Research Project

e-Learning

“How e-learning affect the learning process”

By Jennifer Cheng

Due March 24, 2003
# Table of Content

## A) About the Project
- Project Proposal ................................................................. 3
- Exclusive Summary ............................................................. 3

## B) Research Report
- Introduction ............................................................................. 4
- What is e-Learning? ............................................................... 4-5
- The Theories ........................................................................... 5-6
- Traditional Learning vs. e-Learning ....................................... 6-7
- The Educator ........................................................................... 7
- The Student ............................................................................ 7-8
- Instructional Design .............................................................. 8-9
- What’s Out there ................................................................. 9
- Summary .............................................................................. 9-10

## C) Interview Report ................................................................. 11-13

## D) Working Prototype Proof of Concept
- Summary on Prototype ......................................................... 14
- Proof of Concept ................................................................. 14
- Project Evaluation ............................................................... 15
- Assessment Track ............................................................... 15
- Project Post-Evaluation ....................................................... 15

## E) Internet Sites about e-Learning
- e-Learning in general .......................................................... 16
- On-line tutorials for students ............................................. 16

## Appendices ............................................................................. 17

## Reference ................................................................................ 18
**Part A: About the Project**

**Project Proposal**

The topic I am going to research on is e-learning. In my research I am going to investigate how e-learning is different than traditional learning, particular exercise books. It will focus on the pros and cons of e-learning. I would also like to find out what different categories or e-learning are there and what method or approach should be implemented for specific categories.

The reason I want to do this project is because I am making customizable education applications for my director project. By researching different types of learning applications I can have a wider variety of types of applications to choose from when creating the director project. The primary reason however is because the passion I have for teaching. Being a tutor for over 7 years, it’s frustrating to find some learning materials focus on a very narrow lesson. Those materials often condense lessons into specific category, and leave out the necessary information on one lesson is derived from previous lessons. I believe an interactive learning application can solve this problem, because the students no longer have to read lengthy explanations to visualize hard concepts.

One of the obstacles that I may face is finding children or students to conduct this research. One possible solution I came up with is to create a message board where people can exchange ideas and give me input. However, I don’t know if it will be effective or how to implement this.

**Exclusive Summary**

This research is about the effect e-learning has on the learning process. This research will explore topics such as what is e-learning and educational multimedia, and the theories behind this industry. The traditional method of teaching-learning process is compared and contrasted with the technology enhanced lessons. Then it will turn to the humanistic aspect of e-learning, such as the educator, the student and instructional design. There is also a market and school report on how e-learning affect the learning experience. This report also has an interview with a public school teacher on her viewpoint on the rapid implementation of technology in the classroom.
Part B: Research Report

“Imaginary is more important than knowledge”-Albert Einstein

Technology brings comfort and better quality of life for the human race. For the past century, the technological bloom has been phenomenal. Computers and the Internet is an important part of our daily life. We are spending more and more time on the computer. That is why there is a great need for implementation of computer technology into the classroom so that our next generation will be prepared for the rapid changes of technology surrounding them now and in the future. Technology is a tool, it is a learning partner and an integral part of the classroom that facilitates and supports the teaching learning experience.

What is e-Learning?

e-Learning is a term developed during the techno boom in late 90’s when anything that has involved technology will be coined with an ‘e’ in front. e-Learning is a broad term that describes the use of multimedia technology to achieve training purposes. Some people use e-learning, education multimedia and technology based lessons interchangeably. The scope of educational multimedia extend from CD-ROM substitute for traditional encyclopedia, to train programs with audio and video, to network based training application, to Internet-based services that uses the World Wide Web as a tool for training purposes. e-Learning can happen not only in traditional school settings, but also in cooperation, government agencies and many other situations. Using e-learning technology, training and learning does not have to be confined by the limitation of space and time and decrease the operation cost. There are may types of e-Learning and the educator should consider carefully which type of medium should be used to achieve the teaching and learning goal of each particular situation. Here is a table describing the different scenario and example of which media could be used for different goals.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear narrative</td>
<td>The use of traditional computer-based tutorials or video sequences.</td>
</tr>
<tr>
<td>Non-linear narrative</td>
<td>Hypermedia encyclopedias and the World Wide Web.</td>
</tr>
<tr>
<td>Guided discovery</td>
<td>The use of applications with functions that can pinpoint or maybe even correct errors.</td>
</tr>
<tr>
<td>Production tools</td>
<td>The use of multimedia authoring packages and Web production tools, but also word processors and graphics applications.</td>
</tr>
</tbody>
</table>
Communication tools | The use of e-mail, chat and electronic conferences  
Linear narrative | The use of traditional computer-based tutorials or video sequences.

