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Working in high school education for fifteen years, initially as a high school teacher and now running my own educational consulting business where I develop study skills resources and programs for schools, I have noticed a marked trend, particularly in the last five years, in the issues that are troubling the school community with respect to students' ability to learn effectively.

Concerns about technology are high on the school community's agenda. Parents are concerned that students are studying with their iPods blaring and want to know whether this affects their ability to learn. They are concerned about the amount of time students spend on the Internet and have doubts as to whether true educational activities are taking place. Students are constantly struggling with how to deal with more common distractions such as TV and music but now also the demons of MSN, Myspace, as well as other online chat venues and constant texting on mobile phones. This creates continual conflict with parents. Teachers are beginning to feel that they cannot command the attention of their students unless they have whiz bang technology and flashing gizmos; they feel that students now expect to be entertained. The current generation of high school students has grown up engulfed and immersed in all forms of technology. They are connected 24/7 and have moved on from the Generation Y label to be called the 'Millennium Generation' or 'Net-Geners' or the 'point and click' generation. These are students who have never known a world without remote controls, CDs, cable TV, mobiles and computers.

What effect is this lifelong immersion and increasing usage of technology actually having on students? According to Howe and Strauss, this is the world's first generation to grow up thinking itself global and benefiting from this outlook. Despite the initial fears that computers and the Internet would turn students into solitary friendless geeks, students are actually benefiting from the use of the Internet to connect to and build online communities and interact with others. Indications are that while students are becoming better at multi-tasking, they are losing the ability to focus and concentrate for extended periods of time. Technology allows students to access wide sources of information but at the same time their ability to achieve any meaningful work at home is constantly threatened by this same technology. They have developed skills that allow them to adapt and adopt new technology quickly, but does this mean other skills and abilities are being sacrificed or devolved through lack of use?

The research problematic to investigate then becomes: *‘How is the way in which high school students learn and study at home being changed by their interaction with technology?’* Once this is determined a secondary question arises of *‘What then is the role of technology in an effective home learning environment?’*

Initially my research problematic was phrased as ‘is technology changing the way students learn’ but there is enough evidence both from my observations and from initial readings to support the assumption that the effects of living in such a technological society is causing changes. I have two concerns with the research available on this area. Firstly, there are very few recent studies on this topic and in the last five years there have been enormous changes in terms of the types of technology available, its accessibility to today’s youth and the ways in which students use this technology. Secondly, the research tends to focus on what the implications of these changes are for the classroom teacher or at-school learning. For me, the more interesting question which therefore frames my problematic is what does this mean for students completing homework and attempting to study for tests and assessments in the home environment? How can they manage all the distractions that engulf their world but still work effectively? Do they need to change the way they study for examinations and should technology be integrated into this process? What information do parents need to know to ensure their students are working effectively at home?

The scenario that most students face each afternoon is that they come home from school and the choices of how then to spend their time are limitless. Doing their homework or studying for a test is an unappetizing last place option for most students when compared with the joys of MSN, Myspace and mobiles. Most students however, do manage to make themselves do some work but find it very difficult to focus their attention solely on their school work and to work without being distracted or interrupting their progress. Many students are incredibly frustrated by this situation and try to use will-power to help them deal with the issues of distractions and procrastination – mostly unsuccessfully. They are unsure as to the best techniques to use to study and complete their tasks at home, and are trying to use traditional techniques implemented by their parents and teachers before them. When told by parents to stop using the Internet and do some school work they reply with a wry grin that they are doing ‘research’ but neither the parent nor the student believes this, both seeing time

spent on the computer as mostly a non-productive activity. They are seeking guidance on these areas and are dealing daily with the frustrations of knowing that things are not working, but being unsure how to fix the problems.

Therefore I believe my research problematic to be an essential piece of research for the high school community. By understanding the effect of the technological society students live in and the changes in the way these students learn, all members of the school community can make changes as needed to ensure that the learning experience at home is effective for these students – especially as students are given more and more responsibility for their own learning. Technology usage is only going to increase as are the concerns about the effects of living in such a technology rich environment. An understanding of the effects of ‘growing up digital’ can ensure the school community is informed as to the implications for students and thus alleviate these growing and increasingly vocal concerns.

