Introduction and Research Question

The Internet has become an increasingly pervasive part of the lives of people and in particular, high school students. Email, blogs, wikis, Instant messaging, online games, chat forums, downloading media, YouTube and the like are common instances where high school students are known to make use of the Internet. Studies by Luke (2003) have
explored the rapid changes in the digital representations of text, the multimodal aspects of the Internet and the ramifications of each emerging technology.

In this seemingly endless stream of content, the web seems to be a good place to engage students and use the technology for an educational purpose rather than just for a way to occupy time. Online or Web-based Learning Management Systems, such as WebCT and Nicenet.org, are programs that set up virtual online classrooms that can serve this purpose. Thomas (2005) gives the following description of the Nicenet Internet Assistant:

Teachers can provide their students with reading materials and information, annotated links to selected and categorised websites, information about scheduled events such as assignments and excursions. Students can also enter documents, submit homework, and add links to the web. Everyone enrolled can participate in discussion forums. (71)

I had heard of Nicenet through a professional development seminar in the early part of my teaching career and finding this article rekindled my interest, so I thought that this would be a good place to start using this type of technology in my classroom. Early studies by Pedretti et al. (1996) looked at the combined impact of technology in social surroundings and I thought the Nicenet interface would be an ideal place for me to start my own investigation. The program was easy to set up and I could use it almost immediately in my classroom.

My research question quickly took shape and I began to speculate whether a learning management system could be used to increase student participation? In particular I wanted to see if I could find the answers to some key questions:

- How can I as a classroom teacher make use of an online classroom to enhance the learning experiences of my high school science students?
- What is the nature of online student participation? Who participates, who doesn't participate, what is said, and how does this affect learning?
- What are the aspects of the technology that appeal the most to the students, and to the classroom teacher?

What is participation?
Participation can be described as the act of taking part or sharing in something (www.Answers.com), whether it is a classroom discussion, Internet project or seated group work. However, Hudson and Bruckman (2004) describe conversational participation, where students take on the roles of both speaker and listener at some points in the conversation: "Unlike engagement, which only requires active mental attention, participation requires that listeners also contribute to the discussion" (166). For the purposes of this study, any contribution to the discussions in the form of a question, or any written electronic communication to or from a student was considered a type of participation.

Participants and Procedures
The setting for the study was an inner city school with diverse multicultural mix of students. The students chosen to participate in the study were taken from the following three classes: Science 9, Earth Science 11 and Chemistry 11 (enriched program). All
students in these classes were given consent forms and assent forms to participate in the study. Of the 61 consent forms distributed: 19 students gave assent/consent, one student declined, and the remaining 41 students did not return their consent/assent form. The majority of the consent forms (14) were handed in from the Chemistry 11 class, and two forms were collected from each of the other two classes. Those students who declined or did not return their form participated in all the classroom activities but did not have their data analyzed for the purposes of the study.

What did the students do in the computer lab?
Students were brought into the computer lab once a week during class time to perform a certain number of tasks on the computer. This first class was used to familiarize the students with the Nicenet.org website and register them in the class. Each student was given a pseudonym and asked to log in anonymously onto the website. This was done to allow students to post comments anonymously and it was hoped that this would encourage participation. Each class was then given a specific computer task to perform over the following 4 weeks.

The Science 9 Class was given an "adopt-an-element" research project and used the Internet to find information about an element of their choice. This class also completed a series of worksheets where they had to find the answers using the Internet and various search engines. The earth science 11 class was given a similar task and did research on sea creatures. They were required to research two different sea creatures for a particular ocean depth. The Chemistry 11 students were given worksheets to complete while using the Internet and were asked to complete online tutorials where chemistry lessons were taught using short animations or three-dimensional models and/or animations.

In all cases, Internet hyperlinks were provided for the students on the Nicenet website and the students were also allowed to look elsewhere on the web for other sources of information to complete their task. Opportunities were given to all students to post a reflection or response to a question asked by anyone on Nicenet, and students were encouraged to use the site from home. After four weeks of using the computer lab (approximately once or twice a week for an average of five sessions) the students were given a questionnaire to complete to gauge their perceptions and opinions of the Internet activity. Further data was obtained through a recorded focus group interview, and 4 students elected to do their interview via an instant messaging session using MSN Messenger service. All interview subjects were from the Chemistry 11 Class, and for transcription purposes all students were given an alias to maintain their anonymity.

