

Searching for Word(s): Common Preconceptions about Writing Technologies

Cara Lane, Educational Partnerships and Learning Technologies, University of Washington, USA,
cgiacomu@u.washington.edu

Abstract: This paper uncovers the misconceptions and preconceptions that users have about educational technologies and the impacts that these unexamined mental models have on teaching and learning with technology, especially in the development of educational software and the design of pedagogical strategies for its use. Most significantly, it examines the prevalence of expectations that every writing tool, regardless of its overall purpose, will look, feel, and function like Microsoft Word™—which has become a new norm, establishing a standard against which to measure all other writing technologies.

Introduction

A Harvard student, proudly sporting his graduation gown (that traditional emblem of educational capital) calmly delivers an explanation about how seasons occur: “I think the seasons happen because as the earth travels around the sun it gets nearer to the sun.” This scene from *A Private Universe: Misconceptions that Block Learning* has become a lasting conversation piece in educational discourse. The film offers the startling statistic that 21 of the 23 students and faculty interviewed at Harvard on graduation day revealed “misconceptions” in their answers when asked to explain the cause of seasons (Schneps 1989). The student quoted above even acknowledges that he had studied planetary motion in Physics. Director Matthew H. Schneps argues that students’ private theories and misconceptions can get in the way of learning new information accurately or with lasting impact. To ensure the successful transmission of knowledge, an instructor must identify and challenge students’ misconceptions.

The influence of private theories extends beyond the study of planetary motion to other fields. This paper uncovers the misconceptions and preconceptions that users have about educational technologies and the impacts that these unexamined mental models have on teaching and learning with technology, especially in the development of educational software and the design of pedagogical strategies for its use. Most significantly, it examines the prevalence of expectations that every writing tool, regardless of its overall purpose, will look, feel, and function like Microsoft Word™—which has become a new norm, establishing a standard against which to measure all other writing technologies.

Context

This case study looks at technology use by students and faculty members during two international programs. In 2003 one campus unit sponsored its first international program in a decade, sending fifteen students to Italy for a four-week summer writing workshop. Since then, this unit has developed a strong international presence, seeking out numerous opportunities for its students to participate in study abroad programs, work at international research facilities, or complete independent studies in locales as diverse as Cameroon and Greece. Hand in hand with this growing focus on international experience has come an expanding interest in web-based educational technologies. The 2003 program piloted the use of online writing tools as a means of sharing and archiving students’ overseas experiences.

Program Descriptions

The international programs analyzed in this paper took place in 2003 and 2004. The format and focus of the curriculum varied widely between the two programs. While the 2003 program focused on Creative Writing, the 2004 program brought together three disciplines: Sociology, Art History, and Italian. Both curricula were writing intensive: the 2003 program featured numerous short writing assignments based on students’ reflective observations

about people, places, and personal experiences and the 2004 program required longer projects based on students' research. The student population within both groups remained essentially the same, except for an increase of the size of the group in 2004.

Technology

Participants in the 2003 program used two online writing tools, both developed at the university. The first was an electronic portfolio tool, which provided an online space for students to collect and reflect on textual and visual materials. Each student in the 2003 program created an independent portfolio, for which they chose two writing activities, from the six or seven assigned, to add to its contents each week. The tool featured a comment function, which allowed instructors and other students to leave feedback. The use of this tool provided a means to document individual progress, while promoting opportunities for exchange and revision.

Unlike the individual focus of the electronic portfolios, another writing tool provided a collective space, in which all students added materials to the same source. 2003 students used an early prototype of a content-management system. This software was developed to support a medical information web site, which offers its visitors access to an archive of articles written by health care professionals within the university community. The study abroad program offered an opportunity to reformat this software for pedagogical use. The main challenge of this repurposing was determining how students in an international program fit into the "expert" knowledge model of the database. Like the health care experts who provided information about medical conditions, the students also shared their knowledge, archiving the expertise they gained as they became familiar with another culture. For the 2003 program, students contributed entries in four categories: the "Diary" section contained students' comments on the daily activities of the program, the "Language" section included a collection of Italian phrases that tracked students' language acquisition, the "Dining" section featured Italian recipes and reviews of restaurants and cafes, and the "Location" section recorded students' observations on Italy's landscape and landmarks. The entries students wrote for these four categories followed structured templates. Once students saved and submitted their work, it was published to a group web site automatically.

