

Editor's Note: The following are excerpts from the book "Thoughteracy for All." M.O. Thirunarayanan, who is the author of the book, is an associate professor of education and a fellow of the Honors College, at Florida International University, in Miami, Florida. The book is available for sale from most major online booksellers.

Thoughteracy for All

By M.O. Thirunarayanan, Ph.D.

What is Literacy?

Literacy is defined by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) as:

. . . the ability to read and write, with understanding, a short simple statement about one's everyday life (UNESCO, 2005a).

The National Center for Educational Statistics (NCES, 2005) defined literacy as follows, and used it in its 1992 and 2003 literacy assessments:

using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential.

Such limited and primarily alphabet-based definitions of literacy may have been appropriate, and perhaps even sufficient, until the emergence of sophisticated tools of information and communications technologies, such as the computer, cell phone, video cameras, text scanners and text-to-speech converters, and voice recognition and language translation technologies. These new and versatile technologies will slowly but surely initially diminish and then eventually altogether do away with peoples' reliance on soon to be obsolete skills such as reading and writing.

What is the Extent of Illiteracy in the World?

Information contained in a report on world literacy released by the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2005b), suggests that there are about 800 million people aged 15 and above who are considered illiterate. This number, which is just an estimate, represents about 18% of the people in the world who are 15 years of age or older.

Given the minimal definition of literacy used and the problems inherent in estimating the number of people who are considered literate, it is quite possible that the actual illiteracy rate is at least twice the rate estimated in the UNESCO (2005b) report. If the criteria for being literate is raised the number of people who are considered illiterate is likely to be much higher. It is quite possible that nearly 36% of the world's population or 1.6 billion people in the world who are 15 years or older, are illiterate, or cannot read and write fluently.

The Consequences of Illiteracy

Being illiterate in a society that revolves around the written word certainly has serious consequences for those who cannot read and write. After reviewing data from the 1993 National Adult Literacy Survey, Kirsch, Jungeblut, Jenkins, and Kolstad (1993) note that:

- Individuals demonstrating higher levels of literacy were more likely to be employed,

work more weeks a year, and earn higher wages than individuals demonstrating lower proficiencies. . . .

- Adults in the lowest level on each of the literacy scales (17 to 19 percent) were far more likely than those in the two highest levels (4 percent) to report receiving food stamps. In contrast, only 23 to 27 percent of the respondents who performed in Level 1 said they received interest from a savings or bank account, compared with 70 to 85 percent in Levels 4 or 5.
- Nearly half (41 to 44 percent) of all adults in the lowest level on each literacy scale were living in poverty, compared with only 4 to 8 percent of those in the two higher proficiency levels.
- On all three literacy scales, adults in the higher levels were more likely than those in the lower levels to report voting in a recent state or national election. . . . (pp. xvii-xviii).

Of What Use Are the Skills of Reading and Writing?

One of Lewis Carroll's (2004) characters, the "White Queen," responding to a comment made by "Alice," and referring to human memory, remarked "It's a poor sort of memory that only works backwards" (p. 204). A similar statement can be made regarding the definition used to measure the literacy levels of human beings: "This thing called literacy is a poor sort of thing that for most people consists of the ability to read and write ideas and thoughts in only one language."

Can People Who Are Illiterate Think?

Cognitive psychologists (Ellis and Hunt, 1993) consider that

. . . language does not seem to be *essential* for complex mental processes, despite the fact that language facilitates problem solving" (p. 320).

After conducting research to "study the effects of literacy acquisition on thought" Bernardo (1998) came to the following conclusion:

In this research, the direct effects of literacy on thought were studied by comparing performances of illiterate, non-formal literate, and formal literate respondents across the five different communities. The overall results of the study reveal an unequivocal absence of such direct effects of literacy. In the first four cognitive tasks studied (conceptual understanding, conceptual organization, conceptual comparison, and deductive reasoning), there was consistently no systematic difference between the performances of the illiterate participants, the literate participants, and the schooled participants (pp. 122-123).

