Enriching communities: Harbingers of news in the future

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Four prototypes of news presentation are described. These prototypes share the common view of news presentation as a service that changes the relationship between news providers and news consumers.* FishWrap™*, an electronic newspaper, explores the relationship between individuals and communities in a university setting. PLUM contextualizes news from geographically defined communities.* The India Journal *addresses the needs of an immigrant population. Multi-user sessions in community (MUSIC) builds upon relationships among people in urban communities.

The application of technology to the future of news dissemination is not only about the efficiency of professional production and distribution of news. It is also about providing the news consumer with tools that facilitate the gathering of, access to, and use of news in both individual and communal contexts. While the adoption of digital communication technology by the news industry will enhance consumer access to information, it must also support news delivery as a "community service." The news-as-a-service model is one in which the consumer of news is an active, *engaged* participant. This service model encourages two-way communication between the traditional news provider and the consumer, and communication within communities built upon common interests. The news service model becomes a part of the social fabric within communities, a catalyst for creating communities of interest, and a means of facilitating community insight.

Social constructionism

In social and developmental psychology, constructivist models depict the individual as a builder of knowledge, not as a passive receptor. *Constructivism* argues that the active nature of the learning process in which individuals are engaged needs to be enhanced and facilitated. *Constructionism* places a critical emphasis on particular constructions of the individual that are external and shared.[1,2] These external constructions involve both creative action and "recreative" reaction, leading to an interplay between internalized and external experiences in such a way as to promote further creative activity.

Social culturalists, such as Vygotsky,[3] argue that learning to communicate is based upon internalized intellectual structures that allow messages to take on meaning. They argue further that these structures are initiated by external social and cultural relations.

Social constructionism[4] combines the sociocultural and constructivist views: social settings can be enhanced by the developmental activity of the individual. Likewise, enhancing the social setting by intro-

ducing activities that are socially constructive can enhance individual developmental activities.

An individual's theories about his or her own development of knowledge profoundly affect that person's 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 the individual's epistemologies, and they help the individual determine how to develop and use technology.

The FishWrap "front page" is defined by the readers.

Social constructionism is an epistemological paradigm that suggests that becoming acquainted with one's neighbors is an act of extending one's self. Computer networking is a technical tool that can support this endeavor. However, the network is not the active force; the people are. The critical agency is based entirely upon the prerogatives of the people involved.

Previous electronic news systems[5-9] focused on the individual. The four projects described below share the common view of news as a community service:

- *FishWrap*** is an electronic newspaper[10] that explores the relationship between individuals and communities in a university setting.
- *PLUM*[11] contextualizes news for geographically defined communities.
- *The India Journal*[12] addresses the needs of an immigrant population.
- *MUSIC*[4] builds upon relationships among people in urban communities.

These projects all investigate the impact of social constructionism on news dissemination. In each project, community members take charge of the information technology and become their own information managers. The role of the expert, e.g., the newspaper editor, differs in each project, as does the setting and technological base.

FishWrap: Personalized news

Since the fall of 1993, the Massachusetts Institute of Technology (MIT) community has been using a prototype electronic newspaper called *FishWrap*, named after the journalist's proverb "Yesterday's news wraps today's fish." It was originally designed to address the needs of freshmen being integrated into the MIT community. *FishWrap* attempts to balance an individual's desire for personalization with the need to participate in and know about the world at large. *FishWrap* provides its readers with an egocentric window into world affairs while allowing them to receive news from their hometown and stories of personal interest. In addition to personally selected stories, *FishWrap* provides a continuous update of general news items and features. *FishWrap* readers are connected to both the MIT community and the world.

The *FishWrap* design accepts traditional news-wire stories and direct contributions from the MIT community. Social and cultural calendars are also integrated into the system. All items coming into the system are analyzed for geographical or topical relevancy. Stories are automatically placed into categories such as: "Star Trek," "softball," or "artificial intelligence." *FishWrap* employs an automated news model composed of interrelated components that assemble an individual's news selection: user profile, knowledge representation, news suppliers, authentication, self- and community organization, customization, and presentation.

MIT community members first interact with *FishWrap* at one of the four hundred publicly accessible Project Athena** workstations (MIT's campus-wide computing facility). Readers learn about *FishWrap* from friends, from advertisements around campus, or by exploring the workstation's menus. Access to *FishWrap*'s personalized news system appears as a World Wide Web (WWW) hypertext link. This link calls upon a program to create a subscription to the news service for the individual. An access password is provided to the new user at this time. After the initial session, readers can access *FishWrap* from any computer connected to the MIT network (including personal com-

puters in dormitory rooms and off-campus living groups) with a WWW browser. Generation of a personalized news presentation takes about 15 seconds.