The 2004 program used one tool, an enhanced prototype of the content-management system. This new version provided each user with a private workspace, where he or she worked on drafts of assignments before sharing them with the others. It also featured a community workspace, where written work was shared with the class before it became public. Within this space students and teachers gave feedback using a built-in commenting feature. After receiving comments, student revised their assignments and submitted them for publication. Next, the instructor (or any user granted this level of permission) published the work. Once a piece of writing was published, it appeared on the public web site and could be viewed by an audience outside the class. The site also allowed instructors to easily add and revise templates for assignments, without involving the software developers (a step necessary in the earlier prototype). Plus, users defined a system for categorizing entries. Overall, these changes allowed a greater degree of user control over the information presented. Students completed three major assignments using this tool. The first assignment was a research project about a historical site for their Art History class; the second, observations about the characteristics of various neighborhoods in the city for their Sociology class. Each student also completed one daily diary entry, wherein he or she described the events and highlights from one day of the program.

Problem

The 2003 and 2004 programs were the subjects of two research studies. The 2003 study looked at the impact integrating technology had on course planning, student/instructor interactions, and student writing. The 2004 study investigated the types of communication fostered by technology. The purpose of these studies was to inform the ongoing development of tools and prototypes, identify strategies for their effective integration, and to understand the interactions that take place with and surrounding technology. Although neither study focused specifically on faculty or student preconceptions about writing technologies, the data from both studies brought these issues to light, since research subjects frequently used references to Microsoft Word™ to explain their answers to questions. For instance, one study participant responded to a question about giving online feedback by saying: "I much prefer the Word™ approach which allows one to insert a comment anywhere." Another made a similar comment about writing online: "I wrote all my drafts not using the programs, the web tools, but just using Microsoft Word™." Note

this subject's use of the word "just" in her discussion of Word™. Using this tool to perform a task and using it as a mental model are both reflexive actions. The prevalence of comparisons like these compelled me to return to the data from both studies and examine the evidence it provides about users' technological expectations.

Academic discussions about integrating technology in schools make very little noise about word-processing technologies, such as Microsoft Word™. Courses where students write papers using this type of program and turn in printed copies to their teachers are seldom, if ever, labeled technologically integrated—especially on college campuses. Teachers and students perceive the process of drafting a paper on the computer, printing it out, and turning it in as unremarkable or standard. Consider the following remark from a student about the writing process she used to complete a research paper for her Sociology class in Italy (this assignment was completed without using the online tools): "I approached it like any other paper [...] Since it was just a regular paper it turned out like a paper in my other courses would have been." The student uses the term "regular" to describe this process because it represents her norm. Additionally, the difficulty of thinking about or practicing another mode of writing comes through in a comment from another study participant about her past experience writing by hand during a study abroad program: "Now try doing that again, going back and handwriting a paper. It takes so long and then if you make a mistake and have to rewrite it—I don't know how we ever did it!" The novel and difficult aspects of the process of hand writing indicate how much the convention of word processing shapes current writing practices.

Yet Word™ represents a relatively new writing technology; students and instructors regularly completed assignments by hand or by typing on a typewriter not that long ago. Extensive research has been done on the history of writing and impact of computers in writing classrooms. Almost twenty years ago, James L. Collins and Elizabeth Sommers assembled a collection, *Writing On-Line: Using Computers in the Teaching of Writing*, to contextualize and complicate grandiose claims of "computers being the best thing to happen to writing since lined paper, about word processing having automatic and wonderful effects on writers, and so on" (Collins & Sommers 1985). Their book cuts through the hype to offer practical advice for teachers seeking to use technology in their classrooms. In the last two decades countless similar volumes have followed suit. The preface to Christina Haas's 1996 book, *Writing Technology: Studies on the Materiality of Literacy*, begins in a markedly similar manner to the collection written eleven years earlier: "Although the actually technology identified as a revolutionary force may have changed—from word processing in the later 1970s to electronic mail (e-mail) and hypertext in the 1980s to the InterNet as 'information highway' in the 1990s—in most cases it is a technology of words, a technology that changes how written language is produced, processed, and used" (Haas 1996). In other words, new ways of presenting writing are closely connected in academic discourse with the power to transform culture. However, like Collins and Sommers before her, Haas does not fully embrace the "revolutionary" ideology. Instead, she offers a more concrete representation of how technology impacts writing. First, she demystifies the "cultural revolution" angle of technology discussions, by indicating that writing has always been connected to technology—whether by ink, pencil, typewriter, or computer—commenting: "Yet it is precisely because technology is such an integral part of writing that it is often overlooked. As is often that case, what is ubiquitous becomes transparent: Writers do not notice most of the technologies they employ, simply because those technologies are always there, the technologies work, and their use becomes habitual." I would argue that this exact pattern is what happens with writers' internalization of Microsoft Word™ as a standard. Using different writing tools forces writers out of this comfort zone, making them consciously aware of the technology they employ.

