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ABSTRACT

For several years, the University of Washington School of Communications has been evaluating the costs and advantages of incorporating electronic editorial systems in its educational program. Concurrent with the development of newspaper editorial systems, other applications of computer technology have evolved that are of potential use to journalists. Among the questions posed by the communications educators were how these capabilities might be of use to journalism instruction and research, and whether there are advantages to having them integrated into one system. The educators wanted a computer system to help in such areas as computer assisted instruction, analysis of textual materials, tabulation and reduction of statistical data, reductions in the complexity of conventional computer tasks, bibliographic systems, analysis of the editorial process, simulation and games, word processing, and the transfer of electronic copy. The problems in implementing such a system involve such factors as cost, formidable complexity, system augmentation and modernization, potential intrusions into the teaching process, and security. In attempting to solve such problems, educators at the University of Washington have worked out arrangements to enhance existing campus computer resources, minimize costs, and train system users. (GW)

NEWSROOM TECHNOLOGY IN JOURNALISM EDUCATION: OVERSOLD OR UNDERUSED?

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A design rationale and description of the Gannett Editorial Laboratory, School of Communication, University of Washington, presented as part of a system demonstration given for the Graphics Division at the 1978 Annual Convention of the Association for Education in Journalism at Seattle.

Electronic editorial systems make eminently good sense to the economics of newspaper production. The rush of all but the smallest papers to technology is ample proof of at least a desire to lower production costs. Since 1975, the ANPA Research Institute estimates that use of video terminals has tripled in newspapers, while capacity to optically scan typewritten copy has increased by a third (1). Certainly employment conditions (of both journalism instructors and their students) seem increasingly to demand skills in its use (2). Employability of graduates then may be a growing arguement for some schools. Others may simply want to flex their innovative muscle by parading the latest technology has to offer. Newsroom technology's most devoted supporters may even argue for some as yet unverified quality such equipment gives the journalistic product. Thus many journalism program administrators -- with success -- are surveying budgets, alums and industry sources for the purchase price of this equipment. One survey shows substantial growth of editorial technology among larger schools.(3) The question of incorporating editorial technology -- somehow -- into programs seems increasingly one of "how" rather than "if".

Doubts remain. Many faculties and administrators will continue to blanch at high prices for what seems little more than advanced typewriting equipment. Others may see their primary mission as one of honing writing, interviewing and research skills with little need apparent for "back shop" printing technology. But if the technology seems inevitable, how may it be best exploited and accommodated for more than typing skills or a quick familiarization with production equipment? Why should educators, beyond marketplace pressures and a desire to be "with it" technologically speaking, be interested?

Over the past three years, the University of Washington School of Communications has been evaluating the costs and advantages of electronic editorial systems. Our struggle with the problems of new technology -- of justifying its cost and curricular merit -- resulted in a system with some unique properties going beyond those common to many newspaper editorial systems. Because our needs were diverse and difficult to meet, our experience may prove useful to others. By no means have all problems and doubts resolved, but the wisdom of considering applications and compromises in advance of purchase proved essential.

Our basic premise was and remains that computer technology cannot be educationally justified solely as a typewriter replacement or a mock-up publishing operation. If we were to seriously consider this equipment, we would have to increase its utility to the educational environment. We believed part of the ambivalence journalism educators may feel toward editorial technology results from inadequate appreciation of its extended uses.

In part, this problem can be traced to the manner in which such systems evolved in newspaper printing plants and the traditions of manufacturers. The prime incentive for editorial technology continues to be economic. By capturing the effort reporters and editors made in typing-up stories in the first place and by automating routine composition, much expensive human labor is eliminated in producing a newspaper. Because of this, attention is placed on this "replacement" capability. Little attention is presently given to new functions a system may perform quite apart from the human labor it automates.

Over the past decade, concurrent with the development of newspaper editorial systems, other applications of computer technology were evolving which have potentially great use for journalists. Large, state-of-the-art systems currently embody some of these developments which are on the verge of integration with editorial functions.

1. The evolution of "word processing" systems to handle stenographic, filing and typing chores in offices.

2. The development of systems able to distribute messages (so-called "electronic mail").

3. The development of cost-effective data base management systems, especially bibliographic search and retrieval.

A few large, experimental systems -- mostly outside of newspapers, such as those of the Augmentation Knowledge Workshop project at Stanford Research Institutes, NSF's Editorial Processing Center, and the Advanced Research Projects Agency (ARPA) system (4) -- have combined these functions into an integrated systems. Most newspapers, while having need for all these functions (and perhaps having the computer capacity for them), have not implemented them. Cost, lack of perceived utility, prime interests in replacing back shop labor and little marketing of new functions for such systems have restricted this kind of growth.