Data Gathered From the Questionnaires

Student Computer Use Habits
The first part of the questionnaire was concerned with gathering information about the students' computer habits. Table one summarizes these results from the surveys and I discovered that all of the students had access to computers and high speed Internet at home. Most if not all the students were using Windows enabled PC's at home as well.

Table 1. Students' Access to Technology at Home
The next series of questions dealt with common uses for the computer and students were given a series of choices and were asked to check off any of the activities on the list and to then select their top three uses for the computer (see Table 2). The nine most common responses are listed below, however, it is very interesting to note that when asked to rank their top three uses of the computer, the three most common uses of the computer were in order: Instant messaging, Word processing, and listening to music. Although email was the most common activity for all of the students, when asked which ones they would choose as their top three, instant messaging comes up on top.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of responses that do this activity on the computer</th>
<th>Percentage of responses as indicted by the students as being one of their top 3 uses.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checking Email</td>
<td>95%</td>
<td>37%</td>
</tr>
<tr>
<td>Instant Messaging</td>
<td>84%</td>
<td>58%</td>
</tr>
<tr>
<td>Downloading Media</td>
<td>84%</td>
<td>5%</td>
</tr>
<tr>
<td>Listening to Music</td>
<td>84%</td>
<td>47%</td>
</tr>
<tr>
<td>Word processing</td>
<td>84%</td>
<td>53%</td>
</tr>
<tr>
<td>Gaming</td>
<td>84%</td>
<td>21%</td>
</tr>
<tr>
<td>Online surfing &amp; research</td>
<td>79%</td>
<td>42%</td>
</tr>
<tr>
<td>PowerPoint Presentation</td>
<td>68%</td>
<td>5%</td>
</tr>
<tr>
<td>Online communities</td>
<td>53%</td>
<td>5%</td>
</tr>
</tbody>
</table>

The students were then polled on the length of time that they spent on the computer, time spent doing homework and time spent doing things other than homework on the computer (Figure 1). This graph shows the number of responses for each task and a large proportion of the students (14 out of the 19) reported spending two or more hours each day on homework. The average student in this population spends between two to three hours on the computer a day and almost half of them spend three hours or more on the computer doing things other than homework. It is interesting to note that the average time spent on the computer (for things other than homework) is almost equal to the average amount of time students spend on homework itself.

**Figure 1. Student Use of Time on Computer and Homework**
Unforeseen Circumstances

The data collected thus far confirmed my suspicions that the students spent a considerable amount of time using computers and would be proficient at using the web-based learning management system I had set up on Nicenet. However, what I was unprepared for was the lack of participation I observed with this group of students. As stated earlier, participation can be defined in a myriad of ways but I was most interested in what the students had to say on the online discussion boards. I resisted the urge to force the students to post things online and did not make the posting of messages on the discussion boards a mandatory part of the online assignment.

In hindsight, it might have made more sense to encourage participation in this way with the lack of data I generated. However, I was keen to see what kinds of participation I would receive if the students were left to their own devices. The students did not post as many questions as I thought they would have, in fact, only a handful of questions were asked online but these were basically simple questions, asking for handouts and what was going to be on the test. There were a few online posts that were asking for help, but no other students came forward to answer the questions and I had to answer them myself. When asked to see whether students felt they participated more, the same, or less than they usually would have (Table 3), a majority of the students reported that they participated the same or less than they would have normally. This was again a very unexpected result and I followed up on this topic later on in the student interviews.

<table>
<thead>
<tr>
<th>Question and Responses</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>How would you rate your participation during the computer unit?</td>
<td></td>
</tr>
<tr>
<td>I participated MORE than I normally would have</td>
<td>5%</td>
</tr>
<tr>
<td>I participated about the SAME, as I would have normally</td>
<td>63%</td>
</tr>
<tr>
<td>I participated LESS than I would have normally</td>
<td>32%</td>
</tr>
</tbody>
</table>

When asked to indicate how they participated in the class, most students reported that they did some of the online tutorials and sent messages to people using Nicenet. However, the messages that they sent had nothing to do with the subject matter but were more of an insulting nature towards their fellow students. This resulted in almost 18 pages of random "spamming" (unwanted messages) and "flaming" (derogatory) text. This was another totally unexpected behaviour and this part will be discussed later in the implications section. In a sense, the whole experiment seemed to fall apart at the seams and I did not get the participation that I hope for.
To this end, I believe my students were *engaged* during the online tutorials but they were not communicating with each other, as I would have hoped. Many were just listening and reading the online posts, being 'lurkers' (to take the term from Internet forum chat rooms), happy to just read the posts, and did not feel the need to post anything online besides what suited their immediate needs, or else to post anonymous insults. This may be due to the bystander effect, as described by Hudson and Bruckman (2004). They compare the lack of participation with another phenomenon—wherein people will refuse to help someone in need because they think that someone else will do it instead. In the student interviews that followed, I decided to look into this and try to discover why there was such a low rate of participation amongst my students. I looked for further insights in their oral and written comments.

