Is Technology turning our Kids off?

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Introduction

A discussion with some twelve year olds has led me to do some investigating about exactly how are your people are relating to technology and what they learn about it. This raises some questions. How do we influence our youngsters to incorporate and assimilate technology in a meaningful way in their lives? To what extent are we able to interest children to get involved with the development of technology?

Kids are not interested in knowing how technology works today because today's environment is driven by product glitz. They see a product, are dazzled by its glitz, and they want to get it immediately. They get the glitzy product and learn how to play it. But nowhere in this approach do they learning anything about the technology behind the glitz In K-12 programs, we use products with glitz but our explanation of the technology is often quite short. I believe that the key to changing this is getting kids to learn how technology develops the glitz so they become more interested in learning how to it works. In the process of teaching the 3 R's, incorporating the use of these technologies with an explanation of the glitz will perhaps spark students' interest and move them into the areas of learning sciences and technologies.

Today's environment

Today's environment is very different for our children. Our children are increasingly saturated by technology: from television-to-Internet, radio-to-CD players, VCR-to-DVD players, telephones-to-multi-media portable devices and from multi-media video games-to-multi-media computer games. All of these technologies and the stimuli they generate bombard our children from the earliest age.

Let's examine a few aspects of today's environment.

On average, each household in the United States owns 2.5 televisions (Consumer Research, 1999). Each child watches an average of 25-30 hours of television per week (Consumer Research, 2000). By the age of 18, the average child will have watched 22,000 hours of TV - more time in front of the tube than in the classroom. They are consistently bombarded with advertisements that try to get them to be consumers of various products. The advertisers use various devices to stimulate, excite, and engender some form of rapid buying response. Mothers often see and understand this phenomenon when they go shopping with their child who asks for something that they saw in a recent television advertisement. At what point does the child become engaged enough to become proactively involved and request the item he or she has seen in the advertisement?

Every advertisement presents some form of excitement. The child is able to project for itself from the advertisement. As a result, the advertisement achieves its purpose in stimulating the child to anticipate the same excitement when the item is purchased. The child develops the excitement ("what") and learns that playing with the product ("how")

is the stimulation and driver of the motivation to purchase. Why it is exciting (colorful, speed, etc.) or what makes it work (programming, levers, gears, etc.) are not the primary drivers in this advertising scheme. From an advertisement or marketing perspective, the objective is not to delve into the reason why the technology behind the product works but only that it provides some personal utility.

In that sense, the advertisement only seeks to have the child to become a consumer. Each advertisement elicits some call for action. Preferably, the advertiser seeks a rapid response. Frequently, the child is given some sort of an incentive in order to come to the purchase decision quickly. Many "freebees" are offered so the ultimate purchasers (our kids) perceive themselves as getting a bargain. This drives our teenagers to buy the latest in CD's, cellphones or other technologies.

Coupling of Computing and Electronic Technologies

Computer and electronic technologies are relatively new fields compared to the other sciences. Since the development of the first commercial computers in the 1950's, the growth of computing technology in the last 50 years has significantly impacted our lives. With the introduction of personal computers in 1981, computers have been assimilated into our businesses and homes at a phenomenal exponential rate. Today, the average household owns 2.5 televisions (Consumer Research, [CR], 1999), 1.5 VCRs (CR, 1999), .25 DVDs (CR, 1999), 1.25 (Bailey, 2001) or (160 million) computers and 100 million mobile phones (Bailey, 2001). Video games consoles are being adopted by American households faster than VCRs and are estimated to be in nearly 70 million homes by 2005 (Lowenstein, 2002). Embedded computer chips are in most of our common electronic appliances: TV's, telephones, VCRs, video game consoles, DVDs, radios, cars, coffee makers, major appliances, watches, beepers and hair dryers. You name it – it might have it!

With the introduction of the Internet, our electronic connections extended our communications (e-mail) capabilities and increased access to information and data stored in web pages. As of January 2002, there were 147.3 million computers (Internet Domain Survey, 2002) connected to the Internet and it is estimated that there will be 250 million by the year 2005. Upwards of 423 million people use the Internet and there are over 1.4 billion web pages on the net (Internet Domain Survey, 2002). Today web pages are being added at the rate of a million pages per day.

These are only some examples of the impact of information technologies. They affect the availability of web-based information/data. Our ability to easily use these technologies in our everyday lives requires us to learn and enhance our technology skills. There will be similar requirements for our kids and our students. They will have to have enhanced skills in order to understand how the technology is used in order to adjust rapidly and easily to such changes.

