

The Four Pillars of Innovation: An Elementary School Perspective

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Abstract

This article describes a study that identifies the innovative characteristics of an elementary, Information & Communication Technology (ICT) school. Using Douglas Watt's (2002) Four Pillars of Innovation, it explores how innovation occurs in an elementary setting. Watt's Four Pillar framework has been used to identify processes of innovative high schools, but not elementary schools, within the Network of Innovative Schools (NIS). The qualitative data used for this particular study was generated from a larger mixed methodology study that focused on the change process in innovative Canadian schools (both elementary and secondary) that are a part of the NIS program (Dibbon & Pollock, 2007).

Keywords: Innovative Schools, Technology, Strategies, Elementary, Educational Change

Introduction

This article describes a study that identifies the innovative characteristics of an elementary, Information & Communication Technology (ICT) school. Using Douglas Watt's *Four Pillars of Innovation* (2002), it explores how innovation occurs in an elementary setting. Watt's Four Pillar framework has been used to identify processes of innovative high schools, but not elementary schools, within the Network of Innovative Schools (NIS). The qualitative data used for this particular study was generated from a larger mixed methodology study that focused on the change process in innovative Canadian schools (both elementary and secondary) that are a part of the NIS program (Dibbon & Pollock, 2007).

NIS was launched by Industry Canada as a pilot project in 1998. The objective of the program was to identify innovative schools in the K-12 systems that were using ICT for learning. The purpose of the network was to link creative and motivated schools so that they would learn from one another in online learning communities. To date, just over 100 schools have been selected for this Network, and they have been provided with modest financial grants of \$10,000 per year for three years in order to facilitate their innovation plans. The larger change process study was of national scope, with NIS schools across the country participating as case study sites. However, for the purposes of this study, only one school site was studied. The rationale for pursuing this study is outlined below, followed by a description of the research site, methodology, framework and discussion.

Rationale

The Four Pillars of Innovation Research Project was a mixed methodology study conducted to examine the process of innovation in high schools by identifying key characteristics and attributes possessed by innovative high schools within the framework of the NIS. According to Watts, (2002) the four pillars (or elements) of innovation are; 1) people, 2) culture and climate, 3) structures and processes, and 4) leadership. These pillars formed the context within which he believed innovative processes occurred within schools. Watt claims, “no matter how different organizations may be in terms of their focus, their products or services, or their customers, the truly innovative one’s demonstrated many similarities” (p. 11). This study attempts to expand Watts’ framework to include how innovation occurs in an elementary school setting that was not present in the original study. These four pillars of innovation will act as the framework for describing the process of innovation at this ICT elementary school. The findings from this study will add to the growing research on the phenomena of innovative schools. This research will provide insight into how we can extend innovative teaching and learning beyond pockets of excellence in isolated schools to reach a much greater proportion of students and educators across the country (Stevens, 1999).

Canadian schools and school districts are facing increasingly turbulent times in a fast-changing global economy (Dibbon, 1999; Leithwood, 1999; Rait, 1996; Fullan, 1996; Stoll and Fink, 1996; Leithwood and Aitken, 1995; Prestine, 1994; Leithwood, Janzi, and Seinback, 2000). Changes in our economic environment, as well as the rapid growth and expansion in information and communication technologies (ICT), have made it increasingly necessary for Canadian schools to pursue innovation as they prepare students for a contemporary world (Government of Canada, 1995; Conference Board of Canada, 2001). This success can be facilitated with increased levels of literacy, both traditional and technical.

Literacy has been greatly influenced by Technology and ICT. Not only has technology provided innovative strategies to address traditional literacies, but new technical literacies have also developed because of ICT. In addition to new literacies the rate of change within communication is staggering (International Reading Association, 2001). It is imperative that schools pursue ICT initiatives in order to maintain a minimum level of skill competency for its students. In particular, it is important that technical literacy be successfully taught at the elementary levels as well as in secondary school. The IRA recommends an intensive program of research on literacy and technology issues and states that reading instruction must address the profound changes taking place with the new literacies (p. 3).