Three questions are asked of the first-time user: "Where are you from?"; "What is your affiliation with MIT?"; and "What majors interest you?" The answers to these questions provide the foundation for the reader's personal news profile. The answer to the first question is used to create a "hometown news" section in the reader's news profile. This section contains geographically relevant information ("local" means something different to each person at MIT). The answers to the last two questions are used to create a section with news related to career choices; news that will keep the individual abreast of trends in specific industries; community news, such as seminars and job postings; and news affecting undergraduate class government for student readers, or news regarding employee benefits for faculty and staff readers.

Self-organization. Accessing *FishWrap* using the World Wide Web browser allows an easy traversal of the information space. The multilayered nature of the *FishWrap* news presentation allows the individual to quickly determine where there is activity of interest. The main page shows which filters have collected news. The reader can then focus on a news category and view summaries of stories that match the filter. If an article summary seems interesting, the reader can call up the full text with relevant graphics or audio augmentation. This structure provides the reader with a consistent model of the *FishWrap* components. As a navigation aid, *FishWrap* displays at the top of each page a status bar that indicates the reader's current location in the hypertext document. *FishWrap* records how the reader navigates through the paper in order to adapt future presentations to the reader's habits. (The order of presentation of sections and topics within sections reflects the number of articles read in previous interactions with *FishWrap*.[13]) The reader can also update her or his news profile by selecting existing topics from a list. Each article displays the categories it belongs to so the reader can view related articles.

Community organization. Not all of the intelligence for article selection resides in the server. The *FishWrap* community also has a "front page" called "Page One"; readers add articles to Page One that they think are important to the larger community. The articles are then ranked according to the number of people who access each article. This allows the reader to enjoy the breadth of community interests, to be exposed to new communities, and to participate explicitly and implicitly in the collaborative process. Readers in effect become editors. Page One takes leverage from the intelligence of the *FishWrap* community (Figure 1).

Figure 1 The *FishWrap* front page

FishWrap offers the reader a number of staples: social and cultural calendars, reviews, and advice columns. Calendars are provided by large organizations (*The Boston Globe*, MIT Arts Office, MIT Activities) and individual *FishWrap* readers. Restaurant reviews provided by large organizations (*The Boston Globe* and Zagat** restaurant guides) reflect the likes and dislikes of the general population. Access to the reviews is organized from the perspective of a pedestrian on campus. Submissions from the readers provide reviews of the local fare (the food trucks, "cheap eats," etc.).

Reflections. More than 700 regular readers access *FishWrap* from computers connected to MIT's network. User feedback was critical to the development of the system; focus studies were conducted in the spring of 1994 to gauge the usability of the system. The focus studies examined issues surrounding the interface and content. Along with the information gathered from the focus studies, numerous comments from the readers were received. Readers were gener-

ally pleased with the system. It filled a niche they felt was missing from other news services freely available on campus.

Interface. Readers responded favorably to the WWW interface (see Figure 2). They were pleased that they could use the interface for more than one purpose. However, three levels of depth in the hypertext document was as much as they could tolerate. The readers preferred skimming one section after another until the presentation was exhausted. They found it easy to return to familiar parts of the news presentation. One blind student appreciated the consistent structure and audio segments for illustrations. Readers were concerned about the lack of a mechanism for changing the order of the news presentation. However, the self-organization mechanism seemed to make up for the lack of such a tool.

Instead of filtering news, PLUM relates news to the reader's hometown.

Content. In the focus studies, readers expressed concern over the lack of an editorial voice to guide the reader to important issues. As a result, Page One was devised and it seems to adequately address this concern. Readers, in particular those from foreign countries and small towns in the United States, appreciated the ability to receive regional news. Readers were pleased to receive extensive material on political subjects, such as abortion, from different viewpoints.

Privacy. Effort was put into protecting information collected about the readers. Yet readers in the focus studies indicated they would forego security to gain greater access to the news service, or to be able to share material with their friends. New interfaces will provide the reader with greater control in this area. Readers also expressed concern that information might be given to outside sources, such as advertisers, without their consent. However, they were less concerned that the information might be used to tailor advertisements within *FishWrap*.

Informed consent. The MIT Undergraduate Academic Affairs Office scrutinized the plans to make *FishWrap* available to MIT students. Its concern was that even someone with the presumed technological sophistication of an MIT freshman would not be able to give informed consent to an experiment that involved monitoring individuals' interests. *FishWrap* readers were asked to fill out a consent form before participating in the experiment. Nonetheless, how to best achieve informed consent remains an open question.