**Data Analysis: Student Interview Responses**

*Advantages and disadvantages of Using MSN messenger to do interviews*

Six students were selected to do interviews, two of the students elected to do a focus group interview together, and the other four chose to be interviewed via MSN messenger, an instant messaging program by Microsoft. There were some obvious limitations with choosing to do interviews through MSN messenger. Students did not say nearly as much as they did compared to the spoken interviews, and students had much more time to form their thoughts while using messenger, so they may have changed their answers as they typed them out and/or they may have edited their comments so that they would not have to type as much. However, with MSN messenger, interview transcripts were easier to obtain, and this reduced the total amount of time needed for transcribing the interviews. This was an obvious benefit, but perhaps more insight may have been gained from follow-up personal interviews. The focus group interview was tape-recorded and the text was transcribed from the audio recording.

Comments from the interviews were grouped together with the written responses from the class taken from the written part of the questionnaire. The comments can be grouped into the following four categories:

- Use of LMS: Pros, Cons and Suggestions
- General Computer use in class
- Participation: Perceptions and Barriers
- Role of the teacher and control

**Using the LMS: Pros, Cons and Suggestions for Improvement**

When asked what they liked about the web-based management system, the students focused on the fact that they had fast and easy access to links that dealt with the classroom material. Many students mentioned that they liked how the worksheets and answer keys were posted on the Internet and that you could check your answers right away. They also liked the fact that they could always keep in touch with the online classroom and could check for updates on homework assignments, deadlines and things to study for an upcoming test. Some students enjoyed the key visuals and animations that helped them understand a particular chemistry topic. Many students enjoyed going to the computer lab simply because it was a room other than the chemistry lab and it provided a nice change of pace. Bobby, one of the
students in the Chemistry 11 Class had this to say about the Nicenet LMS:

Nicenet gave me an opportunity to ask the teacher a question out[side] of school time… overall I found Nicenet really effective in enhancing the chemistry class because we can always keep touch with it."

—Bobby, Chemistry 11, Spring 2007

When asked what they did not like about the LMS, the students were very forthcoming and had many things to say. One student stated that she did not like it when they did not understand something and could not get specific help. Other students complained that some of the tutorials listed on the site were either too abstract, too complicated, and/or were hard to follow. Other tutorials were not thorough enough for some students. Many students said that they liked the site to be up to date and did not like stale items being left on the site, it made the site look messy and unappealing. Some felt intimidated by the tutorials because they did not know how much time to spend on each page. They spent so much time trying to understand everything that by the time they were halfway through the class was over. Brenda was somewhat indifferent in her opinion of the site and gave her impartial view:

I thought using Nicenet.org was somewhat impractical because although people asked questions on Nicenet, none of the students tried to answer the questions of their peers. However, it made the process of asking a question simpler; although it was sometimes hard to find the right words to ask a questions, therefore using Nicenet was neither good nor bad."

—Brenda, Chemistry 11, Spring 2007

Asking questions was particularly difficult task for some of the students in the class, and although many students reported that they liked the ability to ask questions of the teacher outside of class time, many felt that it was much more difficult to pose their questions online and preferred to ask them in person. Often those students who did post a question had to wait a disproportionate amount of time for a response to be posted and preferred asking someone that could give them an immediate response.

Although there were some benefits to having the site, I was left with the impression that the site was severely lacking in certain areas. I then asked the students what could be done to improve the site, or what things could be added to make the site more useful to them. Students came up with the suggestions that are listed here in bulleted form:

- More clear and accessible links listed on a links page
- Good concise descriptions of each link and the content therein
- Have link names that are based on words so that they are easy to remember because complex URL addresses with numbers and dashes can be too confusing
- Navigation bar to allow quick and easy access to all points of the site
- Have videos like YouTube, where you could watch experiments being performed by the teacher so students could emulate the proper technique
- Real Time Notifications as to when the site is updated with useful content
- Must have an appealing visual design
Although not explicitly stated, I also felt that one of the problems was the lack of an immediate response, and perhaps having online office hours or email access to the teacher would be a benefit to the students as well.