Theoretical Framework

In this study, as in Dibbon & Pollock (2007), innovation and success are associated with technology and skill development. Therefore, innovative is defined as “adopting an idea, practice or object that is perceived as new...” (Rogers, 1995, p. 46) and, success refers to “the skills that graduates need to enter, stay in and progress in the world of work” (Conference Board of Canada, 2001). Innovative schools adopt an idea and strategically implement it into the schools’ organizational processes, which may include the schools’ philosophy, curriculum, culture, climate, and structure. The innovation becomes a part of the school’s essence where success, in

the case of NIS schools, is dependent on whether the student has acquired skills that contribute to not only life long learning, but also active participation in the workforce.

Douglas Watt's (2002) research project, *How Innovation Occurs in High Schools Within the Network of Innovative Schools: The Four Pillars of Innovation*, analyzes the fundamentals and characteristics of innovative high schools and compares these characteristics with innovation in business organizations. Watt's framework is derived from the report, *Building the Future: 1st Annual Innovation Report*, presented by the Conference Board of Canada (CBOC) in 1999. This annual report introduced the concept of the four pillars of innovation from a business perspective. Watt has taken this framework and applied it to innovative high schools within the NIS program.¹

Four Pillars of Innovation

When asked to rate the importance of the four pillars of innovation, participants in Watt's study, rated 'people' as the most important in achieving innovative success. Watt (2002) describes the people element in terms of human resource capacity, which refers to the "knowledge, skills, attitudes and behaviors" (p. 10) of school staff. Attributes of people in a creative school included: creativity, continuous improvement skills, implementation abilities, risk taking capacities, and relationship building skills (Watt, p. 10).

Another pillar of innovation is culture/climate. Watt (2002) stresses that innovative schools have a culture that allows innovation to develop. A vital component of this pillar is the 'entrepreneurial' and 'risk taking spirit'. The ethos of an innovative school also values collaboration. Teachers work together to create new ideas, learn new skills, and develop programs.

In addition to culture, structures and processes must also be in place to encourage and support innovative thinking and action. Watt (2002) describes the structures and processes found in innovative schools as flexible, allowing for sharing of knowledge and the ability to work in teams (p. 10). Innovative schools provide teachers with easier access to resources and build strong community relationships.

The final pillar of innovation is leadership. According to Watt (2002), leadership that fosters innovation requires leaders who have a clear vision of where they want to take their school, have a commitment and passion for change, support risk taking and lead by example. The following diagram illustrates Watt's assertion that it is not the four pillars of innovations, in and of themselves, that bring about innovation in organizations or institutions; rather they are a "framework from which the complex process of innovation can be better understood and studied" (p. 11).

¹ The CBOC is an independent, not-for-profit applied research organization in Canada, whose mission statement states, "build[ing] leadership capacity for a better Canada by creating and sharing insights on economic trends, public policy, and organizational performance". (<http://www.conferenceboard.ca/who.htm>)



Villa Nova Public School

Villa Nova Public School ICT Innovation

Villa Nova Public School was chosen for this particular study for a number of reasons. First, it is a member of the NIS, as were the five schools studied by Watt (2002). The consistency with being an NIS member means that all studied schools have commonalities. Criteria for selection as an innovative school include: (1) leadership for ICT by school administration, (2) involvement and commitment of teachers in the innovative use of technology, (3) the contribution of ICT to student-centered learning (4) how ICT is integrated across the school curriculum, and (5) future plans for the use of ICT.

Villa Nova Public School was also unique in that it was an elementary school. To date elementary schools have not been studied. Finally, Villa Nova Public School is also a mentor for other schools seeking innovation, indicating that it is a leader in the innovative school concept. One teacher commented that Villa Nova endeavors

To share with others and help them brainstorm and develop plans. To help them prioritize what to do as it can be very overwhelming to have all of this equipment - she is talking about a mentor or support group. Since we are one of the pioneer schools we can help.

The school has five NIS projects: Ancient Civilization, Literacy Education, Digital Music Opportunities, Robotics, Networking Beyond our School, and IT Professional Development. Three of these innovative programs are briefly described below; Literacy program, Innovative music program and Ancient civilizations. The program descriptions are meant to give the reader a picture of how ICT innovation transpires in this particular elementary school.