PLUM: Community augmentation

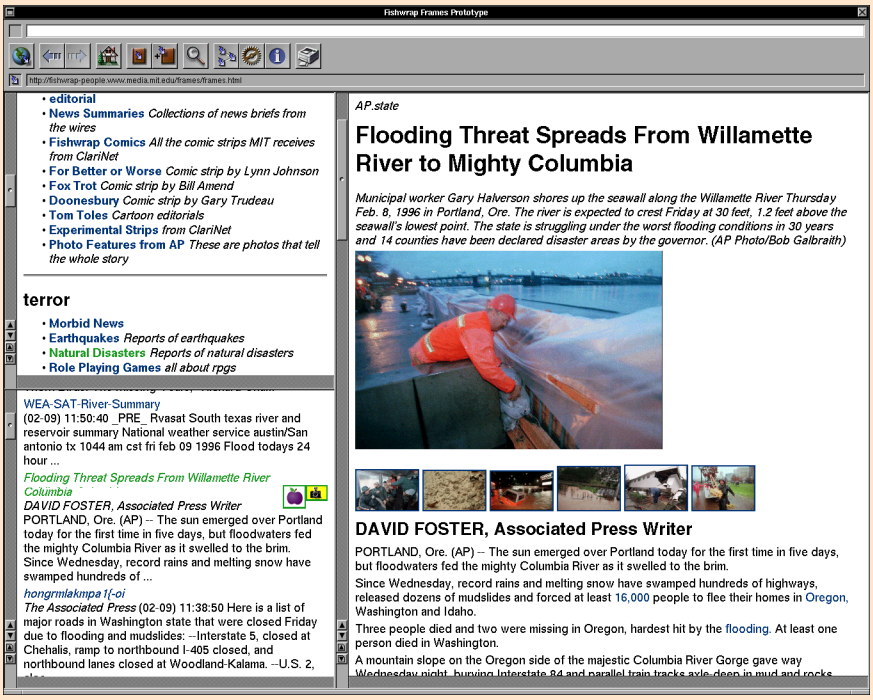
Digital news is a young medium for both the news industry and the readers. Since a computer allows tailoring of information, digital news can be made meaningful to an individual reader. The ideal computer software program would present us with news that relates to our personal experiences: when your uncle is traveling in India, you would read news about an earthquake in southern India carefully. A computer cannot know this unless it has detailed and up-to-date information about each reader. Such information is hard to acquire and maintain.

The task is made easier, however, with publicly available information on a geographic community. Information about demographics, weather history, and the geography of a city are more readily available and less volatile than information about an individual. Furthermore, this information need not be secured because of privacy issues; a single community profile permits tailoring news to all residents of the community. Contextualizing news to a person's community, rather than to the person, is more feasible.

PLUM (Peace Love and Understanding Machine) is a software program[11] that augments news on natural disasters reported in *FishWrap*. By explaining reported facts in terms of a reader's home community, PLUM adds a context that helps the reader better understand distant disaster news. Augmented news expands on the content and makes remote news relevant.

Motivation. Local newspapers often rely on wire services such as that of the Associated Press or Reuters for news from outside their community. Small newspapers cannot afford to send reporters to cover faraway events. From the incoming news wires, editors choose the articles to include in their paper. Apart from labeling articles that include some local refer-

Figure 2 ***FishWrap*'s WWW interface includes an index of topics (upper left), a summary of stories within a topic (lower left), and the stories themselves (right)**



ence of interest to the client newspaper, wire services rarely indicate the relevancy of their articles to the readership's community. Outside of the obvious references, the local journalists must research the implications of reported events for their home community. When a highway bill passes the United States Senate, a journalist uses insight, the local library, or other resources to "localize" an article before press time. This is more difficult with foreign news. When news on a Niger River flood arrives, the local journalist must get acquainted with this distant place and, under deadline, scramble to find good resources. Given these pressures, smaller newspapers often reprint international news-wire articles without further refinement for the local readership.

Computer technology has begun to significantly affect the content of news. It is being used as a research tool by reporters and editors. Until recently, most news organizations employed computers only to make quantitative improvements, to cut costs, speed production, and generate better graphics.

While 79 percent of newspapers surveyed by *Cable & Broadcasting* magazine had computer graphics capability, only 29 percent had a computerized library, and even fewer used information-gathering tools such as CD-ROM databases.[14] (This latter figure is likely to be much greater today in light of the World Wide Web.) Technology can do more in the newsroom. While it is unlikely that computers will take over the gathering of news stories, computers can play a major role in the on-line versions of many print papers. In an effort to attract readers to their on-line services, newspapers are seeking ways to add value to the digital paper—automatically, if possible. Unlimited by column space requirements, an on-line newspaper that integrates archives of historical articles and other background material can be a meaningful resource. A digital article becomes a gateway to exploring related resources.

