

Symmetric Knowledge Advancement: Creating Knowledge Building Culture in Upper Grand District School Board

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Abstract: A dramatic shift in the traditional mind-set of teachers and the culture associated with teaching practice is a knowledge-age imperative. 21st century education requires acculturating students into a democratized knowledge creating culture in which students can participate and that they can contribute to the knowledge advancement of others. Knowledge Building (Scardamalia & Bereiter, 2003) represents a particularly demanding model and pedagogy for new forms of teacher-student engagement. Teachers and students embrace the complexity of real-world problem solving and take collective responsibility for symmetric knowledge advancement. The broader research aims to investigate the diffusion of Knowledge Building pedagogy as an educational innovation across Ontario schools in a supportive culture for transforming educational practice. The ongoing research will provide a detailed account of Ontario's uptake of Knowledge Building, however this study will present preliminary findings. The inquiry of diffusion of Knowledge Building is investigated through a qualitative approach from conception of the case study in order to illuminate the ways of how educators can seed a knowledge creating culture at school and district level through a case of specific school board.

Introduction

Alignment of schools to knowledge society goals and challenges represents a dramatic shift in the traditional mind-set of teachers and the culture associated with teaching practice; this shift in mind-set is a knowledge-age imperative (Fullan, 2007). Teachers play a critical role in actualizing change in schools (Desimone, 2009; Edwards, 2012). To meet standards-base improvement teachers must be in position to engage students in new programs and practices to achieve higher-order competencies (Birman, Desimone, Porter, & Garet, 2000; Darling-Hammond & Richardson, 2009) and implement contemporary pedagogical practices effective for teaching their subject (Blank & de las Alas, 2009).

Knowledge Building (KB) --the production and continual improvement of ideas of value to a community (Scardamalia & Bereiter, 2003)-- represents a particularly demanding model and pedagogy for professional development and new forms of teacher-student engagement, as it adds the need to enculturate students into knowledge creating cultures in which teachers and students alike embrace complexity of real-world problem solving and take collective responsibility for knowledge advancement. Knowledge Forum (KF) -a Computer Supported Collaborative Learning environment- serves as a supportive technology in KB process. Scardamalia (2004) defines the aim of the design of KF as; "(a) to make advanced knowledge processes accessible to all participants, including children, (b) to foster the creation and continual improvement of public artifacts or community knowledge (Scardamalia, 2002), and (c) to provide a community space for carrying out this knowledge building work collaborative" (p.183).

Research context and current project

The adoption of KB as a substantial theory and pedagogy (with KF as a CSCL technology) that addresses authentic problems, complex thinking skills, and collective cognitive responsibility has been realized as a natural process within a systematic project run by Ministry of Education at the following stages.

In addition to the researches with the major project of CSILE, Bereiter and Scardamalia have been growing out KB pedagogy at laboratory schools at the University of Toronto since the 1980s. The international research community has been also sustained by the Institute of Knowledge Innovation and Technology (IKIT) with the Knowledge Building Summer Institutes since 2003. However, the research and practice of KB in Ontario used to be limited with the laboratory schools and university courses. A special effort for the diffusion of KB pedagogy and technology among the public schools was started by cooperation of IKIT and Ministry of Education a few years ago.

In August 2013, conversations started between the steering team of Leading Student Achievement: Networks for Learning (LSA) project and Dr. Marlene Scardamalia, Professor, OISE/UT, and Dr. Carl Bereiter, Professor Emeritus, OISE/UT, the co-developers of KB theory and pedagogy for collaboration opportunities. LSA project is developed and led by the three Ontario principals' associations -- The Ontario Principals Council (OPC), the Catholic Principals Council of Ontario (CPCO), and l'association des direction et directions adjointes des écoles franco-ontariennes (ADFO) in partnership with the Literacy and Numeracy Secretariat (LNS) and Curriculum Services Canada (CSC) (Leithwood & Miller, 2012) for more than a decade. LSA project "is based on a multi-level approach providing support to district and school leaders as they work to develop greater coherence, as well as to improve achievement and well-being for all students." (Leithwood & Miller, 2012).

Throughout the 2013-2014 school year, KB pedagogy and KF as supportive technology were introduced to LSA participants in two symposia, several regional sessions, and also a series of virtual learning sessions. As some LSA participants became more familiar with the approach, they began sharing their own experiences, questions, and challenges about getting started with KB and KF.