**Use of Computers in the Classroom**

I was not prepared for the responses that I received under this topic. I had predicted that based on their computer use habits, the students would really enjoy using the computers in the computer lab, but the reality was completely opposite, at least with the Chemistry 11 Class. Some students did express their desire to use computers more often in class, as it would allow them save time by typing out their assignment on the computer, which would allow them to carry fewer textbooks and binders as the assignments could all be stored on a small laptop. Some people enjoyed the different modes of representation offered by the Internet websites and said that it helped them learn the material faster. However, I also received many comments from students who thought quite differently. These students did not want to use computers in the classroom as they wanted a change from what they did at home.

I don't think it's good to use computers in class because I already use the computer too much at home. Computers isolate people... At school we should learn /interact with other people more participation—reality—human. Plus it takes longer to communicate on computers than in person. And if I see my friends/teacher at school, isn't talking the best form of communication? Anyways, Nicenet is like MSN...I can do it @ home.

—Patricia, Chemistry 11, Spring 2007

When I asked Penny and Susan if they wanted to use computers in all of their classes, they both gave very indignant responses, which I was totally unprepared for:

... No! Because it's a waste of school time. I can use the computer at home by myself to learn. So slow—it takes longer to type than to talk. Couldn't ask the teacher in person. Learning tutorials was useless for me. Confusing, couldn't ask questions at the right moment. I think school should involve a teacher, not a computer.

—Susan, Chemistry 11, Spring 2007

NO, that is horrible ...it is easy to slack in class already... using the computer lab for all classes, I don't think I will learn anything... 'cause most of the time, what is being taught isn't interesting...so it's hard to concentrate and with a computer, it's easy to wander off to something else that I'm more interested in.

—Penny, Chemistry 11, Spring 2007

There was an apparent backlash at the way I used the LMS in my classroom and there was a very concerned group of students that wanted more teacher-student interaction and felt that the use of the computer lab was using up precious time that could be used for face-to-face instruction. Apparently, some students felt that the time they spent on the computer at
home was more than enough and they wished to spend their time in classroom without the use of the computer. It is unfortunate that the other regular classes did not hand in their consent forms, as I would have liked to see what their perceptions were in this area.

Participation

Class Perceptions: Why was the class level of participation so low?
The data presented in Table 3 suggested that 95% of the students participated the same or less than they would have normally. This was definitely an unexpected result and I looked into the written responses from the questionnaire to gain some insights. Bernard, one of the few male responses I received, explained that his lack of participation on Nicenet was due in part to the asynchronous nature of the medium:

I said that I participated less because I am not always on the Nicenet. One thing that keeps me away from that is the fact that anyone could post anything at anytime. So I'd have to come and check back on the site like...at every hour. Sometimes people posted so much, I'd have to go back and reread everything. I find it easier to participate in class because everyone is learning the same thing at the same time. So if someone said something really important, I'll be there to hear it. Also, on Nicenet there could be some misunderstandings and we can't show our work easily.

—Bernard, Chemistry 11, Spring 2007
Other students stated that other sites on the Internet distracted them and that the online LMS was less interactive. Some students enjoyed the computer site and participated the same because they felt they learned best independently, figuring things out on their own, and felt no difference between the online class and the physical classroom. Others, like Susan, did not feel like participating at all due to what was going on with the message forum and because of all the distractions offered by the computer.

I was too lazy to interact with my class and since no one knew each other, I didn't feel guilty. Also, I participated less on the class discussions because most of the ppl talking weren't really talking about chem., just dising others/, making jokes. I didn't really want to participate. And I was distracted by Facebook.

— Susan, Chemistry 11, Spring 2007

Obviously, some students felt that the conversations that were going on in the message area of the site were not chemistry related at all but more of a free-for-all where anonymous entities could post random thoughts at their leisure. This type of behaviour probably contributed to some of the lack of participation, and due to the barriers discussed in the next section.