Figure 3 Augmented news for Boston, Tampere, and Buenos Aires

China is roughly the same size as the United States and 459 times the size of Massachusetts. Population density: **China** 128 per sqkm, Massachusetts 296 per sqkm. Electricity consumption per capita: **China** 630 kWh, US 12,690 kWh. Languages spoken in **China:** Mandarin, Yue, Wu, Minbei, Minnan, Xiang, Gan, Hakka dialects, minority languages. 14,255 people in Boston speak a Chinese language at home.
China is roughly the same size as Europe and 31 times the size of Finland. Population density: **China** 128 per sqkm, Finland 17 per sqkm. Female life expectancy: **China** 69 yrs, Finland 80 yrs. There is no record of people from **China** living in Tampere. 6,643 people of Asian origin live in Finland.
China is roughly 3 times the size of Argentina. Population density: **China** 128 per sqkm, Argentina 12 per sqkm. Male life expectancy: **China** 67 yrs, Argentina 68 yrs.
China is located in Eastern Asia, between India and Mongolia. Local name of **China:** Zhonghua Renmin Gongheguo.

14 million is 24 times the people living in Boston and 17 times all people 65 years and older living in Massachusetts.
14 million is 78 times the people living in Tampere and 3 times the people living in Finland.
14 million is 2 times the people living in Buenos Aires and roughly all the people living in Buenos Aires Province.
The total population of China is 1,190,431,000. **14 million** is 1 out of 85 people in China.

100 is 1 out of 5,700 people living in Boston, and is also 1 out of 80 people aged 85 or older living in Boston.
100 is 1 out of every 1,800 people living in Tampere, and is also 1 out of 18 farmers living in Tampere.
100 is 1 out of 79,000 people living in Buenos Aires, and is also 1 out of 2,300 children under 15 years living in Buenos Aires.

The total area of China is 9,600,000 sqkm. **250,000 acres**, or 960 sqkm, is less than 1% of the total area.

Friday, 30 June 1995:

Hundreds Dead as China Fears Worst Floods This Century

SHANGHAI, **China** (Reuter) - China fears its worst **flooding** disaster this century with rising waters already killing hundreds of people and devastating farms and fisheries in its eastern region. Spring rains which annually bring calamity to tens of millions have been compounded by the effects of global warming and some meteorologists predict the worst inundations in a hundred years.

Torrential rains have lashed the coast and set off mudslides and an official in Jiangxi province said Friday the death toll there now stood at 194 and was rising fast.

Fourteen million people in the province, a Chinese grain-basket, have been affected, the official in the general office of the Jiangxi provincial government said in a telephone interview. "It's a terrible disaster," the official said. Shanghai's Liberation newspaper Friday put the Jiangxi toll much lower at 64. It said **220,000** houses in the area had been swamped and put the cost of damages at **$500 million**. The official Xinhua news agency this week reported that **100** people had died after a week of downpours in central Hunan province.

Rains during the Chinese spring season bring calamity to tens of millions of people living along the Yangtze River and its many tributaries each year. Villagers are forced to huddle in shantytowns thrown up along river banks, and in unsanitary conditions many die of waterborne diseases. But this year meteorologists have noticed alarming new weather patterns that could spell greater disaster. Global warming is melting the snows on the vast Tibet-Qinghai plateau, the source of the Yangtze in western China. This has sharply raised water levels in rivers and lakes along the Yangtze's central and lower reaches, threatening dykes that have for centuries protected Chinese peasants and their crops.

In Shanghai, where the Yangtze flows into the East China Sea, pounding rain has already briefly put large areas of the city under a sheet of filthy water. Worse is in store for southern coastal provinces such as Zhejiang and Fujian, which are regularly battered from the sea by summer typhoons.

In Jiangxi, rainfall between April and mid-June has been 7.1 inches higher than the average for the past few years, the Liberation Daily reported. Rain storms in the second half of June sent water levels in the Xinjiang and Raohe rivers surging past historic highs. Water in the Poyang lake was reaching a level surpassed only once since the 1949 communist revolution. Jiangxi's transport hub of Yingtan had been badly hit, disrupting rail links with neighboring Zhejiang, Anhui and Fujian provinces, the paper said. More than 40 highways in the province had been blocked.