Rather than investigating the impact that computers have on the writing process or the teaching of writing, this paper focuses on what the mental acceptance of word processing (in general) and Word™ (in particular) as a norm means for the development, adoption, and use of other writing tools. While some level of experience with technology does aid users in adopting a new tool, the preconceptions about technology that this experience can engender may also hinder the learning process and cause users to react negatively to features and formats that do not match their expectations. The next sections of this paper provide more detailed examples of this pattern and discuss its implications.

Evidence

Faculty members and students conveyed their expectations about writing tools in a variety of comments they made during the two research studies. These ranged from direct comparisons of the online tools to remarks about features common to word-processing programs. Generally, the areas where users had the most suggestions for improving a

tool were in areas where the tool most closely resembled word processing (the workspace where writing was entered or comments posted), rather than the features that were significantly different from word processing (publishing, categorization, et cetera). This pattern suggests that users found these tools to be lacking in their word-processing capacities, which were not their primary function, rather than in their presentation and categorization capacities, which were. Users expected all components of the tools to be fully developed and imagined an ideal online writing tool that incorporated the functionality of Word™ with the additional features of an electronic portfolio or content-management system.

Take, for instance, the feedback we received from an instructor: “I think the writing/portfolio part of the digital tools needs to be more Word-like, needs to be formatted to a full page size rather than a narrow column, in other words to look more like a hardcopy essay on the screen so that students take the writing more seriously.” Not only does this user directly reference Word™, but also focuses on the display features of the tool. Notably, he wants the display to be a full “page” size and to look like a “hardcopy,” emphasizing a connection to a physical piece of paper, specifically a printout of a paper generated by a word-processing program. He feels that reinforcing students’ perceptions that online writing is like a standard paper will reinforce their typical academic work patterns and allow them to approach their writing with more discipline and rigor. He fears, as related elsewhere in the interview, that the writing space in the online tools looks too much like email. In a later interview, after the completion of the program, the same instructor commented again on his experience: “I think the thing I realized was that especially when you are dealing with a writing class, students go online and their writing tends to be sloppy like online writing is. As opposed to writing a paper and turning in a paper on a piece of paper, you know?” This comment indicates the lasting impact of this concern—looking back on the program several months later, this was his first observation. Again, this instructor’s comment reinforces the importance of the materiality of academic writing. He repeats the word “paper” three times. Yet, this term does not always refer to a piece of paper; writing a paper, as earlier comments indicate, includes using a word-processing program. For this user, Word™ does not undermine the physicality of writing in the same way that online tools can. He continues: “when I printed it out [a student’s paper], then it became something real too, to them.” By treating the online writing like a regular paper, printing it out and then writing comments on it, this instructor found he was able to reestablish the pattern of a traditional class.

Comments by students echo the observations and concerns of their instructor. According to one student, “I think I wrote more [online]. Because it was online I could type that faster than I could at this point write on a computer. It’s kind of a bad idea for writers to do that, but I think I probably write more, expand my language.” Interestingly, this student differentiates between “typing” online and “writing” on a computer. Thus, entering words into the online template seems to be less formal than the standard writing process. Tellingly, this student sees his tendency to type fast online as a “bad idea.” Another student duplicates the instructor’s remarks about the importance of printing papers: “I really liked how they printed out our assignments and wrote on them, like parts they liked, parts that could be improved, and things like that.” The printed copy with written comments stood out for the student as one of the most beneficial components of the writing process. The handwritten comments were also, notably, one of the components that most closely resembled the standard paper writing process described earlier in this paper. However, this student goes on to expand her point with more ideas about how to provide comments: “And they don’t even have to print it out to have the feedback on it, like if they just put it in the margin of the online version or even in a Word™ document where you like change the color behind the parts that you like.” The Word™ options for highlighting and commenting stands out as a strong technological substitution for handwritten feedback.