Literacy Program. Classes were held on Tuesdays after school and involved Grade 1 students and their parents and siblings. During these classes information was provided on literacy skills and strategies that parents can use with their children at home, such as prediction, clause, retell, and asking questions to connect children to the text in a meaningful way. Classes begin with group-sharing and a snack, during which children read books they had worked on over the week. New reading strategies were demonstrated in a large group setting, and parents worked with their children and with teachers to practice together. The sessions were held in the computer

lab using a Scholastic reading software program called WiggleWorks. This program has 96 books, from a beginning reading level up to early Grade 3. It permits students to listen to the books, read them, do vocabulary exercises, record their voices and then listen to themselves, etc.

Innovative Music Program. This program is based on the Music Instrumental Digital Interface (MIDI) format in which both students and parents use computers to learn the basics of music to harmonize, create and compose original compositions. At Villa Nova Public School, digital music school, (also referred to as the school community program) operated twice a week after school for both parents and students. The program makes use of multilingual volunteers. Teachers commented on how students use technology as part of their music program. For instance,

If a student has a CD or hears something on *Much Music video*, they have the same equipment in the school that makes those sounds and they have the same software that sequences and masters the same sounds so it is the production side of music that they can do here that isn't found in traditional schools.

Ancient Civilization. This unit is a community outreach initiative in which interested parents are invited to four evening sessions at the school's learning resource centre. During the sessions, parents are introduced to the research process, including, how to access information through a variety of sources (such as library catalogues and Internet websites), how to collect and categorize information, and how to prepare a multimedia presentation using Microsoft PowerPoint. Using these skills, students and parents work collaboratively on a research project that focuses on some aspect of their culture's ancient past. These evening sessions with parents were an extension of a classroom curriculum unit.

School Description

Built in 1961, Villa Nova Public School is situated in a Southern Ontario School Board. This school houses approximately 370 students from kindergarten to Grade 5 who primarily come from a geographical subsection of the local community and two childcare centers. Although the majority of the school's student are immigrants, this school is built in the middle of a middle-class Catholic, ethnic Italian neighbourhood. Most of the students in this community, however, attend the local Catholic elementary school and not Villa Nova Public School. The students who do attend Villa Nova Public School are a part of a diverse community of learners, with over 65% of the students coming from non-English speaking homes. Most of these children were not born in Canada. The school attempts to honour this cultural diversity. It does so by simultaneously celebrating student differences and emphasizing the unifying factor of all of them being Canadian. Observed throughout the school are displays of students' individual heritages, recognizing differences next to the building of Canadian citizenship.

The school itself has a very pleasant environment. Everyone appears to take pride in one's space, illustrated by the clean classrooms and corridors. Classes are rewarded with recognition for their effort in this area.

The staff of Villa Nova Public School is comprised of eighteen teachers, four educational assistants, one administrator and two administrative office staff. The staff also reflects the cultural diversity found within the school population; additionally, 40% of the staff at Villa Nova Public School is either new to the school or to teaching in general.

As indicated earlier, the school has a very positive “feel” to it. This positive sense originates in part from the notable parental presence in the school and their interaction with both students and teachers. Teachers’ interactions with students were also positive. Additionally, student and school accomplishments and symbols of diversity were clearly visible on the corridor walls. Overall the school felt welcoming and inviting. Parents were visible throughout the school. During one of the interviews a parent commented:

...they [parents] are so happy about what is going on here at [the school]. They are more comfortable because they are in the school more and interacting with the staff a lot more. So not only are they taking a more active role in their children’s learning, they are also learning themselves. I think they are also becoming more comfortable with talking with teachers, interacting with teachers, asking questions...There is a lot more parental presence in the school then there was before.

Methodology

This particular study was part of a larger study which focused on the change process in innovative Canadian schools that were a part of the NIS program (Dibbon & Pollock, 2007). This study was completed using a mixed methodology, which included a survey, standardized interviews, observations and website/homepage analysis. Teaching staff were surveyed, interviews were conducted with staff, supporting staff, parents, and others associated with the school, and two days were spent at the school observing, in the school generally, and the innovative school music program, in particular. The entire data collection occurred over a two-week period in March, 2003. The survey instrument consisted of 60 questions focusing on thirteen factors. Results from this data were analyzed using statistical computer package, SPSS. The interviews, which focused on the initial 13 factors and three other themes added during the analysis process, were recorded, transcribed and then analyzed using N6 qualitative software.