In neighboring Jiangsu province, **250,000 acres** of **farmland** have been flooded, large numbers of fish farms destroyed and several thousands homes were awash with water, the paper said.

250,000 acres is a circle of radius 11 mi.

250,000 acres is a circle of radius 17 km.

250,000 acres is a circle of radius 17 km.

Frequency of floods:

	US	Fin	Arg	China
1990	•			••••••••
1989				•••
1988	••••		•	•••••••••
1987			•	••••••••••
1986	•••		•	••••
1985			••	•••••••••
1984	••		•	••
1983	•••		•	••
1982	••		•	••••••
1981	•			•••••
1980	•••		••	
1979	•		•	
1978	••		•	
1977	•••		•	
1976	•			
1975				
1974			•	
1973	••			
1972	•			
1971				

Highest recorded death toll for a flood:
United States in March, 1913: people killed 732
None in Finland, neighboring Russia in June, 1993: people killed 125
Argentina in July, 1958: people killed 360
China in July, 1931: people killed 3,700,000

To cover **$500 million**, every household in Boston would pay $4,250. GNP per capita: US $24,700, China $2,200
To cover **$500 million**, every household in Tampere would pay 42,000 FIM. GNP per capita: Finland $16,100, China $2,200
To cover **$500 million**, every household in Buenos Aires would pay 140 Pesos. GNP per capita: Argentina $5,500, China: $2,200
$500 million is 0.02% of China's GDP.

Agriculture in China accounts for 26% of GNP; among the world's largest producers of rice, potatoes, sorghum, peanuts, tea, millet, barley, and pork; commercial crops include cotton, other fibers, and oilseeds.

220,000 is roughly all the households in Boston.
220,000 is 3 times the households in Tampere.
220,000 is 1 out of 16 households in Buenos Aires.

In community augmentation, PLUM operates on the reasonable assumption that residents are familiar with their hometown. According to cognitive scientists, people understand something new in terms of what they have understood previously.[15] This supports tailoring news by relating it to familiar concepts in the home community. It can bring news "closer to home."

In addition to the novel use of community profiles, PLUM differs from previous work on digital tailoring because it adds explanations to existing articles. Rather than selecting articles based on readers' interests, PLUM presents all articles on natural disasters with explanations that relate to the home community of the reader. It also adds a context around the article by placing the disaster within the history of such disasters and by linking it to background resources.

Tailoring disaster news by augmenting may help counter misconceptions about the disaster region. Foreign disaster news often fosters a tragic image of the developing world. The public has "an impression that the developing world is exclusively a theater of tragedy, … This misconception is as profound as it is widespread," said Peter Adamson, author of UNICEF's annual State of the World's Children report.[16] Misconceptions arise from ignorance and lack of familiarity. The current style of reportage of tragic disasters may only exacerbate these misconceptions. By providing a scale for understanding the scope of a disaster, PLUM contributes to a more human image of the disaster-stricken country.

Types of augmentation. As Figure 3 illustrates, PLUM augments facts reported from the disaster site and generates three types of explanation:

- PLUM draws comparisons between the disaster-stricken country and the home community. It refers to linguistic and ethnic similarities and generates comparative statistics from the *World Factbook*.[17] This type of augmentation shows similarities between the two distant communities and may create a sense of connectedness.
- PLUM expands on the history of disasters. It refers to the most serious disaster in the history of the stricken country and of the home community, and compares the frequency of this type of disaster in the two countries. The reader understands better how rare or common the disaster is for the stricken country. By referring to a disaster that has occurred closer to the reader's community, PLUM makes the event more tangible.
- PLUM provides a yardstick for areas, distances, dollar amounts, and numbers of people, families, and houses affected by the disaster. It uses local census data to make reported numbers more meaningful. It also overlays a shadow on the hometown map proportional to the area of land affected by the distant disaster, helping the reader to understand its magnitude.