As of 2015, in its tenth year LSA Project includes 57 districts, 3210 principals and vice principals, and 123 system leaders. Over the last four years, as some LSA participants became more familiar with the approach, they began sharing their own experiences, presenting their school and classroom practices, questions, and challenges and motivations about getting started with KB and KF in virtual learning sessions and workshops.

Method

The aim of the broader research is to investigate the diffusion of KB and KF as an educational innovation across Ontario schools in a supportive culture for transforming educational practice. Ontario's uptake of KB provides a particularly rich context for studying KB professional development. However the current study only focuses on Upper Grand District School Board (UGDSB), which has been involved in LSA project for six years in order to demonstrate a successful case of creating KB cultures in public schools. We aim to illuminate the ways of how educators can seed a knowledge creating culture at school and district level through UGDSB case.

The inquiry of diffusion of KB was investigated through a qualitative approach from conception of the case study to build an in-depth, multi-faceted understanding of this complex issue in its natural context. In a broad sense, this research focuses on elements that impact on the innovation-decision of the administrators and teachers, rate of adoption, and diffusion network. This ongoing study will provide a detailed account of Ontario's uptake of KB.

Participant group consists of three principals of different schools, 16 teachers, and the lead-teacher who initiated KB into UGDSB and provided bunches of guidance for the teachers in aspect of KB.

The main data is obtained through the semi-structured interviews with teachers and school principals. Additionally, archived virtual sessions (aka webinars) organized by LSA team throughout the last three years, *Learning exchange student achievement division resources* which are published in the website (<http://thelearningexchange.ca>) by the Ontario Ministry of Education.

The research question explores if there is any evidence of distribution of KB as a novel pedagogy among teachers and principals in UGDSB? The sub-questions explore;

- a) How do the principals and teachers become aware of KB pedagogy and technology?
- b) What kind of attitudes do principals and teachers develop toward KB pedagogy and technology?
- c) What are the key points that foster the diffusion of KB pedagogy and technology in UGDSB?

Preliminary Findings

In this study, we will present preliminary findings from the qualitative analysis are conducted on teacher and principals interviews following the five-stages model of diffusion of innovation theory. The excerpts from the data mentioned above are used to provide evidence for the research questions.

Dissemination of KB pedagogy and technology within and across the school

The journey of UGDSB with KB started seven years ago -even before LSA- with a science teacher in [Center Wellington Secondary School](#). Larry started his doctoral study with Dr. Marlene Scardamalia who is one of co-investigator of KB theory and pedagogy. Larry holds pivotal role in launching KB in UGDSB. In diffusion of innovation literature, he called as innovator because he is the first teacher in the board with taking high risk of uncertainty. Larry explains his positive attitude toward a novel pedagogy as a part of his personality in the interview:

“I do that a lot, that's just part of my personality and my view of things that if it looks like it would benefit the kids I'll just give it a try and if it works great if it doesn't that's OK too.”

Larry first heard about KB when he started his graduate study. Meanwhile he was looking for a topic area that he would be interested in that's understanding expertise something that the nature of expertise in how humans get good at learning something. When he saw Dr. Scardamalia's works with KB, he had contacted her they had a conversation about KB. His reflection was “Oh well that really sounds really interesting” and he started to work with KB as soon as he completed the Introduction with KB course with Dr. Scardamalia.

In the knowledge process of diffusion of innovation, individuals collect three types of knowledge. The first one is *awareness knowledge* that represents the recognition of the existence of the innovation in question. The impression of the innovation on the individual at this stage can motivate the individual to ask additional questions such as “How does it work?”, and “Why does it work?”.

For the most other teachers and principals in UGDSB, two essential factors in recognition of the existence of KB as an innovative pedagogy are identified; innovator teacher(s) and invitation from the principals and system leaders to LSA events.

When Larry appreciated the effectiveness of KB, he started to talk with other teachers and administrators in his school what he is doing in his classroom. The vice principal of his school at that time, Nicholas found his work very interesting and mentioned about this novel pedagogy to other three principals in a Professional Learning Team (PLT) meeting. The other three principals also found it very interesting and they decided to make it focus of their PLT work in that year. As Nicholas stated in the interview

“So we have a little strategy to get a group of people together in our school. Chris [the principal of [Centennial College VI](#)] was involved with in LSA and Tara [the principal of [West Side Secondary School](#)]. So between the three of us we got a little team. That was the beginning of the journey and becomes teachers were already interested in collaborative inquiry, project based learning.”