Scribner and Cole (1978) conducted a similar study several years earlier, with a sample derived from a different population, and they concluded:

. . . improved performance was associated with years of formal schooling, but literacy in the Vai script did not substitute for schooling. Vai literates were not significantly different from nonliterates on any of these cognitive measures, including the sorting and reasoning tasks that had been suggested as especially sensitive to experience with a written language (p. 453).

The major findings of the two studies (Bernardo, 1998; and Scribner and Cole, 1978) imply that literacy is not a prerequisite for thinking. The findings of the studies can also be used to conclude that literacy does not enhance thinking skills.

Oral Language versus Reading

Pinker (1994) states:

Language is not a cultural artifact that we learn the way we learn to tell time or how the federal government works. Instead, it is a distinct piece of the biological makeup of our brains. Language is a complex, specialized skill, which develops in the child spontaneously, without conscious effort or formal instruction, is deployed without awareness of its underlying logic, is qualitatively the same in every individual, and is distinct from more general abilities to process information or behave intelligently (p. 18).

However, as far as reading is concerned, Levelt (2000) quite bluntly states:

But evolution did not prepare us for reading. It is, in fact, an unexplained accident that most of us can learn to read. The skill is obviously parasitical on the reader's pre-existing linguistic and visual competence, but the specifics of grapheme-to-phoneme mapping (in alphabetic systems) requires the engagement of cortical structures that did not evolve for that purpose and that may vary from learner to learner" (p. 844).

If reading is dependent on a person's linguistic competence, and not the other way around, why do schools spend so much time and resources trying to teach students how to read, especially in the elementary grades?

Oral Language Came Into Existence Long Before Writing

Human beings started using language to communicate with each other and to exchange ideas and information slightly more 100,000 years ago (McGill University, n.d.). However, human beings started using writing only about five millenniums ago (McGill University, n.d.). There is a ninety-five thousand year gap from the time human beings started using language and until the time that they started using writing. Reading as we know it today could not have existed before the development of systems of writing.

Children also begin to think long before they are able to read or write. They can also ask many questions, form associations, and actively explore their immediate surroundings. Children learn by observing, imitating, exploring, trying, listening, and in other ways that do not rely on the skills of reading and writing. Why should children be forced to learn how to read and write as soon as, or even before, they are enrolled in a school?

Can Knowledge Be Transmitted Without Writing?

According to Diamond (1997)

Knowledge brings power. Hence writing brings power to modern societies, by making it possible to transmit knowledge with far greater accuracy and in far greater quantity and detail, from more distant lands and more remote times (p. 215).

Diamond (1977) goes on to add

While all those types of information were also transmitted by other means in preliterate societies, writing made the transmission easier, more detailed, more accurate, and more persuasive (p. 216).

The statements written by Diamond (1977) may hold true for societies that did not have access to modern communication tools. The invention of the radio, telephone, film, and TV has made it possible to transmit knowledge easier and faster from practically any part of the earth to any other part of the earth, however remote these parts may be. Politicians also use radio and TV to persuade voters to vote for them. Politicians and elected officials often use “media bytes” including bytes of sound and video for many purposes.

Reading and Writing Are Means to Ends, Not Ends in Themselves

The importance that societies place on the skills of reading and writing convinces almost everyone that the two skills are ends in themselves. The millions of tax dollars spent on promoting reading, the number of hours spent in schools trying to teach children to read, and the slick gimmicks and promotions used to encourage school age children to read all add to the illusion that reading and writing are ends in themselves.

Papert and His Knowledge Machine

Papert (1993a) considers the three Rs, namely the skills of reading, writing, and arithmetic, the mastery of which he labels “letteracy,” to be obsolete skills. According to Papert (1993a):

New media promise the opportunity to offer a smoother transition to what really deserved to be called “literacy.” Literacy should not mean the ability to decode strings of alphabetic letters. Consider a child who uses a Knowledge Machine to acquire a broad understanding of poetry (spoken) history (perhaps relived in simulations) and art and science (through computer-based labs), and thus draws on this knowledge to conduct a well-informed, highly persuasive campaign to preserve the environment. All this could happen without being letterate. If it does, should we say that the child is illiterate?”