Perception will need to be taken into account in this investigation. While schools and parents do believe in the need to integrate technology into learning, there seems to be a perceived view that some technology is ‘good’ and useful in the learning experience (eg spreadsheets, powerpoint, some internet sites) while other technology is ‘bad’ and a distraction (MSN, chat, mobile phones). But is this perception correct? Can these ‘bad’ technologies be used as a learning tool in some way?

The first question is to determine exactly what level of interaction students have with technology and how this has changed. Indeed, how do we define ‘technology’? The scope I would like to explore extends well beyond computers and traditional uses of the Internet with students now recording study notes as mp3 files and downloading onto iPods, information being shared via mobile phones and a host of new services being available on the web. While the first construct of the research questions must be the defining characteristics of the Net-geners, the second is grappling with the scope implied by the term technology and the breadth of students’ interaction with technology. Is there a difference between students’ actual interaction with technology and their perceived interaction with technology? How do they view their experiences and do they feel it has changed the way in which they learn from how their parents or even older siblings approached learning? This leads to the third key construct

which is how to define learning or which aspects of studying or completing work in the home environment are to be considered.

The research design for the first stage will be relatively simple with students being surveyed as to the types of technology they use, how they use it and the frequency of use. The results of this survey will also help to clearly define the relevant characteristics of the Net-geners. Initial readings in this area show that for the Net-Geners their personal technologies are more than functional devices, they symbolize their own personality and individuality (just like it does for everyone else – essentially they are conformist, they want to fit in). They are technologically savvy and this has altered the way they view time and space. They don't mind structure on condition that their freedom and flexibility are not compromised. Communication tools are essential to maintain friendships and co-exist in social networks and ensure they are not isolated socially. These students expect things to happen quickly – just like the technology does - and feel there is no point planning too far ahead as everything changes so quickly anyway.

The second area, exploring the effect an immersion in technology has on the way students learn, will be more challenging to research. Are high school students the self-reliant, fluent, socially interactive learners that it is claimed technology has created? What are the skills they have gained from greater immersion in technology and are there any skills being lost? Do these students actually process information differently or are the changes purely superficial ones? What are the issues they face in working effectively at home? How can they study in a way that suits the way they process information? It will be interesting to see if the current research that looks at how the interaction with technology changes the way N-Geners learn in the classroom has parallels with how the interaction with technology changes the way N-Geners learn in the home environment.

Once we know what the actual effects are, we can then determine what the implications are for the school community. Do teachers need to give students instruction on how to study effectively in the home environment? Are parents right to ban MSN while students are completing schoolwork at home or are there greater benefits to be had from their interactions with other students? What techniques, styles and approaches to study should

students be using at home in order to ensure their success at school and where does technology fit into this equation?

Papers by Tapscott (1998), Kvaivak (2005) and Gardner (2000) contributed to the development of my research question and support the idea of the need for research in this area.

Tapscott illustrates, initially through examples, the point that the Net Generation children are learning and processing information in a way that is different from that of the baby boomers. The technology available is creating new opportunities for learning, moving away from traditional broadcast learning where the expert simply transmits information to students. While Tapscott does not really take into account improvements in teaching methods in schools and the recent move towards student centered teaching, the overall point being made is valid. Tapscott contends that the broadcast model of teaching is causing a crisis in education and that given the nature of today's students it is necessary to take advantage of technology in order to transform and improve the effectiveness of the current learning model. There have been a number of arguments proposed by various sectors of society as to why this cannot or should not take place in schools and Tapscott addresses each of these concerns. As an alternative, Tapscott proposes a model of interactive learning as the new paradigm to cater for the N-Gen experience.

Tapscott explores eight shifts to create a more effective learning paradigm but focuses on learning in a classroom setting. This will be a useful framework for my research question when exploring the issues of learning in the home environment. Briefly, the areas covered are the move from linear style learning to hypermedia learning, from instruction to construction and discovery, from teacher centered to learner centered education, from absorbing material to learning how to navigate and learn, from school to lifelong learning, from one-size fits all to customized learning, from learning as torture to learning as fun and from the teacher as transmitter to the teacher as facilitator. Tapscott's perspective is that this paradigm shift from broadcast learning to interactive learning can only be achieved through the use of technology. I would challenge that assumption. I believe that many of the shifts above can be achieved without the aid of technology but simply through changes in teaching strategies and that an examination of the way in which N-Geners learn most effectively could explore this issue.

