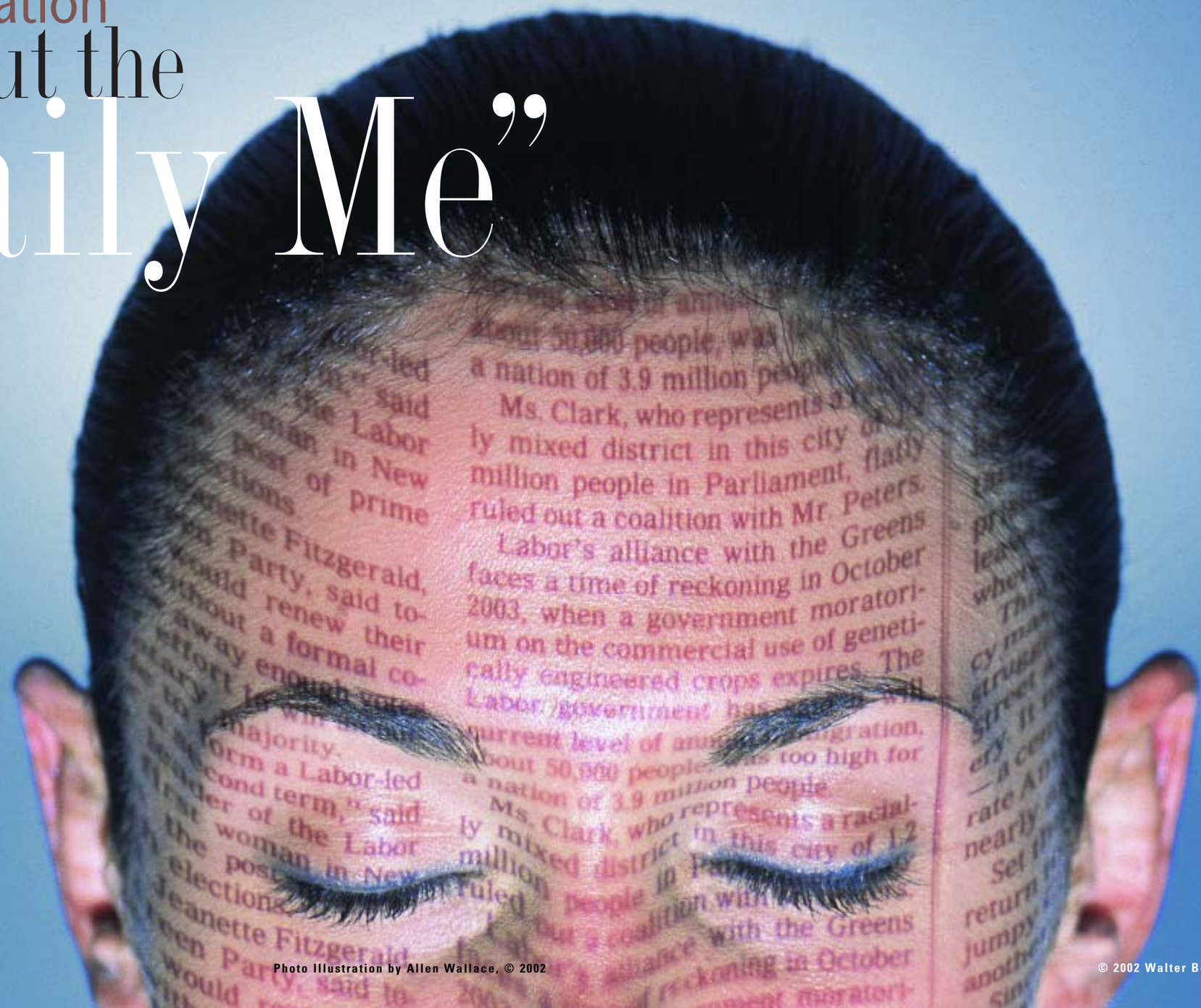
Twenty Years of Personalization

All about the "Daily Me"



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By Walter Bender

Entitled "The Computer Age of Discovery," a recent *Non Sequitur* comic by Wiley pokes fun at online news. Two teenagers are engrossed with a broadsheet purchased at a newsstand. One of them remarks: "This is so cool . . . All this stuff has already been downloaded and printed out for you! I wonder why no one ever thought of this before?"