Writing in an online template or text box was not the only place where divergence from the look and feel of Word™ impacted the process of writing. In addition to interviewing students from the 2003 and 2004 programs, we also spoke with another population: students who had studied in Italy in the past with another campus unit. For that international program, students completed all of their writing by hand. According to one student, “for a long time I’ve been writing predominantly on the computer, because when I’m creating something that’s going to be turned into finished work, it is far, far easier to write it on a computer.” Indeed, writing by hand has long been a standard practice for many study abroad programs, as commented upon by another study participant earlier in this paper. Yet, students find this to be an alien experience, divorced from their normal practices. In some ways handwriting becomes challenging because it does not function as a word-processing program, as can be seen in this student’s comment about the journal in which she wrote all of her assignments: “It’s there. I could slog through it. It’s wonderful. I love having it, but I can’t cut and paste it. You know?” Here the journal fails to be an entirely satisfactory artifact because it does not have that standard computer feature of cut and paste. This student has internalized a technological model so completely that she thinks about her projects in these terms.

The internalization of a particular model also extends beyond Word™ to other programs. In talking to a group of study participants about using text and images together, PowerPoint™ became the dominant metaphor of our discussion. Like Word™, PowerPoint™ has become a standard format for visual presentation, as can be seen in the following remark about students' in-class presentations: "The PowerPoint™ presentations were the most successful. That's an ideal format." This subject's personal familiarity with PowerPoint™ also shapes how he approaches other technologies: "I'm a big fan of PowerPoint™, this other stuff—I don't know." For these users, common technologies like Word™ and PowerPoint™ have become so internalized, or "transparent", that they stand in the way of the adoption of other tools, rather than serving as stepping stones that prepare their users to embrace an ever-expanding arsenal of new technologies.

Local Implications

This case study reveals the expectations many users have about the look and feel of writing technologies. These expectations have a significant impact on teaching and learning with technology because they shape users' interactions with different tools. Although this case study cannot determine conclusively whether or not this issue impacted the quality of work completed with the tools in a significant manner, it is clear that users' preconceptions did have a significant impact on users' attitudes towards the technology. While most study participants expressed enthusiasm for the idea of putting materials online and voiced interest and appreciation for the workflow, categorization, and presentation aspects of the tools, frustration with the word-processing elements dominated study interviews. While the prevalence of Word™ as mental model does not keep users from being able to use other tools, it does cause moments of discomfort and frustration in the adoption process. For some users, this is enough to keep them from considering using a tool again in the future.

In *A Private Universe*, Schneps suggested that the best way to overcome a person's misconceptions or private theories is to challenge them directly (Schneps 1989). Therefore, it is necessary to confront these expectations when training a user on a new technology. Often in educational forums we assume that knowledge of any technology is an asset, without looking at its hidden costs. Thus, we need to speak directly to how a new tool may feel alien for users familiar with a different model. We also need to describe the purpose of a tool clearly, outlining where there purpose is similar to word processing or other relevant software and where it is different. It may also be useful to explain why an online tool may not have all of the features that Word™ has—due to loading time, display space, emphasis on additional organization and display features, et cetera—to prepare users for a different experience. Based on this case study, I propose the following theory: It is not enough to train on a tool, but you must also help people learn to think about what a tool is, what it is meant to do, and why it works the way it does. This may not erase the mental model of Word™, but it should help equip people to deal with things that do not act as expected, without causing them to shut down from technology. Basically, additional steps are needed in training in order to address users' preconceptions. Since the studies described in this paper were not designed to specifically address these issues, they do not give sufficient evidence to indicate whether or not this training would successfully reduce this problem, but it is a logical place to start.

Anecdotal evidence from the studies, however, does support this approach. In 2003 there was no discussion during training sessions of the ways that the online tools were different than Word™ or could interact with Word™. During that year's study, most students began interviews discussing the word-processing challenges they faced when using these tools. They then went on to applaud other features that enhanced the processes of publication and organization. In the 2004 program, students were taught two approaches to writing with the online tool: typing answers in the online templates or cutting and pasting to and from Word™. Most students opted for the second approach, and complaints about the word-processing capacity of the tool decreased (except for remarks about the manner in which comments were added and displayed). Individuals who had the greatest difficulty adopting and understanding the online tools also had the least training. Tellingly, they were the most prone to making comparisons to Word™ and PowerPoint™.