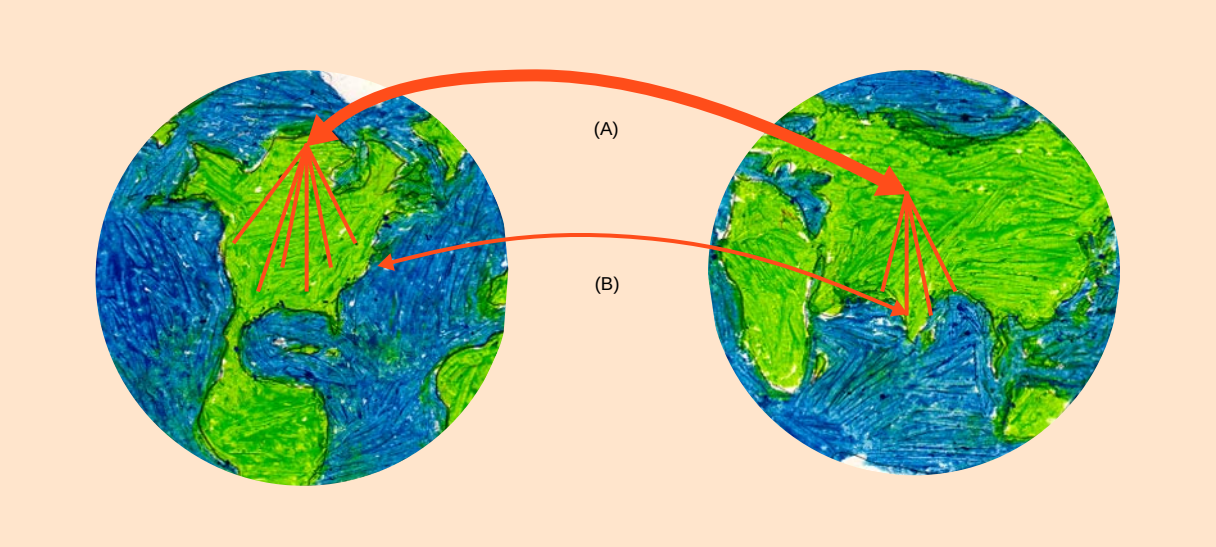
Arguably, no right way exists to compare facts from different cultures and societies. Facts are sensitive to context and subject to interpretation. For example, if an article reports the evacuation of 500 families in Vietnam, a comparison with Boston cannot be readily drawn. In Vietnam, "families" may include several generations of relatives, while in the United States families are nuclear or separated. PLUM cannot resolve such differences in definition. It compensates by proposing several different interpretations for the facts in the article. Each entity is augmented several ways to give the most complete account.

The PLUM system. While many systems that analyze news seek understanding to better retrieve or classify articles, PLUM uses its understanding of news to generate and explain. In order to augment text, PLUM integrates techniques from several fields of computation. The PLUM Parser analyzes incoming disaster news. Using part-of-speech tagging and pattern matching, it extracts the characteristic items reported in a disaster article. The stereotypical reportage of breaking disaster news lends itself well to automatic analysis.

Relying on a frame-based knowledge representation, the PLUM FactBase cross-indexes three databases serving as background information for the augmentations. Using rules defined in the PLUM RuleBase and template-based language generation, the PLUM Augmenter produces the augmented articles as hypertext documents.

PLUM has been incorporated into *FishWrap*. *FishWrap* readers click on highlighted words to reveal informative augmentations that place statistics in a familiar context. Augmentations can also be viewed from the perspective of communities other than one's own hometown. Currently, *FishWrap* readers can read news augmented for Boston, Massachusetts; Bellefontaine, Ohio; Buenos Aires, Argentina; Tampere, Finland; and Helsinki, Finland. Because PLUM supports adding home communities, more cities can become part of the augmentation as interest dictates. Because PLUM's articles are on the WWW, readers can

Figure 4 (A) Hierarchical vs (B) local-to-local news distribution (illustration courtesy of Daniel Bender)



easily contribute information and feedback. They are encouraged to add pointers to Web sites that relate to the articles. This way, the otherwise static PLUM FactBase grows continuously.

With the increase in digital archives of information, computer systems that help editors and readers are becoming necessary. While some aspects of the gathering, assembling, archiving, searching, and delivering of unstructured information cannot be fully automated at this point, a computer program with a limited knowledge of the content and the topic can contribute to these tasks. PLUM demonstrates that, within restricted domains, a computer program can expand on and localize news written for a global audience.

The India Journal: Communities of interest

The MIT Media Laboratory and *The Jersey Journal*, a newspaper published by Advance Publications, Inc., formed a team to experiment with customized newspapers designed to meet the needs of a distinct community within a larger community. Beginning in the spring of 1994 and continuing through the summer of 1995, the project focused on one ethnic community—the approximately 10000 Indian Americans living in and around Jersey City, New Jersey. A four-page electronic newsletter printed on demand was made available free at three sites: two grocery stores in Jersey City and a video store in the nearby town of Iselin, New Jersey. Each site housed a personal computer and a printer with a large, red push button; the most recent edition of *The India Journal* was produced at the push of a button. Because so many members of the Jersey City Indian community emigrated from the state of Gujarat, India, the newsletter focused on news from that location. It included stories from three wire services and local dispatches from community members. The stories were edited daily at *The Jersey Journal*. *The India Journal* served approximately 200 users daily.