Some recent progress toward serving multiple functions in the newspaper environment has been made. Most work has been accomplished by major dailies who already have significant computing facilities. Integration of editorial production and on-line library (morgue) retrieval systems have been accomplished by the Toronto Globe and Mail and is under development in a massive system by the Chicago Tribune. Many newspapers such as the Los Angeles Times, The Boston Globe and the Louisville Courier-Journal have computerized library retrieval available on separate systems (5). Wire service resources and commercial systems such as that offered on line by the New York Times offer computer based information beyond local editorial resources. Many systems now of course commonly computerize bookkeeping, circulation, classified advertising and the selection/updating of wire service copy. But few of these subsystems interact with each other. Rather, they remain discreet managemenet and filing functions which might happen to share the same computing machinery.

How might these and other computer capabilities common to the academic setting be of use to journalism instruction and research? Are there advantages to having them integrated into one system verses piecemeal availability? In our planning, we obviously wanted a text processing system typical of the most powerful available, providing the full variety of features students would expect to find on the job. Our requirements were not easily met.

We desired a "mixed" system; one capable of input from Selectric-produced scanner copy and of direct input from video terminals. We also wanted a complete production system: one able to handle copy from reporters' input to typesetting. In this manner, major steps in the production process could be accommodated on the system. Reporters' input, editing, composition, generation of proof copies and typeset output should be represented. Capabilities to control production flow, queue stories entered into the system, and keep records on editoral production would be essential to managing a large system. Finally, we desired a system that was distributive, one which could process text from a variety of terminals and sources for output on a variety of typesetting or printing devices. We did not wish use of the system restricted solely to special (and expensive) terminals having powerful editing capabilities. Text from conventional (e.g. "dumb") terminals, punch cards and other editing systems should be accommodated. Composition and control commands, thus had to be in standard (ASCII) character codes used by most scientific computing systems. In short, we wanted a facility able to simulate major stages in newspaper production, but open to a wide range of users with different equipment and needs.

Our ambitions beyond text processing were manifold. Some we hoped to realize immediately with the completion of the system, others were future prospects where we at least wanted some assurance that our equipment was compatible if we decided to develop a new use. These included:

1. Potential for computer assisted instruction (CAI) and simulation. Few can deny that traditional writing courses require a low studentnstructor ratio to assure the feedback and in-class assistance necessary to quality instruction. But much time can be taken with routine drills, elementary error correction and simply managing the wealth of paperwork produced each week. Delays in responding to errors, however minor or short, detracts from the learning experience. Pilot efforts to assist writing and editing instruction have been in use for several years both at Indiana University and the University of Michigan (6). Others at least are considering the idea. We desired a capacity for powerful CAI, employing the same terminal devices and

hardware used for text editing.

2. Analysis of textual materials. Content and linguistic analysis are often foiled by computing technology. Few scientific computing systems are designed especially for the rapid inputting and editing of text. Often text must be laboriously entered line-by-line with punch cards. We wanted the text-oriented equipment designed for the publishing industry to be available for scientific use. Optical scanning equipment and powerful editing terminals would reduce the complexity of this task.

3. Capability to assist students interested in "precision journalism"(7), polling, survey research. The ability of computing machinery to easily tabulate and reduce statistical data has long been of interest to journalists, but rarely used owing to the complexity and difficulty in accessing a computer. Because many of our undergraduates regularly carried out projects in public opinion and research courses, extending computing capability to cover these needs seemed desireable.

4. Reducing the Complexity of Conventional Computing Tasks. The traditional method of punch card preparation, checking data decks for errors, rekeypunching "bad" cards and the inconvenience of feeding all data records into a card reader, deter many from the power of computer analysis, whatever the need. This may be especially true of communication or journalism students, many of whom have little familiarity with and tolerance for data processing rituals. Inexpensive CRT terminals and interactive computing have removed some barriers, but interaction still isn't easy. Harnessing the powerful text editors designed for reporters and editors to general (usually non-text) data entry, greatly expands access to novice users.

5. Bibliographic Systems. The importance of computer assistance in the use of newspaper libraries has been well documented as has their presence in general or academic libraries.(8) We wanted the ability to implement such systems, knowing that future reporters would need familiarity with systems of this type.

6. Analysis of the Editorial Process. Depending on their sophistication, many text preparation systems keep statistics on the information which flows through them. The ability to associate reporters with story topics over time, to abstract stylistic characteristics of writers and editors, and to chart modifications in copy as it progress through the editorial chain have been of interest to

scholars of journalism. Computers are dutiful and cost-effective in collecting information of this kind. Sucb data cast into appropriate analytic frameworks can enhance our understanding of the editorial process.

7. Simulation and Games. Disciplines related to journalism -- advertising, PR, public opinion, for example -- can use computing machinery for simulating the complexities of field conditions for more realistically than could be realized through textbook exercises. DONMAR, for example, simulates media buying situations for would-be advertisers(9). Another package, EXPERSIM, simulates public opinion sampling and data analysis situations.(10)

8. Word Processing. As with most academic departments, editing and preparation of final manuscript copy is a constanct activity -- one which ties up secretarial personnel in multiple retypings, often to make fairly trivial changes or to meet stylistic demands of different journals. We wanted the text editing capabilities of our system to also manage these needs. Processing manuscripts, form letters, updating questionnaires are usually greatly simplified with word processing. Too, by having word processing integrated on a general purpose computer, tables generated by statistical analysis software could be directly modified and electronically inserted into manuscripts.