Rapid introduction of New Technologies

Computer and electronic-related innovations have enabled the development of new technologies in many areas. Innovations have occurred in the area of biology, chemistry, electronics, metallurgy, physics, and sociology. Specific applications in the fields of aviation, energy, graphics, materials, medicine, nanotechnology, software and transportation have been driven by computer and electronic-related changes (Benditt, 2002).

The rapid introduction of new computer and electronic-related technologies has posed new problems that need to be addressed. As a result, we need:

1. To understand the principles used in the development of the new/advanced technology.
2. Assimilate these changes to reduce the level of anxiety associated with the change.
3. Incorporate the use of each new technology into our lives.

These are some of the key challenges that the introduction of new technology places on the classroom.

Glitz verses Substance

In the development of these new technologies, an enabling component of the technology is software. With today's current marketing model used by most software corporations, new product introductions provide more glitz than product substance. In many cases, this results in unreliable software. For example, Microsoft's Windows XP operating system has 45 million lines of code. On Oct. 25th, 2001 the date of XP's introduction, Microsoft issued 18 megabytes worth of changes associated with fixes for bugs, enhancements, and compatibility features. Once XP is installed, the computer user must then add these 18 MB of changes (Mann, 2002). Is this reasonable?

In other instances, when you download new software, it is likely that the new software interferes or disables another piece of functioning software on your computer. This causes an individual computer user a great deal of inconvenience in both terms of both time and money.

All too often, students are enamored with the glitz of technology and do not step back to evaluate the substance of the technology. In the examples above, the choice is made based upon the software being "cool, neat, slick, or wow". It is essential that we provide K-12 students with an understanding of the principles involved in the development of a given technology, like software, so they are able to make clearer judgments about the substance and not the glitz. What approaches are most successful in providing students with an understanding of that substance?

Educational Environment

The Fundamentals

The curriculum for K-12 students focuses upon three key areas: reading, writing, and arithmetic. In developing each of these skills, each student may be exposed to teaching techniques like stimulus-response, emotional development, and finally, problem-solving in the course of their learning. Each of these approaches is used in K-12 classrooms.

In the stimulus-response approach, the student is taught to develop good habits in solving problems directed towards one solution. Stimulus-response is often used in mathematics and the language arts. The emotional development technique focuses on the personality of each student and lets the student develop skills that fulfill his/her particular need and desire. Lastly, the problem-solving technique teaches students to distinguish and understand relationships between objects in a particular situation and learn how to come up with the best solution. Again, language development and mathematics often use this technique.

Each of these teaching approaches is used to broaden the student's learning experiences. In today's classrooms using various technologies, additional variables associated with the use of electronic and computing technologies need to be considered to augment the learning process.

Preparation for Technology

Using new technology within the classroom setting requires additional resources and planning. Introducing computer technology in the arts, literature, and mathematics places high demands upon the teacher to know exactly *who* will make use of the technology, *what* is to be achieved, *when* is it appropriate, *why* this technology is helpful, and *how* it will be implemented in the classroom. Given the plethora of choices, *planning* is essential to achieve an integrated and consistent delivery.

Using computer technology requires that the institution provide a significant amount of supporting resources. Depending upon the scope of your technology plan, additional resources are needed for computers, PDA's, networks, software, and supplies. It depends upon the application(s) being proposed. A centralized planning approach to integrate all resource needs provides the best economies of scale.

But, regardless of the planning involved on the teacher's or administrative staff, the student's involvement is critical in the assimilation of the technology being taught. Factors relating to this are:

Desire to Learn

A passion for learning is a key factor in the student's development. By investigating and determining which technologies are appropriate for classroom delivery, the challenge is to couple those technologies with the student's interest or desire. Since the technologies are a means to fill the student's needs, and it may foster their passion for learning.

Motivation of Achievement

Each student is challenged to achieve in many ways. Providing the insight into the knowledge of technologies and their use may provide another vehicle by which the student can achieve a desired goal. An expectation about the achievement is a critical factor in terms of addressing the motivational desires of the student. Coupling the student's desire to achieve a goal with the use of some technology is a way to introduce new technologies to the student.

Creativity Fostered or Suppressed

Students may be already enthusiastic by technologies or may have some desire to learn the technology. If prior desire to learn the technologies has been rebuffed or deflected, the children may suppress their desire to learn the technologies since they did not get an initial positive response. The challenge is to understand the child to foster a positive and inquiring approach the next time such an inquiry occurs. How can we make each interaction a positive experience for our children? What guidance can we provide our students?