At MIT in the early 1980s, I started exploring the use of interactive computing to customize news for individual readers. The resultant personalized news projects of the MIT Media Lab became known collectively as the "Daily Me." Early in my exploration, I made the observation that every newspaper has a "front page," with headlines and content in juxtaposition. Ever since the modern form of the newspaper was invented in eighteenth-century Holland, editors have exploited graphic design and layout to steer readers down a variety of paths through the day's news. Considering that in the early 1980s, interaction with a computer took exceptional effort, and that the established medium of the newspaper, as Wiley's teenager rediscovered, was being routinely delivered to homes around the world, why would a person pursue electronic news and explore personalization of news?

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In answer to this question, I postulated that personalized, electronic systems could provide news based on the user's interests, taking into account the user's knowledge level and style preferences. This information would be manifested in the detail and complexity of the articles chosen for the user, as well as in the media types used for the presentation. The goal was to more deeply engage the reader in the news, ordering priorities and expanding scope rather than restricting it. At MIT, we began experimenting with computerized "butlers" or "agents" that were programmed to act on the reader's behalf, culling articles of interest from traditional and nontraditional news sources before sending them down the wire to the reader's home. Paralleling the decision-making process of human editors, these agents utilized multiple mechanisms to filter content for individual consumption, with the goal of "fine-tuning and prioritizing information based on criteria that include timeliness, importance, and relevance to the audience"—in this case, an audience of one. (This definition of news editing is from Jack Driscoll, former editor of the *Boston Globe*.)

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One task of any editor is to examine the news for a given day and try to find the "meaning" in it—that is, not only to understand the news but also to understand its context. What is new or timely? What is of importance? What is of high general interest? What does the reader need to know about? What would the reader like to know about? What informs, educates, guides, or entertains? How many articles on a topic are appropriate, and if the answer is not "all of them," what should be kept and what discarded? With this editorial process in mind, I would like to briefly summarize my twenty years of exploration of these issues at MIT.

In our 1981 "News Peek" system (a play on George Orwell's "New Speak"), the reader could be explicit about personal or situational interests. Today's analogy is a search-engine query: the user makes a request that the search engine consider a large number of possible "articles" and select and present those articles for the reader's consideration. This is neither more nor less than an editorial process. Of course, search engines return results that would be considered poorly edited, and they utilize only primitive layout to help

the reader navigate through the results. By contrast, the forgiving nature of newspaper graphics makes erroneous editorial decisions tolerable—the newspaper is a display designed to make it easy for readers to ignore news that does not interest them.

Another News Peek feature was implicit modeling of readers. We constructed filters based on the premise that readers are already engaged in a rich computing environment in which calendars, correspondence, location, and the like are made accessible to the system. The content of tomorrow's paper was not just an extrapolation of what was read today but also a product of observations about readers' activities external to the news: where readers are, whom they are with, what they are doing.

News Peek also exploited the fact that we are all members of communities—of geography, interest, and/or necessity. The system expanded on the role of the newspaper by adding a sense of community and shared worldview through the incorporation of peer-to-peer communication, such as e-mail content, into the editorial decision-making process. Topics of interest communicated by readers' peers were extracted from e-mail and used as input to the editorial process. Providing context through a shared information source is important because without it, people lack a common reference point with which to engage in discussion.

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Finally, News Peek also let human editors continue to play a role in deciding the news of the day. Since defining searches was (and remains) such a difficult task, we quipped that paying the local newspaper only twenty-five cents to make decisions on our behalf was a real bargain. It is even more difficult to define what the search should be about. We continued to trust that editors would provide the information we needed—or at least some reasonable starting point.

In a follow-on project, "Network Plus," we addressed the need to integrate multiple sources of news, since not all articles of interest come from the same source, nor do they all come from professional news services. In fact, unless someone's interests are exactly aligned with the focus of a particular publication, the reader will probably need to consult several sources of information each day to find what he or she needs: the television, for the weather report, in the morning; the newspaper, for general news, on the bus ride to work; the radio, for the outcome of that day's Red Sox game, in the afternoon; and the online news service, for up-to-date stock information, throughout the day. Each of these sources presents information in a different

format; and if a unified presentation is to be made, they all need to be understood and considered together. For example, using the same editorial processes as were incorporated in News Peek, we augmented Walter Cronkite's reading of television news during the Iran-Iraq War with content culled from other sources.

Providing readers with the proper context is as important as providing the content itself. In 1986 Gitta Salomon, an MIT graduate student, created a prototype of an electronic version of *Popular Photography* magazine. The "Camera Review" feature best illustrated the difference between the magazine's paper version and its personalized electronic instantiation. Each month, in the print version, the editors would review three new cameras. In the electronic version, four cameras were reviewed: the three new ones juxtaposed with the camera owned by the reader. By "computing" the article from a database, we were able to put the personal experience of the reader side by side with that of the editors. Context became the value added.