Source: Rahman, 2001

**The Theories**

There are many different theories on e-Learning. A lot of these theories are rooted with the idea of behaviorism developed by Russian psychiatrist Ivan Pavlov in the 1950’s. The below chart will briefly introduce each theory.

<table>
<thead>
<tr>
<th>Theory</th>
<th>Explanation</th>
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<tr>
<td><strong>Constructivism, Multiple Intelligence and Situated Learning</strong></td>
<td>This theory claims that knowledge is constructed, and the situated learning happens in a social context that needs to take into the consideration the complexity of human’s multiple intelligence.</td>
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<td><strong>Literacy, Multimedia Competence and the FIKS-Model</strong></td>
<td>This theory uses the concept of literacy and ICT-didactical competence where literacy denotes the very generate ICT skills and the ability to update these, as all should be posses the three basic literacy: reading, writing and arithmetic (Anderson, 1999). This theory encourage the teacher to be comfortable with the multimedia technology as he/she would be with reading writing and doing arithmetic.</td>
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<td><strong>Cognitive Load Theory</strong></td>
<td>The human cognitive architecture comprise of three basic components: sensory memory, working memory and long-term memory. The cognitive load theory uses this architecture to develop learning effects such as goal-free effects, worked example effect, completion problem effect, split-attention effect, modality effect, redundancy effect, variability effects, imagination effect, and rote vs. meaningful learning. (Refer to diagram A.1)</td>
</tr>
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</table>

![Diagram A.1 (Source: Rahman, 2001)](image)

There are many more other theories that are not covered in this report, because this is an rapidly changing industry that scholars have only explore the tip of the iceberg. The theories the report has to offer are limited to the instructional context. There is very little
research conducted on how animation, image and sound affect the learning experience. It is difficult to measure the effect of e-learning because the learning experience cannot measure the quantitatively of the experience.

**Traditional Learning vs. e-Learning**

This report defines traditional learning as classroom based lessons that use of blackboard, books and printed exercise. One cannot say traditional learning is better than e-learning, because the focus should not be which method should be used to teach, but actually what should be taught. If should focus on how to create a successful curriculum that targets the needs of the students. Traditional learning is primary facilitator driven. The teacher or facilitator plans out the objective for the class and controls what happens in the classroom. The role for an teacher facilitator should not be overlooked in an e-learning environment.

In general, e-learning tends to be more cost efficient because there’s less down-time and don’t have to hire as much staff as traditional learning requires. Distance learning can cut-down the cost of running a school building. For cooperation, they can decrease the production cost because they don’t have to accommodate the opportunity cost of sending their employees to a class or seminar. However, the down-side of e-learning lacks the dynamic interaction between the people in the class. Another danger that e-learning post is the human dependency on technology. The tradition classroom is where most children learn communication, interaction and discernment skills that electronic classrooms cannot provide this type skills.

I had a fairly bad experience with distance learning course in university were we are require to go to school only for examination. The course was based on the student reading the textbook and then writes reports and assignments, afterward we are required to go to school for evaluations. Each week we are required to listen to a twenty-minute visual and audio presentation, then log-on to a message board to discuss the week’s lesson. I think it was a failing learning experience because it doesn’t provide the dynamic of a learning group. Even though I’ve saved time by not traveling to school but it took me longer to process the material than I would usually need if I were in a lectured based course. I was also less eager about this class because it was not satisfying to fill out
message board questionnaires. It lacked the crucial human interaction between the facilitator and the students, and among the students. In my opinion, the learning experience would be enhanced if the course were taught in a combination of lectures and on-line supplements. Distance learning requires the student to be more self-motivating and have greater self-discipline. It is crucial for the facilitator to spark the interest of the class. A static message board lack the real-time respond needed for a successful lesson.

The Educator

In traditional teaching and learning environments, teachers are customarily the primary facilitator of the classroom. He/she dominates the atmosphere and the flow of the class. It is important to keep the teachers up-to-date with the technology for maximum results, because the teacher has to manage the technology and the class at the same time. Any drawback on the technology will result in lost of time for lesson. That is why teachers have to be trained to use the technology. According to Patricia Rogers, the author of Designing Instruction for Technology-Enhanced Learning, the model for technology adoption hierarchy for the educator is familiarization, utilization, integration, reorientation and evaluation (Rogers, 2002). The teachers who use new technologies in their curriculum have to constantly be updated with the technology, they also have to constantly navigate through vast amount of knowledge and pick just the topics they need. Other issues surrounding e-learning educator include the teacher’s “role of self-paced learning calls for a range of new competencies, including supervisor-qualifications, support and facilities the student’s progress, advise the process, expert in special subject matters, inspire when spirits go low, arbiter at group discussions, critical friend in order to provoke the students to seek beyond the easy solution and evaluate the objective to improve the students’ learning capacities” (Rahman, 2001).