In order to support this cross panel effort, in the lead of PLT, teachers and lead-teacher came together and talked about the project what they would like to do. Chris mentions in the interview that:

“Once the teachers got introduction and got a feel for what it [KB] was we talked about how that might look in those specific classrooms from those teachers from the cross panel... there was an elementary school and there was a science class in which Larry was teaching. And then how it that translates into maybe a Math classroom or History or some more difficult subject areas that knowledge building hadn't been used before. ...”

They ultimately came up an idea that each of them would invite four-five teachers from their schools in order to create a sustainable model for growing KB communities across the school board. These teachers -aka original twenty- are the early adopters in the UGDSB.

Larry explains the importance of collaborating with someone who has competency (e.g. an administrator) and network in the process:

“And from there though he [his vice-principal] seemed to take the ball and run with it because he was an administrator. He would have it administrator support. And I think he really like the idea of KB in the classroom. So, he managed to get other people on board that had money in funding to be able to release teachers and then we released teachers and they came out. ... And from there I think Nicholas got other principals involved to work quite keen on that.”

In the interview, an elementary school teacher Robert mentions the invitation from his principal as

“I heard about Knowledge Building through my principal. We were asked last year to take part in a Knowledge Building group for junior division teachers. We met once a month to discuss how we could incorporate these ideas in social studies.”

At a first glance, it might seem as a top-down approach, however participant teachers lay stress on it is not a requirement for their job and/or there is no obligation

from their principals. Tony who is the head of the Canadian World Studies department (including history, geography, and family studies and social studies) in his school replies the interview question, which asks whether it was mandated by any authority as following:

“No not by any means. Just she [the principal] just said ‘ hey there's something going on’. But they all say this is the rough idea and I was that kind of found it interesting so. I went and then it was like a deep hole that I just haven't got out of yet.”

In the diffusion of an innovation, the knowledge dissemination is crucial. In UGDSB case, the awareness-knowledge is disseminated through in two ways; one is interpersonal communications and the second one is media with the support of LSA. Larry’s conversations with other teachers and Nicholas, and then Nicholas’ conversations with the other principals in his PLT meeting set fire of an informal professional learning among the teachers and principals. With the inclusion of LSA, the media channels are broaden, more teachers and principals are reached, and also a systemic promotion and collaboration is supported through virtual learning sessions, provincial symposia, speaker series and so on.

In the second phase of knowledge stage, individuals seek more information for “how-to” knowledge. How-to knowledge is significant because if it is not getting obtained enough prior to trial of innovation, it has the risk of rejection to adopt or discontinuance as a result.

In 2013, with increasing emphasis on KB in LSA, lots of virtual learning sessions, workshops, and professional development activities are organized. In the collaboration of lead teacher and principals lots professional development activities and KB sessions for specific fields –in addition to LSA events- organized and numbers of teachers gained awareness-knowledge and how-to knowledge about KB. Robert mentions one of those activities as:

“He [his principal] asked me last year to come in along with the other junior teachers that were here, to meet with... well he opened it up to anybody to attend. It was after school and basically we came together with some other teachers from other schools in Orangeville to talk about Knowledge Building within specifically social studies.”

Another elementary teacher, Clare highlights the importance of trial in gaining how-to knowledge by stating, “We were trying to figure out exactly how it works, so you can't learn about it until you actually try it.”

Currently, a significant number of teachers and principals are working with KB in UGDSB. Their effort has sustained by the creation of a welcoming environment for newcomers, sharing current practices, and asking for feedback. Talking about the failures is as important as sharing success cases in the community. Chris shared an example of growth of the group throughout time:

“... one teacher even got up in front of her (...) that “I don’t even know how to start. Can I talk to the group about ... how we could do this?” which is a really would see that and in any other PLC or any other environments especially in a group of twenty. ... So we that was (...) over the course of the year everyone give it a shot and came back and talk about what their

successes and what their failures were and what do we try differently next time when they try KB”.

