Adding Societal Impact and Reflection to Information Technology Fluency Classes

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ABSTRACT
Information Technology fluency courses often focus on terminology, history, and application use without addressing societal impact. They can and should be augmented to incorporate readings that explore our technology-centric society in order to help connect technical material and modern tools to real-world events and personal concerns. Additionally, guided classroom discussions can help students reflect on what they've encountered in the course materials and readings to better integrate technical knowledge with personal beliefs and actions. Using these techniques, students can explore how technology affects changes to our society and to themselves.

1. Introduction

Courses seeking to establish fluency in Information Technology tend to focus on terminology, the history of technology and applications, and understanding how to use currently popular applications. However, such courses often do not address the societal impact of the technology they introduce. They can, and should, be designed to do so.

Our educational goals are expanding to include more ties to personal ethics and societal issues. Technology fluency courses can play an integral part in achieving these goals. They can explore how technology is used in, and affects changes to, our society and ourselves. This paper will address two ways in which this can be accomplished.

First, these courses can incorporate non-technical or semi-technical readings that explore our technology-centric society. Books such as "Leonardo's Laptop: Human Needs and the New Computing Technologies" or "True Names and the Opening of the Cyberspace Frontier" can meet this goal. The courses can also include news articles about topics such as digital privacy laws, the use of digital evidence in court cases, or technology corporations operating at a global level. Readings such as these help connect technical material and modern tools directly to real-world events, and both global and personal concerns.

Second, these courses can include in-class discussions on these readings to further expand on their content, and to allow students to reflect on both what they've learned about in class and what they encountered in the readings. They can then expand upon this reflection through the exchange of thoughts and debate/discussion over specific issues. However, accomplishing this interaction in the classroom (especially in large lectures which can be typical for these courses) might be difficult. One solution is to have a set of well-designed paired discussions carried out in the classroom. These help students integrate their new technical knowledge with their personal beliefs and actions by facilitating directed conversations with a peer about serious issues such as file sharing, personal privacy on the Internet, and various digital divides.

Combined, these two approaches can provide an excellent conduit for advancing our students' understanding of how the technologies about which they are learning have changed, and continue to change, the world in which they live.

2. Non-technical Readings

In the design of a new Introduction to Technology course at the University of Maryland in 1996, I wanted to incorporate a reading that would allow students to make use of their new technical knowledge, and also show the impact of technology and electronic communities on society. There were a number of books that could be assigned in a technology fluency course to fit this purpose.

Books such as “Where Wizards Stay Up Late”, “Net.Wars”, and “The Cuckoo's Egg: Tracking a Spy Through the Maze of Computer Espionage” are examples of books that have a high technical component and show how technology, electronic communities, and “offline” society intermix. However, a number of my students had commented that these books, while somewhat interesting, were too focused on the “techy stuff” in their opinion.

Two very different books that we have used are "Leonardo's Laptop: Human Needs and the New Computing Technologies" and "True Names and the Opening of the Cyberspace Frontier". Both of these focus more on people and society in their discussions of technology.

Ben Shneiderman’s “Leonardo’s Laptop” [11] talks about the “old computing” where the focus was more on things such as how powerful the machines were, and the “new computing” where the focus is on what computers can do to help people accomplish the things they want to accomplish. It discusses how people interact with each other and society, and the ways in which technology can be used to support, enhance, and extend these interactions. It addresses practical concerns in high-visibility areas such as eLearning, eCommerce, eHealthCare, and eGovernment.

By having the class read this book, and then write individual papers addressing specific topics, students are encouraged to explore their own feelings on technology's impact on society, and the consequences of various technology designs and decisions. The issues of trust and privacy recur through many of the topics of the book. By asking students to address questions such as the importance they place on trust in online commerce, or asking them to explain how the need for security must be balanced with the need for access to information in eHealthCare, we can get beyond the regurgitation of facts, and encourage the integration of these facts into their view of technology in society.

Shneiderman's "Activities and Relationships Table" provides a way to visualize the things people do with respect to information (collect, relate, create, donate) as well as the different circles of relationships to which we belong (self, family and friends, colleagues and neighbors, citizens and markets). Students can be asked to fill in cells of the table for a specific interest of theirs such as music or cooking, and asked to identify places where the technology is lacking.

"True Names and the Opening of the Cyberspace Frontier" [14] is a collection that includes a speculative fiction novella written in 1981, and eleven essays written by noted technology pioneers, scientists, and fiction writers. While the quality varies, there are some very poignant pieces.

The essay "True Nyms and Crypto Anarchy" by Timothy May delves into notions of privacy, trust, and identity online. Asking students how they know an e-mail message they receive is really from the person from whom it claims to be, or why they think their floormates aren't intercepting and reading their e-mail and IM messages bring the technical material they have learned about how SMTP and TCP/IP work directly to relevancy in their own lives.

"How is the NII Like a Prison" by Alan Wexelblat explores issues of how access to the Internet and the ways in which resources are provided via the Internet can have some serious consequences. After discussing how client/server systems work in general, and how IM works in particular, asking students what similarities exist between Bentham's Panopticon [3] and systems such as AIM [1] exposes some of the practical concerns and consequences of the technology that has become a part of our everyday lives.