What is Thoughteracy?

Achieving thoughteracy is not just a matter of mastering a set of cognitive or thinking skills, although such skills are necessary for a person to become thoughterate. It is also not just mastery of meta-cognitive skills. Thoughteracy can be best envisioned as a continuum that begins with instinctive actions that are based on impulses to more and more thoughtful actions that are the right actions and which eventually become thoughtfully instinctive actions.

How Can Thoughteracy Be Achieved?

However, in order to facilitate thoughteracy on a large scale, many technologies need to be combined into one portable, and perhaps even wearable, device. Just as the cell phone technology is now a combination of audio, video and text, a “Personal Thoughteracy Assistant” (or PTA) or a similar device with some other name will have many features and capabilities.

Achieving Beginning Levels of Thoughteracy: An Example

When the learner asks “What does a computer look like?” the PTA displays photographs of different computers. In response to additional questions from the learner, the PTA shows and tells the reader what the keyboard looks like and what it does, what the monitor looks like and how it displays

information to the user. A learner can also learn about the various internal components of a computer such as the motherboard, sound or audio card, video card, RAM, and ROM, and also about internal and external floppy drives, CD-ROM and DVD drives, and interfaces such as serial, parallel, USB, and fire wire, and the advantages, common uses and disadvantages of each interface.

In response to a request from the learner, the PTA can also show a timeline of the historical development of computers, starting from the abacus to the modern electronic computer, which is still evolving and becoming smaller and faster.

A curious learner may wish to know more about the history and birth of the Internet. He or she may be curious to know what happened the first time information was transmitted over the Internet. The PTA will retrieve documents authored by Leiner et. al. (1997), Kleinrock (1996; n.d.), and Segaller (1999), to name a few, and either display them or read the contents of these documents out loud to the learner, based on the preference of the learner.

When the learner wants to know more about the World Wide Web, the PTA can either read from or allow the learner to read the book written by Berners-Lee (1990), the person who invented the protocol that led to the development of the World Wide Web. The PTA will also make other scholarly articles and documents on this topic available for the learner to read, hear, or view. The learner will also be able to connect to and browse the Web using his or PTA.

The PTA can organize and allow the learner to interact with content in many ways. It can provide many views of the content such as a "historical view," "context view," "story view," "relevance view," and "applications view."

The Case for Thoughteracy

We human beings have successfully developed machines that can read and write, but we have met only with very limited success in our attempts to develop machines that can think and learn. Our brains are better suited to learn and think than any machine that we have invented until this point in time.

The Cost of Achieving Thoughteracy

How much money will it cost to develop a tool such as a Personal Thoughteracy Assistant (PTA) and implement the same to achieve beginning levels of thoughteracy among people of the world? How much time will it take? The cost will probably be less than or equal to the amount of money and time that is currently being spent to teach children the skills of reading and writing.

Barriers to Achieving Thoughteracy

Reading and writing are deeply entrenched in society. The livelihoods of many people are dependent upon the teaching and learning of reading and writing. One such group of people is the classroom teachers who spend many hours every day for many years teaching children to read and write. Several corporations and their employees make a good living by promoting and catering to reading and writing. These are the publishers of books, textbooks, newspapers, and other printed textual materials. Other groups that will resist change will include parents and politicians. Practically all segments of society values the skills of reading and writing. This is because no other alternatives to learning have existed since the invention of alphabet systems.

Now technology offers an alternative, a viable, cost-effective, sensible, inclusive, and achievable alternative. Based on advances in technology, it can be argued that it is no longer necessary to speculate *if* reading and writing will become obsolete skills. The question that remains to be answered is '*when* will reading and writing become obsolete skills'? Countries should also start planning ahead and ask '*how* and *how soon* should we as a society start phasing out reading and writing and begin the process of phasing in 'thoughteracy'?