The interviewees (n=11) comprised of a cross-section of the school community, including one parent who worked in the school, one parent on the school council, an educational assistant who was also one of the technical support staff, four teachers from different grade levels with teaching experience between 1 to 15 years, the administrator, an educational researcher from a local university, a teacher seconded to another university, and a business partner. The interview participants were chosen in consultation with administrator on the basis of grade level, years of experience, expertise in the school, technological knowledge in reference to the school, and availability.

During the two observation days spent at the school, I placed myself as an observer only. The first day consisted of attending an ICT sharing session with staff and technical support. The second day consisted of interviews, observation of the after school music program, and two parent focus interviews.

Because of the small teaching population (N=18), with only twelve returned surveys, reliability from the survey is limited. Analysis of the data focused predominantly on the interview data and observations.

Data Analysis

As indicated earlier, the purpose of this study is to identify how the process of innovation occurs in an elementary ICT school using Watt's Four Pillars of Innovation: 1) people, 2) cultures and climates, 3) structures and processes and 4) leadership. The data analysis is presented in the context of this framework.

People

As mentioned earlier, this pillar focuses on the people (predominantly teachers) aspect of innovative schools. This people category is described in this pillar by groups of behaviors, skills, attitudes and knowledge which promote practices that lead to innovation and sustainment of innovation. Many of these people skills and knowledge required for an innovative ICT school were present at Villa Nova Public School. In particular, the data indicated that staff members were either well versed in ICT skills or were at least willing to learn new technical skills as needed. The following two sections describe staff and student ICT skill development.

How Teachers Use Technology

Innovative ICT schools require that staff possess the necessary technical knowledge and skill to successfully implement and maintain technological innovation within the school. The extent of this knowledge base and skill was notable within Villa Nova Public School. The examples provided by teachers of how they use technology in the classroom were numerous and teachers were more than happy to demonstrate its use. The examples recorded throughout the interviews reflect a repeated theme of teachers using technology to manage classrooms, deliver curriculum effectively and facilitate their professional development. One teacher demonstrated how she provides more immediate feedback to her students.

...I am able to copy their work from the share drive to my laptop, bring their work home, read their work, make comments on their work and place it back on the share drive and it provides them with more immediate feedback. I am able to sit with a student anywhere in the classroom with my laptop and quickly pull up their work and have a writing conference with them. My feedback is more immediate and more meaningful because I am giving them mini-lessons to work on...I think access to technology has made it easier for me to address the different learning styles in the classroom...fine motor skills, some of the kids can't handle [tasks requiring use of fine motor skills] and get frustrated with writing and find the keyboard much easier or they respond better to the mouse and moving things around.

Another teacher responded,

Because we have all these resources now... and I have access to them... I am on that data projector or I am on my laptop making up even a simple thing like a worksheet now takes me five minutes whereas before I was one of those people who couldn't write straight and my printing isn't the best so having the laptop and the clipart and the internet and all of these things has made it so easy. Such a time saver to get things done... to show things to the kids that otherwise would take forever.

When asked what learning experiences helped her adopt ICT into her teaching another teacher responded that;

It has been a part of my life all of my life...when we were asked what we wanted in our classroom I had no interest in software, a lot of teachers were ordering software specific to curriculum and I just wanted the tools software. Give me PowerPoint, give me Word, give me access to the internet, give me six computers in my classroom, and then let me take it from there...I learned PowerPoint and then taught it to the kids ...as I have learned about technology and more [my] learning curb has gone up...I have been able to integrate more into the classroom.

The above statements demonstrate how teachers can effectively utilize available technology for more effective time management and, subsequently, pass these newly learned skills to the students. Implementation skills are highly valued in an innovative school. As the following section will demonstrate, teachers in this elementary school have not only mastered technology for better management, but have also effectively incorporated technology into student learning.

Student Learning & Use of Technology

The interviews contained numerous examples of student utilization of technology in the classroom. For example, students used the Internet extensively to do research, and then presented their findings using computer software packages. The following Grade 5 teacher illustrates how she has made students responsible for the multimedia presentations after teaching them how to do such presentations.

Presentations are very different now, before I did the multimedia presentation. so it [multimedia lessons/section] is really improving their presentation skills,...let's put it this way, if the student gives me a piece of work and puts a project on the bulletin board you know the weaker students their pieces don't look very nice (by hand) even the lowest student can make something that is pretty low level look pretty spectacular on the computer so it makes them feel good and more successful. I think that is a big deal, whatever they give me looks goods even though the content may be low which is something that can be worked on in other areas. It makes them feel good about the projects they are handing in so I have seen it in that way.