The Students

Most students find it is motivating that e-learning allow them to have control for their own learning experience. The students are excited because the new media enable them to construct knowledge of their own at their own pace that the teachers cannot foresee. Another advantage for e-learning is that student gain more transferable skills
using different media than traditional methods. The skills they learn are not limited to what are being taught in the lesson. e-Learning has the ability to target a wider range of audience than traditional method because each group’s need can be addressed. The below table is a summary of the different types of outcome students can achieve from e-learning.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Definition Examples</th>
<th>Strategies, Media, Learner Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>Moral development, social development, and human interaction. Changes in attitudes are demonstrated by preferring or choosing options.</td>
<td>Teaching strategies should include human modeling and allow actual practice, instructional medium must include real practice and/or close simulations. Feedback with explanations is necessary.</td>
</tr>
<tr>
<td>Motor Skills</td>
<td>Movement of any kind, including: dancing, writing, welding, playing a game, etc.</td>
<td>Teaching strategies should allow actual practice. Instructional medium must include physical objects or close simulations. Feedback with demonstrations is necessary.</td>
</tr>
<tr>
<td>Verbal Information</td>
<td>Facts, spelling, basic terminology, reading and/or listening to learn.</td>
<td>Teaching strategies are usually teacher-centered (lecture is most common). The medium must present verbal information in written and/or oral form for nonreaders. Feedback may be simple notice of correct or incorrect answers.</td>
</tr>
</tbody>
</table>

(Source: Rogers, 2002)

**Instructional Design**

Instructional design is the communication or transfer of knowledge to learners in the most efficient, effective manner possible (Mergel, 1998). Instructional design have to use a more formal and systematic way of thinking about the teaching and learning process, because systematic thinking helps designer focus on each component of the design process that ensures a successful design that targets the uniqueness of each lesson. The designer has to think in multidimensional ways and has to be familiar with more than one media. He/she has to take into consideration that the technology is not the primary focus of e-learning, but they are a tool that increases the quality of the learning experience for both the student and the student. One other advantage of electronic learning application is that the navigation of the lesson does not have to be linear and it can provide real time feedbacks. Some important thing to take into consideration when designing multimedia application is split-attention effect, which means the limitation of human mind to process multiple sensory stimulations. For example, it is found that which
mean animation with sound is more effective than animation with text (Rahman, 2001). A good understanding of the human behaviorism and cognitive architecture is needed to develop useful multimedia instructional applications. The design should be student and goal oriented. There are many technologies out there, a designer should be careful in choosing which media is appropriate for the individual goal.

What’s Out There

On my preliminary market research on what e-learning software available in retail store I’ve found that the products available in major electronic retailer stores such as Futureshop only target the preschool children audience. A majority of the applications are read-along stories or basic arithmetic application. One commonality between all the multimedia applications available in the market is that they use mainstream cartoon characters such as Disney’s Mickey Mouse and Buzz Light-year, or PBS’s Arthur and Franklin the Turtle. The average price for these applications is about thirty dollars. This is a growing market with a lot of potentials, because students of any age can be benefited from educational multimedia. There is an increasing need for tools to help students to visualize different concepts such as atoms and molecules and quadratic equations.

E-Learning is not only limited to delivering knowledge to students. Milliken Mills High School of Markham Ontario is a good example of the uses of web technology outside of the classroom based. They have a student report process that is accessible to students, teacher and parents. Students and parents can log on to their school website to find the student’s grades and compare them with other students in the class. The entire statistics of the school and up coming event are posted in the Internet. Even though the technology is not a direct part of the teaching and learning process, but yet it serves an important educational purpose. It provides easy access to school reports and student progress for the parents so that they can be a part of their children’s education and have more feedbacks.

Summary

Technology plays a big role in our lives today. Bringing technology into the classroom can increase the proficiency teacher’s delivery of his/her lesson. It is important
to implement technology in the classroom because it is tool to bring up the students’ level of interest. Using technology in classroom not only deliver the lesson to the student, but it prepares the student to live in a society that is very much technology driven. The students are going to experience even more rapid changes in technology than we are. That is why using technology in the classroom and e-Learning is very important. It’s not only because lessons taught with the appropriate media will enhance the learning experience, but it also prepare the students for the future.