Conclusion

Thoughteracy is a goal that is not only possible, but one that the world should pursue vigorously in order to improve the lives of all human beings. The skills of reading and writing will probably be the byproducts of thoughteracy. Making all people thoughterate will enable them to realize their true potentials and live happy, prosperous and productive lives.

References

- Bernardo, Allan B.I. (1998). Literacy and the mind: *The contexts and cognitive consequences of literacy practice*. Hamburg, Germany: UNESCO Institute for Education.
- Berners-Lee, Tim. (1990). *Weaving the Web: The original design and ultimate destiny of the World Wide Web by its inventor*. (1st Ed.). San Francisco: HarperSanFrancisco.
- Carroll, Lewis. (2004). *Alice's adventures in wonderland and Through the looking-glass and what Alice found there*. New York: Barnes & Noble Classics.
- Diamond, Jared. (1977). *Guns, germs, and steel: The fates of human societies*. New York: W.W. Norton & Company.
- Ellis, Henry C., and Hunt, R. Reed. (1993). (5th Ed.). *Fundamentals of cognitive psychology*. Madison, Wisconsin: Brown & Benchmark Publishers.
- Kirsch, Irwin S., Jungeblut, Ann, Jenkins, Lynn, and Kolstad, Andrew. (1993). *Adult literacy in America: A first look at the national adult literacy survey*. Washington, D.C.: National Center for Education Statistics, U.S. department of Education.
- Kleinrock, L. (1996). *Leonard Kleinrock's personal history/ biography: The birth of the Internet*. Retrieved June 18, 2001, from the World Wide Web: <http://www.lk.cs.ucla.edu/LK/Inet/birth.html>.
- Kleinrock, L. (n.d.) *The day the infant Internet uttered its first words*. Retrieved June 18, 2001, from the World Wide Web: <http://www.lk.cs.ucla.edu/LK/Inet/1stmesg.html>.
- Leiner, Barry M., et. al. (1997). The past and future history of the Internet. *Communications of the ACM*, 40(2), 102-108.
- Levelt, William J.M. (2000). Introduction. (pp. 843-844). In Gazzaniga, Michael S. (Editor-in-Chief). *The new cognitive neurosciences*. (2nd Ed.). Cambridge, Massachusetts: A Bradford Book.
- McGill University. (n.d.). *Remembering and forgetting: How memory works: Collective memory*. Retrieved July 21, 2005 from the World Wide Web: http://www.thebrain.mcgill.ca/flash/d/d_07/d_07_s/d_07_s_tra/d_07_s_tra.html.
- National Center for Educational Statistics. (2005). *Defining and measuring literacy*. Retrieved July 15, 2005, from the World Wide Web: <http://nces.ed.gov/naal/defining/defining.asp>.
- Papert, Seymour. (1993a). *Obsolete skill set: The 3 Rs*. Retrieved June 4, 2004, from the World Wide Web: http://www.wired.com/wired/archive/1.02/1.2_papert_pr.html.
- Pinker, Steven. (1994). *The language instinct*. New York: William Morrow and Company, Inc.
- Scribner, S., and Cole, M. (1978). Literacy without schooling: Testing for intellectual effects. *Harvard Educational Review*, 48, 448-61.
- Segaller, Stephen. (1999). *Nerds 2.0.1: A brief history of the Internet*. New York: TV Books.
- United Nations Educational, Scientific, and Cultural Organization (UNESCO). (2005a). *EFA global monitoring report: 2005 - Statistical annex*. Retrieved July 20, 2005 from the World Wide Web: http://portal.unesco.org/education/en/ev.php-URL_ID=36027&URL_DO=DO_TOPIC&URL_SECTION=201.html.
- United Nations Educational, Scientific, and Cultural Organization (UNESCO). (2005b). *EFA global monitoring report: 2005 - Literacy and skills development*. Retrieved July 20, 2005 from the World Wide Web: http://portal.unesco.org/education/en/ev.php-URL_ID=35964&URL_DO=DO_TOPIC&URL_SECTION=201.html.

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