The following statement from a teacher captures the computer-assisted teaching and student learning that happens at Villa Nova Public School.

...perfect example, we were learning about fractions last week and typical question; there are ten kids, each of them gets half of... whatever. How many [halves] do they need? Before we would always use something circular; a pie or cookie cause it is easy to cut and you have to use the manipulatives on the board and cut...well...none of them eat pies and... they don't share their cookies but by using Word and Clipart I used fortune cookies. They all break fortune cookies in half so... I said ten kids, each gets half a fortune cookie, how many do we need? I put fifteen fortune cookies on the screen and we start chopping them in half with the Line Tool and they all got it. And I can tell you in the past....there is always a group of them [who don't get the concept] and part of it is the

mechanics of teaching it because there is all this cutting and taping and it is all paper... you want them all to see it and it may be something that they can't really connect to very well...it's just...all those mechanics take away from the learning.

The above statement indicates that the teaching and learning at this progressive elementary school is not exclusively for students. Teachers also participate in professional learning. Many of the teaching and support staff participated in professional development that was aimed at career development and entailed more than informal and formal professional development at the school level. For example, one educational assistant plans to attend a local university to complete teacher training. The technology teacher is enrolled in a Master's program with an ICT emphasis. Another teacher has been an adjunct professor for a local university. This teacher is responsible for supervising teacher candidates who are placed at Villa Nova Public School for their practicum placements. Currently, there are six candidates at the school this year. Lastly, teachers have presented at various conferences and workshops throughout the city, such as the educational Computing Organization of Ontario (ECOO).

Cultures and Climates

The learning environment as described above, as well as the desire to pursue professional development, can only occur in a school culture and climate that encourages these practices. Watt (2002) describes the predominant characteristics found of this culture as 'entrepreneurial' and in terms of a 'risk taking spirit'. A work environment existed at Villa Nova where initiatives were celebrated, risks were tolerated, and learning and change were valued. Entrepreneurial spirit was demonstrated in the school newspaper, *Villa Nova Choice*. In addition, the librarian/tech teacher explained how;

The organization called the learning partnership is one [relationship] that we have had and worked with in the past and they work to bring schools and businesses together. I have written curriculum for them actually on how to develop entrepreneurial skills in students.

Another comment from a primary teacher demonstrates the risk taking spirit and the value of learning;

I think a lot of us are up for the challenge. A lot of us are interested in learning and we're encouraged to take risks and to try things...no one is nailed if we do the wrong thing or if it doesn't work...that is one thing [administrator] is really good at... she is really good at encouraging us and believing in us and [this] has resulted in us trying out things and just going for it ...like the sharing session I was really worried that people would be feeling nervous to share maybe a little insecure worrying that their stuff might not be good enough but a lot of people expressed interest in sharing which showed that we are willing to take risks and we feel we are doing something positive.

Villa Nova Public School clearly possesses a culture that values innovation and provides the capacity to implement new initiatives. Teachers at Villa Nova Public School believe they have the capacity to successfully implement new initiations as long as the initiation is a part of the school goals and vision. This belief can be supported with the numerous awards and grants received by the school. At the time of this research the school had received up to 12 different

awards and distinctions such as Industry Canada's Canada Awards for Excellence for Quality Education, Claude Watson Teacher's Award for Outstanding Teaching, and Ontario Reading Association, Service Award for Outstanding Contribution and Commitment to Reading in Ontario, to name a few.

As a part of culture and climate, Watt (2002) believed that innovative schools encouraged collaborative approaches to learning and innovation. Successful teacher collaboration prevailed at Villa Nova Public School and was highly valued amongst the respondents. A relevant comment made by a teacher includes;

We have had different people come and show us things once in a while... a lot of the times I found them hard to adapt to my classroom because it is someone external to our school. They don't know our issues. They don't know our kids. They don't know our resources. They don't know our time limitations. But sitting with the staff just one on one or a group of us happen to say 'oh, I really like that you did there, can you show me how you did that?' that has been the valuable. Our sharing session last week was amazing.