Teachers' and principals' attitudes toward KB pedagogy and technology

In persuasion stage, people develop a favorable or unfavorable attitude toward the innovation. For example, the reported attitude by the innovator teacher is enthusiasm at one side and feeling nervous at the other side.

“I do that a lot, that's just part of my personality and my view of things that if it looks like it would benefit the kids I'll just give it a try and if it works great if it doesn't that's OK too.”

“...And the third time, I was still nervous and then what's I start to see happening in these three times at all; ok, this is working, the kids are curious, they are willing to put in their effort to learn about something that really interest them.”

Robert expressed his curiosity and interest as “I wanted to find out what it was about to begin with. I had heard about it before and then Mr.[school principal's name] had asked me if I wanted to come in and learn a little bit more about it.” Teachers and principals also have some level of uncertainty about the innovation. Kelly mentions her initial feeling toward KB as frightening: “I think it's a scary thing when you're starting from scratch on Knowledge Building because you're letting go of a lot of control of your classroom. The kids drive the learning to where they want to go.” Jack also felt frustrated at his first tries of Knowledge Forum:

“When I first started, I was very frustrated by the old Java version [previous version of Knowledge Forum], and so I liked seeing that I wasn't the only person who kind of went, ‘Alright, that's not the important piece, the actual understanding is the important piece and how to set it up is the important piece’”.

To cope with uncertainties, teachers received feedback and reinforcement from both colleagues and the system. They regularly come together in local meetings such as workshops, learning fairs, or informal meeting as well as online learning sessions and symposiums across the province. Kelly mentioned how she dealt with her hesitations of turning control over the students through the discussions with her colleagues:

“So, I think just having those discussions is very valuable because it's gearing trying something so new sometimes. So I think it's valuable for other people to hear somebody who has tried it that it's OK for it to kind of flop the first time or what we've done to work with different problems that have come up or things like that. So I think it's super valuable for us to have these discussions about where we started and where we are now and but how that looks different and things like that.”

Chad alluded that their teachers don't avoid talking about the failures in those events. Oppositely, they see this as an opportunity to get feedback from the others. In preference to knowledge transfer from an expert, they learn it by practicing and giving to and receiving support from each other.

“...a greater number of teachers who had gone through the process tried it and found new things. ... whether be successes or failures we talked about it again. It was great to see the again we started that an environment where no one knew what was going on and people opening up as those sessions went

on as we came back together every single time we had more and more teachers willing to speak up about you know “this didn't work for me for this works for me” but it was really nice to see that when teachers were able to let down the garden saying you know “this is it working any need your support how do I do this”.

Another elementary teachers, Alisa, also stresses on the significance of these events:

“If we hadn't been sharing then it wouldn't have grown as much. It wouldn't have been as successful with the students. You always need someone else. It's just you in the classroom and it's nice to bounce ideas off of other people or get ideas from other people “Oh that's a great idea. I'm going to use that and I'm going to make it like this I'm going to tweak it a little bit” or whatever right?”

The perceived attributes of innovation are crucial in the formation of favorable or unfavorable attitude toward innovation in the persuasion stage. The expressions of teachers and principles provide examples of perceived attributes of innovation.

Brian, the social science teacher in a high schools, mentions one relative advantages of KB is gaining their own voice to the students:

“They have an opinion something and they don't even know why. Whether it was they heard their parents talking about it or they read, they saw one thing on the news and that all of a sudden, yeah it's my opinion. They don't know why but, they just heard it. And the idea is, if they were just to look into something on their own, they might only read a couple things and hear their own biased view of it. Because they have their engrained bias from growing up, as every person does that. The idea with Knowledge Building, and you're working with others, you're hearing their opinion, maybe one person found this in and they saw it this way and they you're like "OK" and it allows you to shift your thinking or at least be more informed when coming to an opinion on whatever it is you're looking at, right, instead of just going "oh, that's just what it is, right. Or yeah, I heard my mom and my dad say that so this is what it is. So, it forces them to think more, a little bit, to challenge themselves.”