**Barriers to Participation**

I asked the question, "What are some of the barriers that prevent someone from asking questions or participating in classroom activities?" The responses were varied. Students reported that possible reasons could be: being shy, being afraid of looking stupid or appearing slow in front of their other classmates, feeling intimidated when someone asks a sophisticated question and you have a simple one, and not understanding the subject matter. An interesting comment came out from this discussion about the proximity of students to the teacher and the likelihood of them asking questions. Penny brought up this point about the students who sit in the back of the class. Students in the back of the class have a harder time asking questions since they have to speak up for the teacher to hear them. If they feel that their question may make them appear slow, they won't ask it. However, for the students in the front, they can ask simple or clarifying questions quietly to the teacher, without having the whole class hear it, thus making it easier for them to ask without the stigma of appearing slow or stupid. I had hoped that by adding the online discussion forum to the classroom that this would help students to ask their questions and not be afraid of being identified as "slow," but as it turns out, the process of asking a question online was too onerous and not timely enough, and the students found other means to get the answers they needed. Ariel responded in her interview that she would ask her friend before asking a teacher because she was with her friends more often than she was with her teachers. Since she had access to her questions from her friends who were online, she could use Instant Messaging to get a quicker response than with Nicenet.

**Role of the Teacher and Control**

If there were quiet barriers to participation, then many of the students felt that it was up to the teacher to help rectify the situation. For a lot of the students, it was up to the teacher to make sure students stay on task with the computers, and that the teacher plays a key role in meaning making and understanding.
Using the computer has its advantages but I'd rather speak and learn personally from a teacher in a classroom. If you don't get it, your teacher can use many different approaches to explain it to you, while the computer will just repeat the same explanation. If you don't get it the first time, you don't get it again.

— Angela, Chemistry 11, Spring 2007

Rachel in her interview stated, "learning from a bonded relationship is more effective than from the Internet 'cause that's virtually self teach." I was very surprised when I heard the following comments from more than one student who felt that it was up to the teacher to force the students to participate even if they did not want to. I had asked the question, "What should teachers do to help students participate more?" Rachel stated that the teacher should make it a requirement that everyone participates, and even though they may not want to participate, that is because they are shy and the teacher should help them anyway. Her rationale for this answer was illuminating: "It's better to be forced and know, than to be left behind and clueless" (Rachel, Chemistry 11, Spring 2007).

Penny suggested asking the students in the back more questions so that they could participate more, or at least it would force the rest of the class to pay attention to those students. Bobby thought along the same lines about forcing students to participate and added:

This (method) will most likely work with [enriched] classes… because it takes away the fact that I am asking my own question and whether I am asking or because I am forced to… by forcing the class to ask questions [it] can prove effective in seeing whether the student is engaged in the topic and whether they are participating mentally or not.

— Bobby, Chemistry 11, Spring 2007

Other students added that the teacher has to have more control over what is happening on student monitor screens, and that the teacher should have access to what the students are seeing so that they can flick an on/off switch on the computer screen to get the students back on task, in case they are distracted by other sites on the Internet. What I found most fascinating about these comments was the fact that the students were advocating the use of force to encourage participation. I thought that by giving students the ability to ask questions, whenever they wanted to, that it would be a wonderful equalizing tool to allow more students to participate. These students were suggesting that the teacher should force the students to participate (by way of an assessed mark) so that it would hide some of the stigma of appearing slow in front of the class. The idea of forcing the students to participate was a sad realization for me as it also implied that the students would not participate unless they had too.

Implications and Unexpected Outcomes:

Multitasking Behaviours
So why was it so hard for these students to pay attention while in front of a computer screen? Why would a teacher have to make their students participate? Looking back at the data presented in Table 2 and Figure 1 we can see that the students spend a considerable
amount of time using the computer at home, but what exactly happens during those two to
three hours on average? In table 4, almost 74% of the students polled reported that they felt
they could multitask on the computer.

Table 4. Multitasking on the Computer

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel I can multitask on the computer</td>
<td>10.5%</td>
<td>15.8%</td>
<td>73.7%</td>
</tr>
</tbody>
</table>

During the MSN interviews, many of the students were multitasking while they were
answering my questions. I asked them what they were doing? Some were listening to
music or watching a video while they were talking to me (or while talking to other people
as well on MSN), all while doing a homework assignment at the same time. Since the
students did a multitude of things on the computer at the same time at home, many of them
felt they could do the same thing at school.