The availability of new technologies does not and should not guarantee the use of them because the lessons should be taught in the most appropriate manners using technology as a tool to enhance the experience. By no mean, should technology take over the role of educator or be the solely because the technology is available or just to lower the operation cost. When to use or not to use new media technology is a difficult judgment call because the success of a learning experience is hard to be measured quantitatively. A lot of close assessment should be conducted to ensure the quality of the lesson. For best result, a combination of e-learning and traditional learning method should be used. New media is a tool and a device to enhance our lives. We should have an equal degree of embrace and cautions when new technology is implemented into our life-style.
**Part C: Interview Report**

Interview with Miss Heidi Chan of Coledale Public School, Unionville, Ontario, on the effects from the usage of new media technology in her classroom and in her school. Miss Chan teaches Intermediate French, geography and mathematics.

1) **Which type of technology do you use in a) your classroom b) the school**

<table>
<thead>
<tr>
<th>Classroom</th>
<th>Technology</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>CD/cassette player</em></td>
<td>- Read-long</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Radio</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Tapes for listening</td>
</tr>
<tr>
<td></td>
<td><em>Over head projector</em></td>
<td>- Demonstrate word problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Notes</td>
</tr>
<tr>
<td></td>
<td><em>Computer</em></td>
<td>- Research (student and teacher)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Type documents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Software: Geo-sketchpad: create shape and manipulation (for math class)</td>
</tr>
<tr>
<td></td>
<td><em>Television</em></td>
<td>Video presentation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School</th>
<th><em>Computer Workstations in the library</em></th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>- Set-up WebPages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Computer classes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Write essay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Evaluate websites</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Athena: Researching software. Student has own account and profile to login and logout.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Report Card system (Home maker Profile 4.1)</th>
<th>Teachers input the grades of student of their classes. Access is limited to the class that he/she teaches. A school staff technician merges the files to compile student report card.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>PowerPoint and Sound system</em></td>
<td>- For school assembly</td>
</tr>
<tr>
<td></td>
<td>- Student run and trained</td>
</tr>
<tr>
<td></td>
<td>- Easy to use</td>
</tr>
<tr>
<td><em>P.A. system</em></td>
<td>- Page student or teacher in school, classes or corridor</td>
</tr>
<tr>
<td></td>
<td>- Student run program</td>
</tr>
</tbody>
</table>

Note: Junior classes (grade 4-6) has their own class website so that the teacher can upload assignments and update test schedules. Intermediate class uses agenda because the teachers feel the students use too much time on the computer already.

These technologies are standard for most of Ontario’s school board including York, Toronto District School Board, YRIDS, Catholic School Board, Durham School Board, Peel School Board and Separate Schools.

2) **How does the technology affect your teaching experience?**

Technology such as PowerPoint and overhead projectors save time because I can prepare the material before hand so that it saves time because I don’t have to write everything on the blackboard. The computer in the classroom is quite handy too. I can save time in
doing research on the computer rather than going to the library. I’d prefer to use projector over PowerPoint because it’s a long process to set-up, and we only limited access to the projector and laptop computer, take a long administrative process to gain access to the equipment. The PowerPoint projector is usually used during school assemblies. Another affect that technology has on my teaching experience is that I have to supervise the students when they are using the computer time to make sure they are not just surfing on the Internet or playing online games. We don’t have the parental restriction devices installed on the school’s computers.

3) **What would you do when a technology fails?**
I would tell the school’s staff technician and he would see if the can fix the situation. If there were bigger problems he/she would call the school board’s technician. The school’s staff technician is a trained teacher and took workshops to become a technician, so his knowledge with the technology is limited. The school’s staff technician deals with internal problems and compiles report cards. The waiting period to fix a technical problem is usually half a day for the school’s staff technician. Whereas it could take a week for the school board technician to fix the bigger problem, because we will have to call the school board, tell them the problem, then wait for them to send a technician.

4) **Do you have a preference for technology based lessons or traditional based? How does it affect the classroom?**
I don’t have much of a preference. I would choose whatever works best for that particular lesson. I usually write my notes on overhead to save time and it’s easier to read for the students. However, I encourage the use of computer for research projects because it have faster access and don’t have to take the students to another location such as the library. The Geo-Sketchpad is good software to use because it visually represents the changes to the students so that they have a better grasp of the math equations in action. They don’t have to visualize the challenging concepts in their head, because it is hard for some students do mentally visualize math problems.
5) From your observation. How well are the students adapting to technology based lessons. What are the differences between technologies based lessons vs. traditional ones?