Lightweight newspapers. The creation of this small, low-overhead newspaper gave a voice to a community under-served by the traditional press. To add an additional page about the Indian subcontinent to *The Jersey Journal* was not economical; adding pages for the other under-served communities in the city, the Egyptian, Caribbean, and Filipino communities, was also not feasible. However, an electronically distributed supplement proved to be inexpensive. Printing the paper in publicly frequented spaces within the community ensured that the news was accessible to the community. The provision for contributions from residents gave the community a voice.

Local-to-local connections. The professional news distribution infrastructure is a hierarchy. Some locally reported events are sent to regional news offices. Only the most important regional news finds its way to the state or national bureau. Finally, only news deemed to be of international significance gets to the international wire services. However, *The India Journal* espoused a local-to-local connection (Figure 4). The Jersey City Indian community was interested in birth and wedding announcements, death notices and obituaries, and, of paramount concern, cricket scores from Gujarat, as well as news of international importance. Both *FishWrap* and *The India Journal* demonstrate that people are interested in "back home" news as well as national and international news.

MUSIC: Proximal communities

Social constructionism has important ramifications for urban communities. If shared constructions and social relations are key to individual development, then social settings that are marked by a limited number of shared social activities and less cohesive social relations may present troubling developmental barriers. However, the social setting is not immutable. Introducing activities that are socially constructive may provide rectifying responses. Social constructionism takes constructionism out of the classroom and into a social setting. When the members of a social setting develop external and shareable social constructs, they engage the setting in a cycle of development that is critical to determining its ultimate form.

Five types of social constructions have been identified: (1) social relationships, e.g., friendships, familial relationships, and partnerships; (2) social events, e.g., potluck suppers and block parties; (3) shared physical artifacts, e.g., public murals and community gardens; (4) shared social goals and projects, e.g., clean streets, food pantries, helping the very young and the elderly, and the activities involved in accomplishing the social goals that come from proponents within the social setting; and (5) shared cultural norms and traditions, e.g., shared dialects, church participation, styles of interaction, and accepted neighborhood identity.

Tools for social constructionism are necessary to mediate developmental activities. Tools can be empowering, since without effective tools, a task may be too difficult to be viable. A tool can be viewed as providing opportunities for engagement in the activities mediated by the tool.

Multi-user sessions in community (MUSIC) is an online bulletin board system (BBS) developed to facilitate information sharing and the organization of projects. The original MUSIC was run by residents in an urban community in the Four Corners neighborhood of Boston. (The experiment has been expanded. A revised MUSIC is now running in Newark, New Jersey.) The project was intended to show that a community computer network can support the local infrastructure of a typical urban neighborhood and that residents can independently, without technical expertise, use the network as a tool for social constructionism.

The MUSIC network consisted of a single server and 18 clients located in specific homes in the community. Eight of the MUSIC users already had computers in their homes. Ten additional computers were given to neighborhood activists—persons who had already been involved in some local organizing efforts. Roughly 40 adults and young people were connected to the network.

The MUSIC system supports real-time text and voice communications between users who are logged on concurrently. It also includes electronic mail and bulletin board facilities. There are a variety of documents and databases on the system that can be accessed and modified by any user, as well as personal and proprietary files. Each user has a private electronic mailbox, and one set of documents is accessible only by members of a local church group (Figure 5). In the Four Corners MUSIC, there were also news stories downloaded daily by *The Boston Globe*, a local metropolitan daily newspaper, which could be read by any user, but modified by only *Boston Globe* editors.

MUSIC uses a room metaphor: rooms are filled with text, sound, and graphic objects organized around specific topics (Figure 6). Users enter a room to view or modify objects in the room. MUSIC uses a graphical user interface modeled after a neighborhood with streets and buildings. Each building represents a neighborhood project. There is also a map room that reflects the physical neighborhood (Figure 7). The map can be used to locate users by street address.

MUSIC has been used to discuss and debate community issues. It has been used as a publishing vehicle for poetry and drawings. It has also been used to organize potlucks, group trips, and various social gatherings. And, it has been used to organize a summer youth program, a neighborhood apprenticeship pro-