While in the school computer lab, I noticed many of the students were distracted by other
websites and were sending messages back and forth to the other students using the message
area in Nicenet. Penny said that this behaviour was unavoidable because, "when you give
the students a chance to be near a computer, they will for sure get off track." Ariel added,
"[students] are rarely on task because we rarely get to use computer in school."

Perhaps the under-utilization of computers in schools makes computer lab more of a
novelty rather than a teaching tool, and hence the desire of students to multitask at school
like they do at home. Rachel noted in her interview, "if I don't multitask I don't get
anything done." All these comments point to a need for increased use of the existing school
computers to help familiarize the students so as to move the computer lab beyond the
novelty phase, and a need to implement tighter controls by the classroom teacher or
computer administrator to limit access to sites that are too distracting for these students.
From the interviews, I get the impression that the students will multitask if given the
opportunity, since it is such an ingrained behaviour at home.

Why Such a Low Return of Assent and Consent Forms?
One thing that bothered me throughout this process was the troublesome fact that I only
received 31% of the Assent and Consent forms back from the students. The forms that I did
receive were largely from the students in the enriched classes; very few were from the
regular classes I teach. It would have been interesting to see what the other students would
have to say about the computer lab experience. The opinions of these students, perhaps the
ones that would benefit the most from this type of technology, would be significant in
helping to find new ways to help them succeed in school.

Other reasons may be due to the high proportion of students who have parents who do not
speak English as their first language. The language presented in the consent form may have
been too intimidating for them to sign it. For the students, the assent form may have
seemed like another thing to do that would take up more of their time, and since it was
optional to participate, many of them might have just left the form at home or lost it. I had
originally placed a box in the office to collect the forms, but I did not have a teacher or
counselor follow-up with each of the students to see if they returned their form; I left it
entirely voluntary, and this would have definitely contributed to the low turn-out.
Finally, students were very busy at that time of the year with term-end assignments and tests, and the consent forms could have been lost in the hectic schedules of the students' daily lives. Further studies should be done for those classes not represented in the data samples collected in this study to provide a fuller picture regarding the use of computers and web-based learning management systems in the greater school population.

**Flaming and Anonymous Names**

Perhaps the most telling detail in this study is the initial eruption of student name-calling and random flaming that went on at the onset of the computer lab. At first, students treated the website like it was some sort of game where they would try to guess each other's identity, then, when one student made a snide remark to an anonymous classmate, and no one knew who he or she was, they felt free to go on a spree of disparaging remarks and taunts.

Although most of the taunts were harmless in nature, it does bring about some interesting insights to the minds of the students. Even though the teacher would eventually find out who said what, the very anonymous nature of the forums, which were designed to facilitate the posting of questions and discussion, had the undesirable effect of allowing students to insult each other with no fear of retribution outside of the class. No one would know who they were, and they could get away with it until the teacher told them to stop. The entire 18 pages of spamming and flaming text took approximately 10 minutes for the class to generate, but when the teacher was made aware of the situation, it came to a stop rather quickly.

This was one of the most unexpected outcomes of the study, and in hindsight, it may have been beneficial to have the students list their real names on the forum so that they would have to own up to any comment made, disparaging or otherwise, and perhaps, if someone saw that their friend had a question online, they would be more willing to answer it. In the interview with Brenda, she stated that she would answer a question differently depending on the person that was asking the question. She stated she would, "probably…be more clear [with someone I talked to more often] than somebody I don't know or talk to as regularly as much." The ties of friendship that form the bonded relationships that are so important at this stage of life would carry through to the online classroom, and perhaps there would be more discussions of a collaborative and cooperative nature.

**Participation in Enriched Academic Courses**

One theme that also came out from the interviews and written comments was the students desire to have the information that they needed right away. The desperate need for immediate answers to the questions that they had played an important part in how these Chemistry students utilized the online forum. When asked what would make a great website for chemistry, the students referred to a biology site that had the entire enriched course syllabus laid out point by point for anyone to see. Someone had posted all his or her notes in a concise form that matched each criterion of the biology syllabus. Rachel, who frequented the site, stated that these sites "make students…feel so much more confident…'cause they know what exactly is expected of them….and if it isn't on the syllabus, then it's not required to know. [sic]" Also, there was an underlying understanding between all the students of the fact that each student was responsible for their own mark, and that by posting answers on the online forum, they may have taken precious time away from their own study. Brenda made the following observation:

I noticed just before the days to the exam on the weekend a lot of people put questions up on Nicenet but no one would
even bother to answer it… everyone was kind of concerned about themselves and that's the whole thing… it's the class mentality … but you have to remember that in the end it is your mark …and you're going to get the mark you get by working hard and not by somebody else, you see what I mean?

