Learning How to Learn...

"For where is any author in the world
Teaches such beauty as a woman's eye?
Learning is but an adjunct to ourselves."
(Shakespeare, 1593-96?)

"Learning how to learn, exploration, and decentralized teaching of beginning computer skills at the college level."

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Introduction

"In this rapidly changing world, the challenge of teaching is to help students develop skills which will not become obsolete. Metacognitative strategies are essential for the twenty-first century" (Blakey & Spence, 1990 p. 2).

This literature review is an exploration of new ways of instructing college students in basic computer skills. Specifically, learning to learn, the effect of phobias on learning, and innovative ways to teach people about technology will be explored.

The Problem

Being self taught, as is evident from the autodydactic nature of those adept at using the tools of the information age (here-to referred to affectionately as geeks) is now a necessary part of being successful in the world. The Internet's chaotic and decentralized nature (Resnick, 1997), combined with computers being crude and hard to use (Norman, 1997), make for an environment where learning to learn thrives. To help students survive in such a changing world, beginning technology courses must teach "learn to learn" skills.

Ideally, college classes are filled with interested students wishing to achieve and succeed; with teachers who provide challenging opportunities to all students so they may experience success. However, because students enter beginning computer classes with totally different skills and comfort levels with technology, the ideal teaching environment is not usually possible. Some students enter beginning computer classes angry because they are required to take the course, others are scared of computers, still others are raring to explore with wonder and joy in their hearts. Teachers can no longer teach all the students at the same time, on the same subjects, and expect to meet the diverse needs of students. A decentralized approach to teaching is needed within a new environment free of fear where learning to learn is facilitated and exploration encouraged.

This review is broken into three sections:

--Learning to Learn

--Phobias

--Innovations

Findings

Learning to Learn

Imagine relearning how to drive every time you bought a new car. What a waste of time! Yet beginning computer students who are only taught the

steps to accomplish a specific task do just that, learn to drive from scratch each time they learn new software. In the name of saving time in the short term, they waste time over their entire working life.

Self directed learning skills are also needed on a purely practical level. There

is too much to teach concerning technology for each student to have their hand held through every step of every application. Geeks, the pros at learning about computers, are by nature self taught and exploratory learners who embrace technology without fear, and they learn new programs as easy as cutting butter with a chainsaw. Geeks are in fact meta-meta learners. Not only do teach themselves how to use computers, but they also teach themselves how to teach themselves how to learn. Should we all strive to be geeks? Goodness no. Should we learn to emulate the way geeks learn when we need to learn about technology? Yes!

A constructivist educational approach would seem to fit nicely here. Constructivist approaches are particularly good when learners need mental tools to interpret and act responsibly in complex, ambiguous situations (Hoffman & Ritchie, 1997). But Ritchie and Baylor (1997) reported student discontent when a basic pre-service teacher competency course was radically changed to a constructivist model. The new environment of learning individually, reliance on newly learned email skills, and students high level of self direction was too radical. A less radical approach that wove together behaviorist, cognitivist, and constructivist theory within a situated learning environment was more successful. Obviously a radical shift to a learning to learn, exploratory and decentralized environment isn't the answer to the problem.

But radical shifts in the environment and technique of existing methods could be. Teacher supported mediated learning approaches are more effective then strict instruction or discovery oriented approaches (Mitrani & Swan, 1990).

Being successful today involves higher level thinking of the Metacognitive sort. A study that explored the qualities of students who direct their own thinking (Dirkes, 1985) found that gifted students were highly metacognitant and developed problem solving strategies, a love of learning, and knew what helped them learn and how to ask for it. This provides a model, but while we all have gifts, we are not all gifted students. And there are dangers of getting too abstract.

Madsen and Lanier, (1992) researched weather high school students' computational competencies would be jeopardized if teachers taught for conceptual understanding but reduced the amount of time spent on drill and practice exercises in math. Their evidence suggest that conceptually taught students scored higher, made greater gains, had the biggest change in attitudes, were more confident in their ability, and willing to try new approaches.

Olsen, (1993) explored how the teaching of abstract concepts effected

college student's ability to transfer knowledge between software programs. The study looked at whether word processing skills can be taught conceptually so that transfer into other word processing software would be easier. One group of students was taught analogies and a framework for each concept at the start of instruction, then demonstrated skills, and then practiced using hands-on exercises. In the next class the same content was taught, but using a different word processing application. Students then compared the similarities between the two applications in a non-evaluative environment. The reduced frustration with new applications and the conceptual abstracting of instructional methods increased both learning and transfer by a small amount.