From my observation, I think the students are adapting to the technology very well. They enjoy going to the computer lab because they rather use the computer to write essays and do research over traditional methods. They also enjoy lessons with television and video. I don’t find a big difference between traditional lessons and technology enhanced lessons. I think the students are very comfortable with the computer. A majority of the students know how to download music from the Internet and burn CDs. They use the Internet very often to chat with friends using ICQ, MSN and e-mails. There is one incident that where two students are so advanced in computer technology that they can hack into the school’s computer and deleted all the files. Therefore I think there’s a need to increase the security of the system.

6) How do you prepare for the implementation of technology in classrooms?

I am offered to take seminars and workshop to learn about new technology and how to use software. Sometimes I learn from fellow teachers who have attended seminars.

Reflections on Interview

The technology and the process that Coledale Public School has to offer surprised me. I remember back when I was in public school less than a decade ago, we had very limited access to computer and we were not trained on how to use the Internet. I think Coledale’s is doing a good job at preparing the children for the future because they are training them to use the Internet and do complicated searching using shared equipments. Sharing the digital space is very important because all it’s something that persistent in the school and work environment with computer. Another thing that struck me is that the teachers take the time to teach the students to evaluate websites. I think this is a good exercise for the students because it teaches the student to discern the truthfulness on the in Internet and media. However, one problem I found with this system is that it takes a relatively long process to wait for a school board technician to fix a technical problem, because a lot of time is wasted on the administrative work that would slow down the lessons.
Part D: Project Prototype

Summary on Prototype

I have constructed two prototypes for this research paper; one is a simple video editing application, the second one is an online exercise builder application. These two applications each have a builder and reader components. The teacher/facilitator can create their presentation or exercises using the builder application and students will use the reader application to view the presentation or complete the exercises the teacher has posted on-line.

Proof of Concept

The Shockwave applications were designed to be used over the Internet to make the distribution of the exercise and presentation easier. I’ve designed the video presentation application to allow the teacher to use any video footage they have and then pause the presentation, insert an image and or text. It works a little like a video editing program where the user can insert a slide. Then all the information will be parse to the reader application and the student can view the video clip with the inserted image and text. The idea behind second application is similar, the builder application will allow the user (teacher) to make math or multiple choices exercise and post those data so that the reader application can grab the information and use them. All the student will log on to the same reader application to do the exercise posted by the teacher earlier on.
**Project Evaluation**

The video builder application did not turnout as the way I wanted it to because I cannot make the teacher application to use Director or shockwave to upload video or graphic. The initial concept failed because of limitation to technology and limited previous knowledge on subject. I have stopped the production when I faced this problem because I wanted the application to be read online. That is when I started producing the second application where the builder application can allow the user (teacher) to sent upload the questions to a MySQL database using php and then, the reader application (student) can download the question and study at their own pace.

**Assessment Track**

The initial concept failed because of limitation to technology and limited previous knowledge on subject. The exercise builder application is not completed because there is limited time left after the initial video builder application failed.

**Project Post-Evaluation**

The production for the first prototype has stopped because of limitation to technology. In the future, I would do more research on how to build difficult applications. I believe the ideas were great because they are practical and it’s something that is not available in the market. The second prototype is still a work in process, and it is looking more promising than the first prototype. The application now is only allowing the user to set up arithmetic questions and even that is not completed. I am working on completing it by next week to hand in as my personal project for the Authoring II course.
Part E: Internet Sites about e-Learning

**e-Learning in general:**
- [http://knowledgeanywhere.com/](http://knowledgeanywhere.com/)
- [http://www.evc.org/](http://www.evc.org/)
- [http://www.e-learningcentre.co.uk/eclipse/default.htm](http://www.e-learningcentre.co.uk/eclipse/default.htm)
- [http://www.e-learningcentre.co.uk/eclipse/Resources/collaborative.htm](http://www.e-learningcentre.co.uk/eclipse/Resources/collaborative.htm)

**On-line tutorials for students:**
- [http://www.explorescience.com](http://www.explorescience.com)
- [http://www.thinkwave.com](http://www.thinkwave.com)
- [http://itech.fcps.net/](http://itech.fcps.net/)
- [http://www.pbs.org/](http://www.pbs.org/)
# Appendices

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Reference

Andresen, B. The art of seeing the woods and the trees. Socrates and educational multimedia, Royal Danish School of Educational Studies: 1999.


Iuppa, Nicholas V. Interactive Design for New Media and the Web. Focal Press: 2001