Watt (2002) professed that none of the five participating high schools in his study 'jump onto innovative bandwagons' (p. 25), but rather assess innovations in relation to whether they fit the schools' mission statement or assisted in obtaining school goals. This screening practice was also evident at Villa Nova Public School in the way that they used *Knowledge Forum*². At Villa Nova, some teachers had a brief introduction to Knowledge Forum, while others had no knowledge of it. Those who did know about Knowledge Forum were not sure about whether its use would be beneficial to students. It appears that they have a 'wait and see' attitude, perhaps requiring more information and convincing evidence before they will make a decision about its usefulness. For example, the librarian/technology teacher has investigated the Knowledge Forum and reported the following;

my initial experience being in my position as the lab teacher I quickly found out that one class a week for an hour doesn't fit with the philosophy behind Knowledge Forum...it's more of an approach to teaching and having the computer network there to facilitate the kids being able to communicate with each other but it is something that you set up in your classroom...

Villa Nova has a culture that permits staff the freedom to decide which new initiatives to pursue.

Structures and Processes

Public school systems are designed to regulate and monitor processes; however, these very regulations and parameters can also inhibit school innovation. Schools that are innovative have in place, structures and processes that are geared to overcome such obstacles. These schools usually have a greater amount of flexibility and tend to be organizationally 'flat', with less hierarchy than normal schools. Villa Nova Public School is organized in such a manner, with

² Knowledge Forum is an asynchronous [Computer mediated communication](http://en.wikipedia.org/wiki/Knowledge_Forum) (CMC) technology that provides a shared discourse environment. It facilitates collaborative knowledge-building strategies, textual and graphical representation of ideas, and reorganization of knowledge artifacts. (http://en.wikipedia.org/wiki/Knowledge_Forum)

only one administrator and two administrative support staff. The school also functions with a number of processes that allow it to negotiate around, and within, policies that may be limiting. It does this in securing the resources that it needs.

School Resources Available to Support Learning

Within an environment of fiscal restraints, schools are facing the dilemma of having to do more with less. Many of the innovative schools in Watt's (2002) study implemented creative ways of finding and securing limited resources. Watt concluded that these schools participated in the NIS program as a means of seeking new/additional resources. Villa Nova Public School also identified resources as an important factor in assisting it with innovation. Specifically, resources were identified as one of three types; professional development training, IT technology (software and hardware), and teacher release time. The school has been awarded a number of funding programs and because of this, teachers have access to appropriate materials to facilitate or augment their professional learning. The following charts the progression of resource development for one teacher at Villa Nova Public School:

The primary groups really didn't have anything [technical supports] except I had a laptop but that way it, everything else was down stairs (higher grades). So, at first, I was standoffish... I felt I was behind. I wasn't in the loop anymore because I was on maternity leave. But then once I got into it, I could see it was just hard to do a lot of things if you don't have the resources there or if you have to book them two weeks ahead of time...but its progressed and I have been more and more... now to the point that I am using it everyday. All the time and if I had more time with the data projector I would be using it even more. So it has been increasing as time goes by... Kind of fought a bit to get stuff in the primary grades and that's working ... right now there are five classes up stairs, grade one and two, and we have one data projector to share but I think maybe a month ago they ordered three and we get those three so it is coming along. I kind of made a big stink that I had a scanner that didn't work and now the scanner is working and that has changed a lot of things again for me...

The areas in which teachers felt there was less support were with regards to teacher release time to collaborate with colleagues, and financial resources necessary to facilitate professional learning. It is not surprising that Watt's (2002) schools responded that the resource time was critical for innovation. "Innovation requires time - time to think, time to create, time to plan, and time to implement" (p. 27). This is an important insight, as release time depends on financial support in order to provide the services of supply teachers to release teachers. Recognizing the need and importance for release time and financial support in light of the limited support provided by the school board, the school seeks external funding from NIS in order to meet this need. As a result, finding and utilizing these additional resources requires teachers/administrators to create relationships with those outside of the school community.

Community Relations

In his study, Watt (2002) states that, "all of the schools participating in this research project recognize the value and importance of implementing and maintaining strong relationships with the immediate communities that they are located" (p. 30). Similarly, the seconded teacher

indicated that Villa Nova Public School used to run a school newspaper known as the *Villa Nova Choice*. The teacher pointed out that this was a very 'viable paper' which was supported by a number of community businesses. The decision not to continue with the newsprint grew out of assessing the next stage of the schools improvement plan. The staff felt that energy had to be utilized for a larger venture that would have greater impact on the school community learning.

