprehend the communal nature of KB, though written in explanatory texts, or the they preferred letter as a proper genre for international and intercultural communication with newly acquainted people.
- One Turkish and one Japanese participant contributed most of the KB related work. The Turkish student who took a class from the researcher previously showed characteristics of a knowledge builder, and was familiar with the pedagogy.

As for the triggering of schoolwork module when faced with coursework that needs to be completed, the Japanese-Turkish collaboration in question did not yield substantial data to review. Psychology of writing beyond knowledge telling requires the writer to consider what to write along with how to write through a cascade of content and stylistic decisions made in tandem. Most students, however, revert to strategy reminiscent of speaking, usually with on liners that lack coherence throughout the paragraph and the whole text. Such a strategy is called "knowledge telling"; similar to a strategy some students employ when reading text to be tested from as they process each sentence as a unit and judge it to be relevant or not for the test purposes. This strategy is aptly called "copy-delete" as the

sentences deemed relevant is earmarked and others forgotten (Bereiter and Scardamalia, 1988). McDiarmid and Vinten-Johansen (1997) report that some of the students who were engaged in a sophisticated verbal discourse in a class for writing historical narratives turned in surprisingly stagnant written work. They suggest that difficulty of writing triggered schoolwork module in those particular students. Students in the conventional verbal and written KB discourse often comment on the difficulty of providing written comments as opposed to talking, which they find much easier. Substantial portions of their written contributions are riddled with improper punctuation and some incoherence leaving the impression that they were mostly concentrating on the content.

The pilot study revealed that knowledge building is too different from conventional instruction that appears to trigger schoolwork module more often than not. Suggestions for a more extensive and inclusive study are as follows:

- There appears to be a need to train students on the basics of knowledge building pedagogy and how to use Knowledge Forum.
- There is a need for immediate support for students who often struggle to understand what is required of them as coursework, usually falling back to concentration on the amount of work and its presentation rather than its quality.
- Virtual site visits for exemplar KF databases can be arranged for students to find out how other students dealt with KB and KF.
- As a voluntary assignment, the pilot was only partial and short. Extras are the first to fall in the wayside when coursework pressure in on the increase for students. Therefore, using KB and KF as the integral parts of a course, as it was in the face to face course that was used for comparison, will unsure student participation.
- Sometimes cultural differences are is easier to cope face to face. Written communication can stifle the contact and impair developing a working relationship. Even though students can all use English and were ELT students, some visual contact, such as video conferencing, may help the forming of a community. This may be difficult to arrange and work around in distance learning situations where mostly individual work is the defining characteristic, despite the fact that best practices are the collaborative ones.

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