Software is often seen as a plethora of differnt programs to learn from scratch, when in fact it is not. There are many similar tools, buttons and commands that run through every softrware appliction, e.g. "cut" "copy" and "paste" are always in the "Edit" menu. Teach this concept and you've taught a learner how to cut and paste text and graphics in hundreds of applications.

Data supports the need to teach learning to learn and exploration skills when teaching adults about technology. But there is resistance to such self directed learning theories in higher education as Susan Wilcox, (1996) found in a study about attitudes and practices of self directed learning among university faculty. Not only do these mindsets need to be changed, but, significant phobias about technology exist and prevent such learning. And phobias should not be "taught over". They should be dealt with before real learning starts, (Filipczak, 1994).

Phobias

In 1994 Dell computer corporation did a survey study (Filipczak, 1994) that found 55% of all Americans were technophobic to some degree, in that they resisted using technology in their daily lives.

At a basic level, phobias have been shown to be related to how much control people feel they have over computers and the things they do (Castleman,

1995). It is essential that these kind of feelings be dealt with before instruction is attempted. But it's not always phobias that block learning.

Computer phobias can be also be a natural reaction to just plain bad design (Yeaman, 1992). A soon to be published book (Norman, 1997) addresses this problem of badly designed computers,

> ...the current state of computers, leaves us with 'no moments of silence', with less time of our own, with a sense of diminished control of our lives...we are trapped in a world created by

technologists for technologists. We have been told that being digital is a virtue. It isn't: people are analog, biological, not mechanical. It is time for a human centered technology." (p. 1 Synopsis).

People making computers today do things backwards in terms of the end user. First they determine the needs of the technology, and then ask users to conform to those needs. The result is technology that is hard to learn and creates frustration (Norman, 1997).

Some people who seem phobic about computers could be suffering from negative aspects of computerism (Yeaman, 1992). They might not like working with computers, they might not understand them or particularly trust them, or view their role in history as negative. Also some people just don't buy into the whole love fest that often surrounds computers (imagine that). Phobic people may also see computers as being over people and computer people being over other people, so THE COMPUTER, becomes a single entity that creates fear and resentment. Feelings like this can also be heightened by the current climate of Internet excitement.

Phobias can also come from beliefs that mathematical literacy makes for easy learning about computers. In fact technoliteracy is not based on the logic involved in solving math problems but more on mechanical and problem solving skills similar to those found in your average car mechanic, (Yeaman, 1992). This makes sense when we look at the definition of technical literacy as an understanding of what the tools we call technology can do (Filipczak, 1994).

My own observations also point to the possibility that beginning computer classes can create fear due to the different skill levels of the students. Fear grows as when the real novice students realize they have to accomplish the same amount of work as the students who know about computers, but they don't get any more time or instruction!

Can people be educated out of anxiety? Not really. The problem is not only fear, but lack of questioning about usefulness of computers. More important then basic skills is giving people ethical knowledge for coping with computer design and social use. Trying to forcibly convert people to love computers only teaches people they are helpless (Yeaman, 1992).

A study conducted by Castleman (1995) addressed the discomfort and inadequate usage of computers with pre-service teachers due to fear and lack of relevancy. Castleman found that a highly individualized, step-by-step program of computer usage in a non-threatening, non-evaluated environment effectively countered these problems. She found a higher level of comfort and confidence, an increase in time spent using computers, as

well as all the basic skills of the course being met. The study's success was credited to students being given sufficient time to become comfortable with computers before results were expected, and step-by-step individualized instruction in a non-evaluative, non academic environment with plenty of free play.

Castlemen also suggested using games to decrease anxiety and build confidence (think geek here) and that assignments shouldn't be restrictive to more advanced students who should be able to explore on their own, or be encouraged to act as peer tutors.

Innovations

Times of change always create chaos in establishments, and education is no exception. But chaos also begets innovations.

A classroom technique developed by a teacher of college level education majors (Yoder, 1996) used a novel way of teaching pre-service teachers about the Internet. Reacting to the data that step-by-step instruction leads to a lack of understanding and limited retention, she designed a series of large laminated signs on strings that were used to represent email servers and other network components. The signs were hung on student's necks and then they were moved into position to show the class what the Internet looked like. As the semester progressed, an email message was introduced as a sign, and thrown between the people to represent the path it traveled. The model grew as the student's skills grew and used humor whenever possible. The results documented fewer problems in assignment completion, and that questions from students revealed they had a deeper understanding of the Internet.