Villa Nova Public School also has active partnerships with businesses. The president of the music software company was recorded stating that,

We have a very close personal relationship with the school more than a normal level. Villa Nova Public School uses much of the software from this company and in return the company provides Professional Development for the teachers, tutorials and software trouble shooting.

Parental Support

Interviews with parents indicate that they use the services provided by the school but do not necessarily contribute to the management or maintenance of the programs. When asked how parents participate in the school community, one parent commented, "letting parents get involved in the music department... they have their story telling with their parents and children after school and all that is offered to them..."

A teacher explained how parents are involved in the school;

After school programs in particular...those are very successful and very popular. And those have really developed out of our ICT initiatives in our school. Prior to that time we didn't really have any parental involvement in the school. Very limited parent school council and I think the ICT project, the program with the parents and children together have really helped to connect the parents to the teachers in the school. And that would be our after school reading program and the music program in particular - about a third of the parents in the school have taken advantage of those two programs so you get to know parents more... and that is kind of a prerequisite for improving student achievements, is having parents and teachers and students work as partners.

Other Community Connections

Taking advantage of the school's location, the administrator has capitalized on resources available at local universities. The school makes use of pre-service teachers and participates in pertinent research which will further benefit the school. As one researcher noted:

The administrator contacted [a local university] to find out if someone would be interested in some research on their innovative music program and with the special link to student achievement they wanted to find out if the infusion of music in the past three years has had an effect on student achievement.

Leadership

Watt (2002) describes leadership as individuals who have “a clear vision, who are passionate about the organization and its future, and who are able to think and act in new ways and motivate others to do the same” (p. 10). Two practices of leadership are prevalent at Villa Nova Public School; leadership within the staff as teacher leaders, and leadership from school administration. A core group of teachers led the technology initiatives in the school. Some teachers demonstrate new ways to deliver curriculum using various software programs, while others facilitate the after-school music program. One teacher indicated that she had expertise with a particular piece of technology and she gained recognition as the resident subject expert. Another teacher made the following comment on the core group of teachers who demonstrate leadership in the school:

Also in terms of leadership, [teacher] is so patient and so generous with their [group of teachers] time and had to contribute a lot of hours on top of their teaching roles because they wanted us to be comfortable ...its funny we are really lucky to have the few...the struggles and the foresight to see what is going on there...its good.

This strong belief in teacher leadership is also reflected in the power distribution. A comment made by the university researcher demonstrates the shared decision-making that occurs in the school:

I have been at a staff meeting here because I wanted to see the chemistry of the staff here and announce my function. It was an interactive, democratic staff meeting. Very efficient, very short, [administrator] didn't impose upon their [teachers] free time very much and she basically is a team building. She had 4 or 5 different strategies to build teams to draw people's opinions together and to give ownership to her teachers. It is really hard to be critical of a principal that turns the decision making process back to you. I think the leadership quality here is really unique.

The administrator of Villa Nova Public School gives teachers the space and resources for teachers to be leaders and to experiment; she encourages and supports risk taking. Thus the administrative style employed by the principal is a good ‘fit’ for the school. It has helped Villa Nova to be a more effective learning organization. There is a clear sense of direction and purpose upon which all decisions are based. For instance, the following interview indicates that, when hiring new teachers, the administration looks for teachers who can best fit the school.

So that is front and center as far as how we are hiring teachers we have an IT component...that has been a question every interview. The requirement is to have IT skills or the commitment to learn them is there...those are quite significant.

The needs of the school have been carefully assessed by the administration and staff and an efficient school plan was created to meet these needs. For example, in addressing equity in the school, the focus on ICT for both literacy and music has met many of the student population needs. One teacher in particular claimed that “our kids should have the same access to music as more affluent communities do and reading programs and internet research as well”. Equity issues concerning music, literacy and ICT access are being met through the innovative ICT programs such as the Innovative Music Program, Literacy Program, and the Ancient Civilizations program.

The administrator pays attention and is responsive to teacher needs by, among other things, providing them with resources and professional development. As one teacher indicated;

it [use of technology in the classroom] has been increasing as time goes by...I kind of fought a bit to get stuff in the primary grades and that's working. I kind of made a big stink that I had a scanner that didn't work and now the scanner is working and that has changed a lot of things again for me so...it's just about resources but now that those are coming in to play...it's [technology] increasing more and more in use.