Quandary for Future

Guidance

Is a methodology necessary to provide K-12 students with guidance to assimilate the material? Will steps, such as the Big6 ^{TM}, help prepare students to become better information analysts and decision makers? The Big6 ^{TM} includes:

1. Task Definition
2. Information seeking strategies
3. Location and access
4. Use of the information
5. Synthesis
6. Evaluation

What guidance is appropriate to provide our students with the material and substance to go forward and accomplish the task? How do we ensure that the students can obtain the information needed? Many students may not have access to obtain the information. Even if they do, they may not know how to use appropriately the information gathered? This activity involves the ability to synthesize and evaluate the content. This also requires

discipline on the student's part in making a decision about *what* the problem is and *how* to use the resulting information to solve it. This approach helps the learning process by focusing the student into the "what" it does and drives to a deeper appreciation of how the component technologies work.

Incentives

We have to bring our K-12 children to an appreciation of the principles and practices behind the implementation of various technologies. The LEGO competition is a tremendous learning opportunity for children to learn teamwork, physics, programming and other technologies at the same time within the experiences of competition. The LEGO Dacta Challenge is a competitive (or non-competitive, cooperative if desired) event in which teams of students design and build (and sometimes program) LEGO models to perform a requested function (Lego, 2002). Placing those models within a specially designed field, students test the performance of their models against set criteria. Events can be set in a competitive or cooperative environment if desired. The model that meets all the design criteria and performs best in the competition wins! We must dispel the attitude that learning the principles of existing technology is not important since the existing technologies will be replaced before they can learn it. It is a great way for K-12 children to gain a greater appreciation for how technologies work. This program provides incentives to our K-12 students in much the same way that our advertising approaches do. With the disposable nature of our product-cycle, students are not interested in learning the *how* but only the *what*. Is because of our current product marketing mentality? How do we counteract this influence?

Attributes of this LEGO's project experience are highly interactive, driven by the nature of the team environment, follows the structure of the project that the team designs, and each child has personal responsibilities to complete a portion of the overall project. This program requires a significant investment of time and individual instruction by the teacher, program leader, and team mentors. A key element is that all the children have a very strong personal experience in learning *how* a project is completed. The development of the team leads to understanding, working together, and excitement.

Once a child becomes enthusiastic, the level of excitement builds if it is encouraged. Our role is to help K-12 children to become enthusiastic about technology. Why? Our children will be encountering technology changes now and in the future that will be rapidly introduced across many industries. From an educational perspective, we have incorporated changes in educational technology but with limited success (Armstrong, 2001). Others technology changes have been very successful, but, has it widened the economic and social gap of the digital divide as described by D. Bolt and C. Crawford (Bolt, 2000).

Rewards

Our children need to become fluent in the use of technologies. They need to know how they can be incorporated successfully in many fields of endeavor. Change is inevitable

and technology will be the main driver of that change. Technology is being marketed into our homes, industries, and governments at a rapid pace.

K-12 children will be continually bombarded by these technology changes. Providing an excellent understanding of technologies and their principles will have a two-fold effect. First, the children will understand the *what* and *hows* of technology and second, they will be better able to assess what are good or bad technology implementations. Remember, it is children who work and not the technologies (Ramsey, 2001).

Our mission is to provide them with the best education that will enable them to use their knowledge of technologies to the best of their abilities. Let's turn off the glitz and provide our K-12 children with substance!

(1) Consumer Research, Video Equipment, January, 1999, www.eBrain.org.
(2) Internet Domain Survey, Internet Software Consortium, January 2000, Retrieved April 21 2002 from http://www.isc.org
(3) Lowenstein, D. (2002, May). Interactive Digital Software Association, opening remarks at Electronic Entertainment Exposition. Retrieved July 2, 2002 from http://www.e3expo.com/media_center/show_news.shtml.
(4) Bailey, R.Reason Magazine, ReasonOnLine, Good Times, Ronald Bailey, April 25, 2001, http//reason.com/rb/04252001.shtml.
(5) "The Young Innovators: Who will Create the Future." (2002, June), Copy Editor: John Benditt. Technology Review, 105, 5, 65-92.
(6) Mann, C. C., (2002, July/August). Why Software is So Bad. Technology Review, 105, 6, 33-38.
(7) Lowe, C. Research Foundations of the Big6™ Skills, Information Literacy for the Information Age, http://www.big6.com.
(8) Armstrong A., Casement, C. (2001). *Child and the Machine: How Computers Put Our Children's Education at Risk*, Beltsville, MD.: Robins Lane Press.
(9) Bolt, D. B., Crawford, R. A. (2000). *Digital Divide: Computers and Our Children's Future*. New York: TV Books, L.L.C.
(10) Ramsey, Grant. *Teaching and Learning with Information and Communication Technology: Success Through a Whole School Approach*. National Educational Computing Conference, "Building on the Future", July 25-27, 2001, Chicago, IL.
(11) LEGO Corporation. (2002, July). LEGO Data Challenges. Retrieved July 8, 2002 from http://www.lego.com/dacta/machines/challenges.asp.