Richard Stallman's "Right to Read" is a fictional work, but can be used to play Devil's Advocate in a discussion about online libraries, copyrights, and digital rights management and law enforcement. The fact that the essay, though published in this traditional book, is also available for free online [12] can itself be used as discussion point on the topic.

Finally, "True Names" itself can serve as channel for discussing how technology has advanced from 1981 when the story was written to the current age. Many of the students in our classes were born in a world that always had home computers, and have had the World Wide Web and graphical interfaces in the world for almost their entire lives. Students can be asked to write about what they think readers in 1981 must have thought about the futuristic cyberspace in which much of the story takes places and the related doomsday scenario, and then be asked to express their own reactions to the same ideas having grown up with more advanced technologies than those readers had. Rather than just dates and trivia, the history discussed in the classroom must be considered from a human perspective to accomplish such a task.

3. Technology in the News

Technology appears in the news in two ways. First, an article can discuss the creation of a new piece of technology. Articles presenting information about a new portable game system or new e-mail service can be of interest in a technology course, but typically do not address the societal issues we have been discussion. However, a second type of article is one about an event in which technology played a critical role. These articles can help us in achieving the goal of exploring the implications and impact of technology on our lives. The following are some examples of articles that have been used with a class, and the related issues they helped expand.

In September of 2005, a story described how fake e-mails were being sent out under the name of the mayor of Orlando Florida [6]. This news article, combined with the essay "Why do you need PGP" by Phil Zimmerman [15] and the Timothy May essay from "True Names" can all work together to show that the topic of e-mail trust is not merely theoretical, and serve as a launching point for discussions of the type of information we receive via e-mail. Another related topic could be phishing schemes such as the IRS-related one reported by PC World Magazine in February of 2006 [9]. Integrating such material provides a compelling reason for students to consider more closely the technology they are learning to use in class.

In a technology fluency course, we might discuss online communities such as those found at MySpace and Blogger, and discuss how the technology works, and how to effectively use the full power behind these resources to create personal spaces online. However, by exploring articles such as "Bloggers Need Not Apply" [13] and "Don't Blog So Close to Me" [8] and "Stalking Over the Web Is a Growing

Threat“ [4] the class can be encouraged to consider the implications of their online actions on their “real world” lives.

From banning cell phones in schools due to locker room or cheating incidents [10] and reactions to such bans [5] to American corporations setting up business in other countries that restrict users in ways which would not be acceptable in this country [2,7], there are regularly stories in the news that involve technology in which our students can take a personal interest. By exposing students to specific examples, and teaching them where to look for others, we can better support the integration of the material they might otherwise learn just for the sake of fluency.

4. In-class Peer Discussions

Another vital key to helping students fully appreciate the impact on society of technology is to encourage personal reflection on the topics and to provide an opportunity for direct involvement in discussions about the assigned readings. Ideally, a small selection of related readings (for example, 1-2 chapters or 4-6 articles or a chapter with 2 articles) will be the focus of an individual class discussion. The discussion itself should be scheduled for roughly 15-20 minutes – while this might not be enough time to fully discuss an issue, it should provide a suitable amount of time to have a lively discussion, which could be continued outside of the classroom.

If a class is small enough, simple roundtable discussions can serve. However, for large-lecture classes, it is difficult if not impossible to engage the entire class. One possible solution to this is to have students pair off to discuss specific points from their readings.

To accomplish this quickly and effectively, students can be placed into teams by simply having them sound off “A, B, C, D” and then having A/B students who are sitting next to each other form teams, and the same for C/D student pairs. Having effective discussions with the pairs can be a more challenging venture. While the instructor can (and should) circulate among the teams, this alone would not suffice if the pairs were not somehow guided in their discussions. To better facilitate these peer discussions, a form of worksheet can be distributed at the start of the discussion time.

The front of the worksheet should start with opening discussion directions that identify and address the general theme of the readings for the day (such as “Discuss the general tradeoffs between accessibility and privacy within the context of the technologies mentioned.”) and provide blank space in which students can jot down notes during their initial discussion (for example, 10 of the 20 minutes).

The back of the worksheet should have more specific questions that force the students to address very specific points in or related to the articles. One class of questions would be requests for specific definitions (“what is PGP?”) or a short-answer question (“What is a potential danger of every e-mail you send being verifiable as being from you?”). A second class of question for this part of the worksheet would present a statement for the two students to discuss and then say whether they agree with or disagree with (“I think that file sharing systems should not be legal.”). This second type of question should be designed to lead the student to look within themselves – it should not be something that can be answered in the abstract.

While the students are exploring these questions with each other, it is useful to circulate among the groups to observe trends in their comments and discussions. At the end of the paired discussions, the worksheets can be collected and the instructor can then discuss the trends they observed in the teams, and also provide comments to help congeal the material, and also inspire further thought. It is also possible to conclude with a directed dialog where a limited number of students will have the opportunity to directly participate, but all of the students will have more fully explored their own thoughts on the topic and be better positioned to passively participate in dialog.

5. Future Work

These techniques and approaches have been integrated with an existing technology fluency course at the University of Maryland. Anecdotal evidence in the form of many positive comments from students reinforces the author's opinion that these methods are not simply adding content, but increasing student connection with course material.

A continuation of this could be to explore whether computer-mediated discussions of a similar nature could allow for broader and more frequent student interactions to help them better internalize the legal and ethical aspects of information technology and our society.

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