William, a Biology teacher mentions another advantage of KB as opening a door for the students for curiosity and keep them to follow it even after the class end:

“But sometimes yes it does have an end point because you know you need an evaluation but in essentially it's students could take the idea like what happened in my Grade 12 Biology class we just had a presentation on what's called epigenetics. All right, so, the girl who did the presentation. Why did she do the project? Because she found the Knowledge Building experience last year. Student interest, right? So, there was an end point in the class because we had to move on but that didn't stop her Knowledge building.”

Larry explains relative the advantages of KF:

“Oh very much so I love it (...) The benefit of Knowledge Forum is the fact that it makes everything so visible and you can see the conversations growing and there's nothing out there like it. And as a result that's the tool that I use and as long as it's working properly, I've got no trouble using it. It's easy; it really is quite straightforward and easy.”

The key points that foster the diffusion of KB pedagogy and technology

Three principals mention the key characteristics of teachers as resilient, curious, and flexible; willing to a kind of model through; growing natural curiosity; being in search of innovation; internal -motivation; open to collaborate; giving to and receiving support from others through the learning process. In an LSA virtual learning session (October 8, 2015) Nicholas mention the key characteristics of teachers:

“And so some of the characteristics in the teachers we were looking for people that were resilient, curious, and flexible, and willing to a kind of model through. Since then initial set up, we really have had a few job take based on, I think just natural curiosity teacher and had a number of principals and teachers come to say “hey how we can get into the game”. And we over 40 teachers and seven schools involved right now and you know another half dozen of self-curious to get involved game a road.”

Tara who is the principal of [West Side School](#) also points out the motivation and teacher engagement. She mentions that the teachers in her school don't hesitate to take the risk, always try new practices and ask for feedback:

“I am very lucky in that I have high teacher engagement. I have a great group of staff who are very motivated and I would say of all the schools I worked that, at this particular school the staff are really willing to try new practices and really want to be better and want to experiment and try stuff. ... So to me that says I have a staff is really engaged and is really willing to try new things ... and they want to do better. So they want to have that feedback and want to work with you to improve their practice because they do want to reach those students.”

Nicholas pulled a special attention to the importance of the self-motivation of the principals and teachers in their team:

And we are always interested in innovating. So the group of teachers we had natural curiosity. When some people that were curious but skeptical of new technology and new ideas. We invited them to participate and get there feedback as well. And that was about it. We just come in group of there.

The integration and congruence of the innovation with the existing values, past experiences, and the needs of the potential adopters is positively related to its rate of innovation-adoption. Brian explains how KB fits on his existing values and needs:

“(...) I really wanted to switch it up. I remember there is a History lesson I was teaching like 4 like 3-4 years ago and... probably 4 years ago. I was teaching at and I was bored teaching it. And I could tell that the students were probably bored too. And I was like this isn't working and I had started to do less like three part lessons and through problem-solving, which is similar to Knowledge Building but I had heard that the Math was doing these three-part lessons for problem solving and I heard all the Math teachers talking about it. I thought, I can do that for History. I started doing that and I saw great results and then the Knowledge Building thing happened right after and I was like, this works perfectly”

Nicholas also indicated that they were already looking for something new to improve students' success with the teachers in their schools:

“...we were looking for ways to include it. And we had teachers doing different things that were doing very similar right, ... like doing inquiry based work we have another teacher doing and she did genius based on Google conceptive. You know there are employees having twenty percent other time did they have ever want ... in innovative project. So we had people playing with that concept.”

Conclusion and Discussion

The findings of the preliminary analysis on the data depict a general overview of the diffusion of KB in UGDSB in aspect of how teachers and principals were introduced to this novel pedagogy, what were their first attitudes toward it, and what are the key factors fostered the adoption of KB by the teachers and principals. Principals primarily pointed out the lead-teacher and teachers mentioned their principals as influential in the initiation of KB in their schools. The preliminary results show the significance of interpersonal communication and collaboration in personal/professional network in this process. The effect of the LSA project is also crucial in stimulating both teachers and principals to be involved in the process and keeping the professional development in a systematic plan. All parties (innovator(s), change agents, and early adopters) have invaluable contribution in the diffusion of KB and KF in this school board.

UGDSB case illuminates the way of seeding knowledge creating culture in the schools. As a further research, it is suggested to focus on more data from larger data sources and investigate the next steps of the diffusion suggested by Rogers (1995) such as decision, implementation, and confirmation as well as the influence of the innovators, change agents, and opinion leaders in these stages.

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