While I agree with Tapscott's model that these eight changes are necessary in the classroom given the nature of the N-Gen learners, my questions after reading this chapter were whether these paradigms apply to the self-study experience of N-Geners at home and what role technology should play in creating an effective home learning experience.

Kvaivak's paper explores further what students are actually doing with the technology they are interacting with. Although this study is based on college students, the principles still relate to high school students. Kvaivak found that for these students technology is taken for granted and doing is more important than knowing with trial and error being the preferred approach to problem solving. The study examined how students use computers and their level of skill and expectations with respect to the integration of computers in the learning process. Contrary to expectations, the results of the study showed that the Net generation only preferred moderate use of technology in the classroom. Students' academic path and disciplines studied were also found to have an affect on attitudes towards computers. It was interesting to note that students cited convenience and time saving as the greatest benefits of using computers as opposed to improved methods of learning. The article also examines the effectiveness of course management systems and cites the need for improvements and training in this area for it to become an effective tool.

Kvaivak started with a clear expectation of the results this study would yield and ended up with surprising results in a number of areas. The study indicated that students do not necessarily want increased use of technology in the learning process nor should we assume they have the necessary skills. Kvaivak emphasizes that we cannot become complacent and assume that Net Generation students require less training with technology. The conclusion is that technology is not yet being used optimally as a learning tool and that further developments are needed if a true 'learning revolution' is to occur. Unfortunately Kvaivak does not explain or measure how the technology that students are being asked about is actually used in the classroom. If the instructors are using the tools ineffectively, then it is no wonder the college students stated that they would prefer only moderate use of technology as a teaching aid.

This article raised two issues which contributed to the development of my research question. Firstly, how are the current Net-Geners really using technology? There seems to be

some parallels with Kvaivak's college students but I suspect that for Net-Geners the scope is much wider. Secondly, is it an invalid assumption to assume that these students would prefer to have technology integrated into the learning experience? Parents and educators alike assume that it is a good idea to try and tap into the technological bandwagon and that if we can find ways to have students learn through technology then this would be the option they would prefer. But is this a valid assumption? Does the situation differ for the home environment as opposed to the classroom environment?

Gardner builds upon the idea that we are not yet using technology in an optimal way for learning. Gardner's article *Can Technology Exploit Our Many Ways of Knowing* led me to include the second part of my research question. In this article Gardner starts off by explaining his Multiple Intelligences Theory that we learn and can be intelligent in many different ways. This theory forms the framework of his argument. Even if one does not subscribe specifically to his multiple intelligence theory, the basic premise that we learn in different ways and are intelligent in different ways is a sustainable foundation on which to build a perspective. Gardner explains that most formal schooling does not take into account the eight different ways of learning that Gardner proposes and instead focuses solely on developing and testing two forms of human intelligence: logic and language. Gardner suggests that technology could be used to mobilize and develop a greater range of multiple intelligences in students.

However Gardner stresses the importance of not using technology to do the same method of instruction in just a slightly varied format. Instead educators need to first be very clear on their goals and then determine if the technology can be used effectively to meet these goals. This highlights a dangerous assumption alluded to by Kvaivak. There is a belief that because N-Geners use technology incessantly, technology should be used as much as possible in improving their learning experiences. But although the amount of TV students watch has increased, the call for instruction through TV as a medium has not increased correspondingly. Gardner is warning against falling into the trap of using technology for technology's sake.

Gardner proposes two classes of worthy educational goals where the use of technology could be considered. Firstly, the accessibility of information and interaction through technology can help students develop into certain types of adults and develop certain types of

skills. This provides support for the idea that while students may not be learning specific assessable skills while in a chat room they could be experiencing a worthwhile learning experience. Secondly, technology can be used to explore the ways of thinking in particular disciplines due to the large volume of information readily available in more interesting and interactive formats – formats that take advantage of the different ways we have of learning and knowing.

While these suggestions support the idea that there is a role for technology in students' learning process, Gardner does not address the issues of effective implementation for such a strategy. Again, we return to one of the central conflicts in my research question: how to strike an effective balance between technology that is used for learning and technology that is proving a distraction from learning. How can one be implemented in a way that controls the other?

Only by examining the way in which high school students learn and study at home being changed by their interaction with technology can we answer the questions as to what is the role of technology in an effective home learning environment?

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