The administrator has also been aggressive in seeking funding outside of the school board in an attempt to provide teachers with resources and provide them with professional development. The NIS funding received by the school is one of a number of funding sources which have assisted in providing teachers with needed resources and professional development that otherwise would not be possible. For example, the Library/Tech teacher commented, "we are a little bit unique because we are also a Pathfinder school so that we have had funding from other sources as well".

Watt also points out that leaders of innovative schools also 'lead by example'. Leadership by example was very apparent in Villa Nova Public School as the administrator was one of the 'staff' who would volunteer to teach one of the four after school music sessions. Leadership by example was also specifically commented on by a staff member:

I guess it starts from the top, [administrator] has some really good ideas. She has initiated our whole music program. She was the music teacher before ...She has many years of experience in education as a literacy consultant as well as a teacher and administrator.

Conclusion

The increased speed of technological change and the rapid growth of knowledge are creating unprecedented new opportunities for prosperity and growth in Canada, as well as contributing to major social, cultural and personal change. To fully participate in this new economy schools need to ensure that future generations of graduates possess the skills and knowledge necessary to facilitate lifelong learning. In order for schools to meet the needs of future students, the general educational system must be responsive to changes in the society and economy. We can certainly learn much more about what is required to successfully make these changes by studying from those elementary and secondary schools in Canada that have been identified as 'innovative.'

The purpose of this study was to identify, using Watt's (2002) Four Pillars of Innovation, how innovation occurs in an elementary ICT school. The data illustrate that Villa Nova Public School has demonstrated some of the processes and characteristics found in innovative schools. The study also demonstrates how Villa Nova Public School is an innovative ICT elementary school.

However, during the process of applying Watt's (2002) framework, it became clear that while Watt acknowledges that the presence of characteristics from all four of the pillars does not guarantee an innovative school, he attributed the synergy of these four elements to the people

within the organization. I would argue that Watt's (2002) framework does not go far enough in explaining the characteristics of innovative schools. Watt's (2002) participants voted 'people' as the most important element. At Villa Nova, it was evident that the leadership people (style), brought all of these elements together to make the innovations work. More specifically, transformational leadership³ and its practices (Leithwood et al., 1999) appear to be ideally suited to shepherd schools through innovative changes. Perhaps future research on the role of transformational leadership could shed important insight into innovation in schools.

About the Author

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³ Eight dimensions of transformational leadership include; building school vision, establishing school goals, providing intellectual stimulation, offering individualized support, modeling best practices and organizational values, demonstrating high performance expectations, creating a productive school culture and developing structures to foster participation in school decisions. (Leithwood, et al., 1999)

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Appendix 1

Network of Innovative Schools Study

Questions for School Council Representative

1. What is your position with the School Council?
2. Please describe what you know about the school's participation in the Network of Innovative Schools.
3. In what ways has the School Council been helpful to the school in adopting ICT innovations?
4. How is the school's participation in ICT initiatives perceived in the community?
5. How are the graduates of the school seen in terms of their readiness for advanced study or participation in the workforce?
6. How do community members make use of the technology that is in the school?
7. In what ways is the public informed of what is happening in the school?

Appendix 2

Teacher Interview Questions

1. How long have you worked at this school?
2. What are your teaching responsibilities?
3. Describe your involvement in ICT when the school became a member of NIS.
4. How has that changed over the past 3/4 years?
5. What learning experiences helped you adopt ICT into your teaching?
6. How has the fact that this school is a member of NIS helped you integrate ICT into your teaching?
7. What kinds of collaboration occur with other NIS schools?
8. What evidence would you point to that demonstrates that your students have benefited from your use of ICT in your teaching?
9. Describe how your students use ICT in their learning.
10. Describe how you share your own experiences with ICT with other teachers.
11. Describe how the community(ies) (parents, business, public library, etc.) from which your students are drawn participate in school-based ICT projects.

Appendix 3

Questions for Business Partners

1. Can you please describe your business?
2. Can you please describe your relationship with Villa Nova Public School?
 - a. Probe for whether it is a silent partnership, financial, supply, professional development, etc
 - b. Is it a past partnership or still active
 - c. Partnership with principal only?
3. When we talk about partnerships, can you tell me what the benefits are for your organization?