These patterns also raise significant questions for tool development. Is it better to develop a tool in a style that matches users' preconceptions and comfort zones or to develop tools with unique designs and features? The former approach reduces the options available for tool design; the latter, may increase the obstacles for tool adoption.

Software developers must negotiate between these two possibilities. Every situation will require a slightly different compromise. However, a good general guideline may be to more closely resemble pre-existing technologies when a tool is meant for a broad audience, especially one unlikely to receive a lot of individualized training, and customize the look and feel of tools more when they are being developed for a smaller audience. Therefore, when appropriate, it makes sense to design a tool that acts similar to Word™, by including features such as spell check, various text-formatting options, and a large workspace. However, when integrating these elements is not always compatible with the purpose and function of a particular tool, consider enhancing the tool's compatibility with Word™. For instance, let people use a word processor to create text and then import that text to the program. Designing tools that take into account users' expectations may help them adopt tools with less resistance.

Larger Implications

While the evidence in this paper comes out a specific case study, the implications of its findings are not limited to this context. Electronic portfolio tools and content-management software are becoming more and more mainstream. With this influx of technology, more people are likely to encounter the same types of patterns described in this paper.

Some of the trends found in this case study also appear in academic scholarship on educational technology. In an article about technology training in teacher education programs, Laura Finley offers the following concern: "This [being part-time] may make respondents less likely to do so [use technology], or to do so in 'safe' ways, such as using word processing or Internet research, rather than in more innovative, exploratory ways" (Finley 2004). Here word processing is introduced as a "safe" or easy technology. In his book, *What Should Teachers Know about Technology?*, Young Zhao identifies three stages of technology use. The first category user functions at a mechanical level: where his/her "understanding of a technology is fragmented, limited, and superficial, focusing more on form than function. Teachers who are at this level of proficiency hold relatively stereotypical views of the functions of the technology—similar to what is conceived in popular media or by the manufacturer" (Zhao 2003). The stereotypes or preconceptions common among the international programs' students and faculty members are consistent with Zhao's description. It is important to remember that many users focus on "form" and "superficial" aspects of a tool. Making a user more comfortable in these areas may help them move on to the more advanced stages of technological proficiency. For as Michael Romano notes at the beginning of his book, *Empowering Teachers with Technology*: "Without a doubt, in education allegiance to tradition endures—and endures" (Romano 2003). Thus, those with a vested interest in the innovative potential of educational technology need to think about ways of making the process of adoption as easy as possible. Being aware of users' preconceptions and mental models is one way to begin to address these issues.

References

- Bolter, J. D. (1991). *Writing Space: The Computer, Hypertext, and the History of Writing*. Hillsdale, New Jersey: Lawrence Erlbaum Associates Publishers.
- Collins, J.L. & Sommers, E.A. (1985). *Writing On-Line: Using Computers in the Teaching of Writing*. Upper Montclair, New Jersey: Boynton/Cook Publishers Inc.
- Finley, L. & Hartman, D. (2004). Institutional Change and Resistance: Teacher Preparatory Faculty and Technology Integration. *Journal of Technology and Teacher Education*, 12 (3), 319-337.
- Haas, C. (1996). *Writing Technology: Studies on the Materiality of Literacy*. Mahwah, New Jersey: Lawrence Erlbaum Associates Publishers.
- Romano, M.T. (2003). *Empowering Teachers with Technology: Making it Happen*. Lanham, MD: The Scarecrow Press.
- Schneps, M.H. (1989). *A Private Universe: Misconceptions that Block Learning*. Harvard University & the Smithsonian Institute: Annenberg/CPB Collection.

Weinburgh, M.H. & Rivera, M. (2004). Infusing Technology Skills into a Teacher Education Program: Change in Students' Knowledge About and Use of Technology. *Journal of Technology and Teacher Education*, 12 (3), 447-468.

Zhao, Y. (2003). *What Should Teachers Know About Technology? Perspectives and Practices*. Greenwich, CT: Information Age Publishing.

Acknowledgements

I would like to thank Janice Fournier, Beth Koemans, and William Washington for their assistance with the research studies discussed in this paper.