Figure 5 Icons for outgoing mail on MUSIC

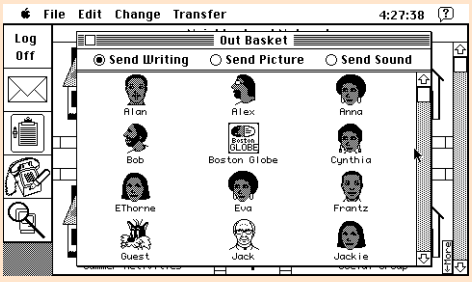


Figure 6 MUSIC's graphical user interface

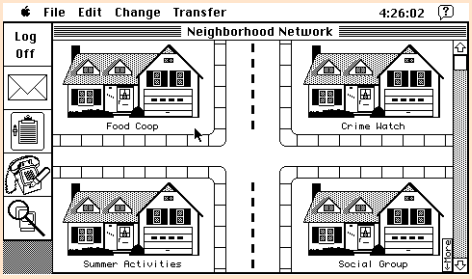
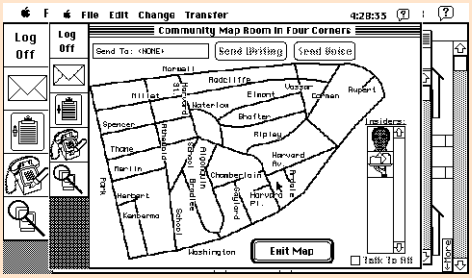


Figure 7 The map interface in MUSIC



gram, a food cooperative, and a crime watch program. Finally, it has been used by other community agencies, including a health center and church groups, as a vehicle for promotion of community projects and events.

Since January 1995, MUSIC has been utilized as a tool for "social resurgence"[18] in Newark, New Jersey. The MUSIC participants are families living in the New Community Corporation housing with children in the Newton Street Elementary School, part of the Newark public school system. MUSIC in Newark has a different organization than MUSIC in Four Corners. Each node on the system is in the home of a "captain," a participant who agrees to allow at least four people from outside of his or her family access to the computer. The captains spent two days on a retreat analyzing community needs and training on the computers before the program began. The captains then helped other participants to learn the system.

Residents use the system to "develop activities on line for off-line implementation."[18] These activities include organizing a community garden, flea markets, talent shows, holiday and birthday celebrations, a photography class and exhibition, and a crime watch program. On-line discussion groups include Circle of Sisters, Circle of Brothers, About AIDS, and Parenting and Housekeeping. There is an ongoing "wellness" conversation between residents and physicians at a neighboring medical center. MUSIC is also the catalyst for parent involvement in the elementary school.

MUSIC provides a locally situated infrastructure. When people in the neighborhood put it to use as an organizational tool, they demonstrate ownership over their social setting in a way that can serve as a catalyst for new, neighborhood-based leadership and development. The same computers that can enhance the independence of the individual can also be used to help the local community stay interdependent.

MUSIC is a practical demonstration of how technology can be shaped around constructionist principles. Neighbors use this technology to coordinate and develop their own programs, expand their communications, and begin forums and social activities that are difficult to organize without these types of tools. This technology can help those who otherwise would use such a system only as a consumer to instead produce their own content, e.g., it encourages local production rather than global consumption.

Conclusion

Modern telecommunications is leading us inevitably to the smallest news focus imaginable: the personalized newspaper, or *Daily Me*, whose content has been tailored to meet an individual's needs and interest. Computerized "butlers" or "agents" are acting 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. Luddites see the *Daily Me* as engendering a fragmented world populated by self-interested myopes. They argue that editors should continue to publish articles that establish the point of view for the community. They want news pushed upon them. The *Daily Me* proponents want to pull news in.

The examples presented demonstrate that there are alternative interpretations of the *Daily Me*. Regardless of whether one subscribes to the "push" or "pull" model of news access, such systems can personalize articles for individuals and communities of readers, e.g., varying the degree of detail and background information provided in an article, or reflecting what the community already knows or does not know about a topic. Providing readers with the proper context is as important as providing the content itself.

News organizations must continue to provide news and encyclopedic knowledge about their communities to people. But they must also acknowledge the role of consumers as producers. The future of the industry is as much about construction as it is about consumption. The impact of "going digital" is the emergence of a new relationship between publishers and their public: making news more relevant by building linkages between news providers and news consumers.

Acknowledgments

The authors would like to acknowledge Shreeram Krishnaswami, Steve Newhouse, Jim Willse, and Klee Dienes for helping to make *The India Journal* project possible, Jonathan Sheena and Matt Mucklo for their help developing and maintaining *FishWrap*, Ken Haase for his numerous contributions to PLUM, the residents of the Four Corners and the New Community Corporation for participating in the MUSIC project, Jack Driscoll in his role as advisor to all four projects, The Associated Press for contributing content to *FishWrap*, Felice Napolitano for her help editing this document, and the News in the Future research consortium at MIT for sponsoring in part this work.

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Accepted for publication April 2, 1996.

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Reprint Order No. G321-5611.