—Brenda, Chemistry 11, Spring 2007

Competition was always a subtle undercurrent in the enriched courses and perhaps this also contributed to the low participation rates in the study. Mock (2001) has stated that in case studies:

Student participation was generally low unless the students were either motivated or were given an explicit assignment using the tool. Each tool also has their own strengths and weaknesses. Bulletin boards are good for extended discussions and wide information dissemination but requires motivation or structure." (14).

Motivation was a key factor and perhaps I did not give enough motivation for the students to take the website seriously enough. While forcing the students to participate or giving marks to post messages seems like a good way to motivate students, in past studies, it was met with limited success, as students would post the bare minimum and then stop. (Mock 2001, 16)

*Suggestions for the Effective Use of a Learning Management System*

There seems to be a need for teachers to make use of the technology that is available to them. However, given the experience described in this study, it would seem to be a formidable task to keep multitasking students focused on a single project for any length of time while in the computer lab. A simple suggestion would be to find a way for teachers to see what each student is doing on their computer screens. This would enable teachers to effectively monitor what is going on in the computer lab and if a student is off task, a simple flick of the switch to turn off the monitor would help to get a student back on task.

Mounted LCD screens connected to the Internet in the computer lab would allow teachers to simultaneously walkthrough online tutorials and use the key visuals and videos online to help supplement their own classroom practices. Another key for an effective LMS is to incorporate some form of real time notification to allow students to know when new content is posted on the site. This would prevent the need to constantly check the site for updates.

Quality links and websites should be made available to the students to allow them to learn at their own pace outside of class time, but the teacher should also spend the time to walk through some of the key elements of the websites, to give guidance on how to effectively use the tutorial. Students need to feel ownership of the online classroom and each person should be able to make a contribution to the site to share in its growth and develop a sense of ownership.

Anonymous names, although interesting in theory, are impractical. Students' real names would add to the sense of community and allow for continuity of classroom discussion outside of the conventional class. As always, care should be taken to ensure that students are treated with the utmost respect both in the physical class and online.
Final Comments

The main benefit for having a web-based LMS is the ease of access to classroom materials for all students to peruse at their own leisure at home. Rather than a substitute for classroom instruction, the LMS should be ideally used to complement the existing classroom activities. Students enjoy the face-to-face interactions between their peers. Teachers and technology should be used in tandem with these interpersonal interactions to maximize the potential for learning.

There is a rapid transition in technology and educators seem to be falling behind. We have already seen the rapid transition from email-based communication to the more immediate communication systems like MSN Messenger, where students can get real-time answers to their questions from their friends and others. Instead of a link leading to a website, where students can read about a topic, they can now link to a site where you can download a streaming video and actually see what is happening, allowing a visual aspect that appeals to the more visual learners.

Teachers need to continue their own professional development and find simple and easy ways to implement technology in their practice to engage their students with, whereby they may be more receptive to learn the technology they already have at home. In this study, the participation rate of the students was unexpectedly quite low. Further study, taking into consideration the needs of the students in the regular stream of the school, would only help to provide further insights to effective computer use in the classroom.
Finally, although it seems that Nicenet did not fit the needs of this group of students exactly, it is only one of many Learning Management Systems that allows educators to set up online classes, where students can access classroom materials in a secure and timely way. Perhaps a different LMS would have been more useful, and so educators should take care to choose a LMS that fits their needs and their technical capabilities and aptitude.

At the onset of this study, I had hoped to find an exciting way to use technology in my classroom that would instantly change the dynamic of my classroom and help me to reach all of my students. It turns out that I was completely mistaken. Although, it seems that the experiment was not entirely a futile exercise—I liken it to a magnificent catastrophe. I discovered what worked and what did not work in my classroom and found insights as to what my students needed me to do. To fully and effectively utilize technology in the classroom, it may take a considerably greater amount of work and study. However, I think that the possible rewards will justify the time and effort.

References


About the Author

Harry Yuen received his Masters Degree from the Center for Cross-Faculty Inquiry in Education, University of British Columbia in Curriculum Studies. He is currently working in the Vancouver School district where he teaches Chemistry, Math and Junior Science. His interests are in science education and he is always on the lookout for new innovative ways to incorporate technology into his teaching practice.