On the forefront of innovations about technology learning we find interesting work being done at MIT's famed Media Lab by a protégé of Seymour Papert. Mitchel Resnick (1996) uses simple simulators to challenge people's centralized mindsets. A person with a centralized mindset assumes a flock of birds is lead by one bird, when it is not. The birds are reacting to a set of behaviors so that at any point any bird can be the "leader". Centralized mindsets assume centralized control when there is none, this kind of mindset to how most beginners view the Web. But the recent work on chaos theory, self organization, adaptive systems, nonlinear dynamics, and artificial life, are all part of a growing interest in complex systems like bird flocks, weather, the Internet, and traffic. But there is deep seated resistance to such ideas. Mitchell is attempting to help people develop a richer set of models for thinking about complexity with tools like StarLogo, a program he developed that builds on MIT's Logo language that was used to teach kids

about programming. StarLogo lets high school students set up simulations of ants, or traffic on highways, that show them how decentralized systems work. In a recent interview in Wired magazine, Resnick (1997) said,

> When schools introduce computers, they usually perpetuate traditional ways of teaching and learning. What we need to do is rethink the process of learning in a way that's suited to the digital age. The traditional approach of the teacher who transmits information to the learner is very centralized. We need to find way for learners to take more responsibility for their own learning. It's wrong for educators to think they can totally control how and what someone is going to learn. That doesn't mean leaving kids on their own. It's more like tending the soil so good plants will grow, less like building a product. (p. 136)

There is also wonderful work being done with kids in the famous Italian town of Reggio Emila (Reggio, 1997). For decades this town's radical approach to educating its youth has been studied in depth. Recently the town bought computers for the schools and, true to form, didn't integrate them in the normal way. Using the same methods as they did with clay, the teachers put extreme importance on first encounters. Teachers did not plug in the computers for the first few lessons. Instead they let kids explore the monitor's similarity with TVs, and how the inside of the computer looked like a city. Realizing that the children's success with computers would depend on successful communication, and that the kids had to get to know computers on their own terms to build trust and communicate, these first encounters were exploratory. Because learning about computers is like learning a foreign language, the first thing the teachers did after turning on the computers was to hook them up to a robot and have kids control it using programming commands.

Innovations like these help teachers explore and learn to learn just as much as the students they are tested on. In the current times, the teachers are learning just as much as the students!

Hypothesis

Creating a learning to learn, exploratory, and decentralized environment is a more effective way to prepare students for the technical world they are entering.

Studies show that teacher facilitated environments where phobias are

aggressively counteracted, learning to learn is constantly encouraged in as non-evaluative an environment as possible, help the teaching of skills that are needed in the information age. At the same time evidence also shows that teacher facilitated classes also still work better then radical changes in the system. New times beget new twists on the proven teaching methods. Teachers must decentralized, but still lead. Skills need to be drilled and lectured, but students also need to compare software's similarities and play games in a non-evaluative environments.

Ultimately teachers need to probe into the chaotic and alien nature of computers and the Internet and find new ways of helping student learn the skills that will let them be successful over the lifetime of self directed learning that they face.

In conclusion, and in the spirit of this paper, the writer hopes that the information presented here has created an environment wherein the reader can teach themselves their own conclusions.

Below are some ideas for further research:

- What if students were taught email and saving using drill and practice? Imagine students emailing multiple emails to themselves first, then to partners, and only then to the teacher for a grade? Or having students save 30 copies of the same non-essential file to floppies, hard drives and desktops in rapid succession before saving any important work?
- What if there was an assignment that had students confront fear by having them crash their computer while using non-valuable data? Now, students first crashes usually take place while alone and in the middle of an important assignment, which only increases fear.
- What if after learning one application, students were briefly exposed to another that did the same thing, e.g. Microsoft Word, ClarisWorks, and then given a short time to compare the similarities?
- A large number of requests for help are the result of students not having dropped down any menu items to look for what they need. What if a Menu Item Toolbar Search (MITS) was taught before any software was taught, and what if students were required to implement it by checking all the drop menus and looking at all the toolbar options before asking for help?

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