Editors do not work in isolation. They receive feedback from the community they serve in a number of ways: letters, telephone calls, and/or e-mail to the editor; comments from colleagues; focus and market surveys; as well as hard numbers such as newsstand sales when a particular headline is run. This feedback allows the editor to determine the interests of the community members and better serve their needs. In the next system developed at the MIT Media Lab—"FishWrap"—this community feedback played a central role.

In 1993 the students in a freshman-advising seminar that I cotaught with Pascal Chesnais developed FishWrap, named after a journalists' proverb: "Yesterday's news wraps today's fish." The system was originally designed to address the needs of freshmen being integrated into the MIT community. FishWrap attempted to balance an individual's desire for personalization with the need to participate in and know about the world at large. FishWrap provided its readers with an egocentric window into world affairs while allowing them to receive news from their hometown and stories of personal interest. FishWrap readers were thus connected to both the MIT community and the world.

The FishWrap design accepted traditional news-wire stories and also direct contributions from the MIT community. Social and cultural calendars were integrated into the system. All items coming into the system were analyzed for geographical or topical relevancy. Stories were automatically placed into categories, such as "*Star Trek*," "softball," or "artificial intelligence." FishWrap employed an automated news model composed of interrelated components that assembled an individual's news selection: user profile, knowledge representation, news suppliers, authentication, self- and community-organization, customization, and presentation. FishWrap readers, in particular those from foreign countries and small towns in the United States, appreciated the ability to receive regional news. Readers were also pleased to receive extensive material on political

subjects, such as abortion, from different viewpoints.

Not all of the intelligence for article selection resided in the FishWrap server. The community also had a front page, called "Page One." Readers added to Page One those articles that they thought were important to the larger community. The articles were then ranked according to the number of people who accessed them. This allowed a reader to enjoy the breadth of community interests, to be exposed to new issues, and to participate explicitly and implicitly in the collaborative process. Page One directly leveraged the intelligence of the community by placing the reader in the role of editor. Readers found Page One to be an adequate voice for guiding them to important issues.

One component used in FishWrap merits particular mention: Jon Orwant's Doppelgänger, which was used to tailor both content and presentation to the individual. This tailoring was accomplished by maintaining databases about individuals' interests, plans, beliefs, behaviors, misconceptions, and schedules. The models were used primarily for article selection but readily facilitated any sort of customization. Doppelgänger collects information about a population of users, makes inferences from this information, and provides the results for client applications. The Doppelgänger user models are dynamic, changing both as the system learns more about users and as the individual users themselves change. The data maintained by the system includes objective and subjective information as well as long-term and short-term information. In addition, implicit information is inferred from the universe of user models: generalizations about populations of users are made and are used to establish default assumptions about user models. By monitoring users' actions, the system bolsters both precision and accuracy of the model over time.

A Doppelgänger variant that was also incorporated into FishWrap is Sarah Elo's PLUM (Peace, Love, and Understanding Machine). Rather than acquiring and maintaining detailed and up-to-date information about each reader, PLUM exploits publicly available information on a geographic community. Information about demographics, weather history, and the geography of a city is more readily available and less volatile than information about an individual. Furthermore, this information need not be secured because of privacy issues; and a single community profile permits the tailoring of news to all residents of the community. PLUM contextualizes the news to an individual's community, rather than to the individual. PLUM scans the wires and extracts the reported facts from stories. It then augments the news by referencing databases to provide a context that makes the stories more relevant and engaging to specific geographic communities.

Learning is a core research interest at the MIT Media Lab. We attempt to develop tools for learning (in the manner of Elliot Soloway's learning-centric design, as opposed to a user-centric design) while aligning ourselves with the traditions of Jean Piaget, Seymour Papert, and Paulo Freire. Over the past six years, I and my colleagues Brian Smith and Jack Driscoll have come to believe that the public has an important, *active* role to assume in making sense of news information; and our goals have gradually shifted toward the development of technologies and processes that will improve the quality of public discourse. As technology accelerates the global flow of ideas and information, we have become concerned with the thinking and learning changes that will support future solutions to social, cultural, and economic problems.

The increase in information flow provides many new opportunities for people to become better informed about the world. However, this increase also means that consumers of news must become more selective and critical of the information that comes across their televisions, computer screens, and so on. When anyone can have a Web page and self-publish "facts," discriminating the truth from the noise becomes increasingly difficult. As the growth in information continues to explode, people must become more critical of their sources; they must engage in a form of media criticism that is rarely exercised today.

To encourage this discriminating outlook, most views of media literacy tend to focus on analysis: on how to train people to be critical about what they see in the traditional press and in the not-so-traditional Internet media. In the final Media Lab project that I will describe here, we took a different approach to learning media literacy—an approach based on synthesis. In each project described thus far, readers took charge of the technology to become their own information managers. The role of the expert—for example, the newspaper editor—differed in each project, as did the setting and technological base. But in this final project, "Silver Stringers," we focused on the reader's role not as a recipient but as an active producer of the news. In particular, we viewed journalism as a model for thinking and creating. Expert journalists are well equipped to distill data into information, and because they are practitioners, they are skeptical, always questioning assumptions. Being a journalist means thinking critically about the world in order to present it to others. More important, it means interacting with others in the community of journalism to receive critique and feedback about what makes a useful body of information.

We thus experimented with journalism as a model for thinking and creating; and we spent several years developing and deploying tools for ordinary citizens—nonjournalists—to engage in the process of creating news. Improving the quality of public discourse means helping people take a critical stance toward the information they see on a daily basis. It also means providing opportunities for people to actually contribute their views and concerns to the wave of information dominated by the traditional press. We pushed media consumers to become active information producers. In doing so, we hoped to see them develop their own skills as journalists and critics of information.

We engaged adults and children in the hard work of inquiry and storytelling. Since 1996, several senior citizens have gathered together to create an online publication. In 1998 a group of children between the ages of ten and sixteen began producing a similar publication. In both cases, we have seen communities forge around journalistic principles, with the participants working to create stories of interest and concern to themselves and their Internet readers. The members of these journalism communities actively debate about the content of their stories and, more important, about the processes that they engage in as media producers. Unlike the World Wide Web, where anyone can publish at any time, these communities have established editorial processes that allow them to critique and learn from each other. Through these processes, we have seen them gain a stronger sense of identity as citizens with stories to tell. We have also observed them develop a more critical stance toward traditional media as they learn to question their own talents as writers and producers of news.

Are there any parallels between personalized news and personalized education? To address this question, I would like to discuss two viewpoints. The first is that of the mathematician Marvin Minsky, who has often said: "Never trust an idea less than twenty years old." The implication for education is that we should focus our efforts on the tried and true—for example, the mathematics of linear operators. On the other hand, the physicist Richard Feynman stated that in order to understand "the strange theory of light and matter," one has to accept nature as being "absurd from the point of view of common sense." Here the implication is that we should challenge the status quo—for example, Newtonian physics. These are contradictory but not incompatible ideas about what we need to learn and how we need to learn it.

People's theories about their development of knowledge profoundly affect their connections to and interactions with the world. How individuals believe they learn about the world around them, or become known by that world, helps to determine many of their goals and ambitions. These theories are an individual's epistemologies, and they help the individual determine how to develop and use technology. What technology?

Technological change is one of the few constants we can count on. If the "half-life" of ideas is short, one will inevitably have to start over again, regardless of what is learned. This would suggest that the goal of formal education is to teach students how to "learn to learn."

If, as is the case in personalized news, a personalized education means that a student will more likely pursue a field of interest in depth through inquiry and synthesis, learning to learn something (anything) thoroughly, then it can be beneficial to the student's development. If a personalized education means that a student never learns to challenge ideas by stepping outside of a zone of comfort, then the merit of a personalized education is uncertain.

Over twenty years, the Daily Me has evolved from the means to enhance an individual's access to news to a mechanism for active engagement in critique and reflection. We are seeing the emergence of a grassroots level of expression that will enhance processes that are democratic and will challenge those that are not. Average citizens today have tools that were never before at their disposal. In effect, they have their own printing presses, in the form of computers connected to the Internet. They have the means to tell their stories to large numbers of people near and far, and that ability changes the established relationship between consumers and the traditional information providers. No longer is it the consumers' (or students') role simply to consume. Their expectations have changed. They are now part of the dialogue—they are engaged in the kind of discourse that was previously taking place largely beyond them.

The Daily Me, though still viewed by some as "dangerous and deluded," is far from engendering a fragmented world populated by self-interested myopes. Rather, it is unleashing in each of us our basic desire to share, which sometimes translates into a sharing of information, social and political ideas, or goods and services. We are more deeply engaged in learning, more in tune with our priorities, and ever expanding our scope. The process has begun, and it is indeed a paradigm shift: the consumer is becoming a creator. *e*