9. Communication/interconnect capability. The ability to tie an instructional system to that of a working newspaper has many potential advantages to journalism instruction and research. Students can send and receive material as it is reviewed by working editors or can see the flow and modification of daily copy as it makes its way to the press room. Too, the transfer of electronic copy could enhance aid content studies of the press by transferring electronically encoded copy to a scientific computer capable of analyzing it. The progression of many newspapers to on-line libraries holds many advantages for reporting and newswriting courses if appropriate system link-ups could be made.

While interconnect is a hardware feature of many computer mainframes, the software necessary to control this activity may not be so easy to implement. We desired an easy-to-develop capability for interconnect.

These fairly complex demands will take time to implement fully. The key, however, was to acquire flexibility with computing resources that permits growth of this kind. In assuring this ability, there are constraints.

Cost is probably the overriding problem. Even the most humble stand-alone text editing system designed solely for newspaper work fetches about $10,000 for a single station. For this money, one gets limited text editing and (usually) little else. The computing portion of such systems usually is very limited, given the expense devoted elsewhere to terminal, output device, cabinet and cables. Systems which on their own are capable of the multiple functions discussed above, cost upwards of $100 thousand.

Most large universities, however, have sophisticated computing facilities that perhaps can be exploited. The need then is to check the compatibility of planned text processing equipment with central computing facilities. A seven terminal system in operation at Ohio University, for example, works in stand-alone fashion for text editing, yet each terminal on the system is compatible with central computing equipment located in an adjacent building.(11) Other systems operating or under development at Texas, Wisconsin and USC have this compatibility with central university computers (12).

Other cooperative arrangements can be sought. Student or university publications often maintain local printing plants which could form the basis of a partnership for major equipment purchases. Occasionally, university computation centers can be interested in acquiring and supporting text processing abilities for their own documentation needs. Such is the case at the University of Texas where computer center documentation is processed together with journalism school materials. Administrative offices might be persuaded to support a system based on its word processing capabilities.

Recurrent costs also must be considered. Clearly, the more equipment, the more upkeep, the greater the expense. If your system is dependent on central computing facilities, you will likely be charged for resources used. Often, this charge is not troublesome as the cost represents internal allocation of resources already paid for -- not a real cash outlay. However, where computing resources are already strained, access to needed resources may be difficult.

Maintenance of both hardware and software is a significant item. Annual costs can easily run 5 to 10% the purchase price of the equipment. Software must be adjusted to changing needs and expansion and the inevitable "bugs" which plague its proper operation. Fortunately, maintenance skills can often be obtained from existing campus computer installations or academic departments (physics, computer science, electrical engineering) at savings over commercial agreements.

Complexity is a second restraint. As functions performed increase, so to do the choices demanded of the user to direct those functions.

Novices often find this complexity formidible. Fortunately, powerful systems are able to group complex command strings under simple, single word commands or keystrokes (e.g. macro interpretors). Much depends on how well thought-out the system software is. With this matter under control, the internal complexity of the system usually makes little difference to the user. As newspapers have discovered, it is vital to try out competing systems under actual use conditions to check for user problems.

Third, ease of system augmentation and modernization is eventually a constraint. Over time, use of a given system builds familiarity with its operation, a library of documentation particular to it and a backlog of costly-to-develop files which provide for repeated needs (such as documents used annually). Changing a system challenges these established investments. A new system may be internally more efficient, but not necessarily in human terms.

The key is to acquire expansion opportunity in existing systems. Are control codes unique to a give device or are they "standard" codes? Is the system modular in the sense that components can be replaced without rendering the balance obsolete? Is software written in an efficient, recognized language and can you obtain source listings of your system's software? Can the software be implemented on different equipment (e.g. can other terminals, communication devices and so forth be substituted)? These capabilities permit modifications and additions. Often, however, equipment is not modular and software source code is the manufacturer's secret, reducing the likelihood of later changes and upgrading short of replacing the entire system. Budgeting, too, will need to take account of eventual replacement needs.

Fourth, text processing systems are potentially intrusive in the teaching process. In a way analogous to educational TV, effective use of equipment in academic programs requires careful planning and possibly reorganization of curriculum. Is the equipment to be pressed into daily use, or only used for infrequent orientation sessions? If daily use is anticipated, one is usually faced with fewer terminals than students. The possible bottlenecks must be anticipated and solved with appropriate scheduling. Computer assisted instruction, if used, must be developed and tested for effectiveness over traditional materials. Both processes require considerable time. Too, many instructors may be reluctant to alter successful teaching formula simply to allow editing technology to intrude.

Finally, security may be a problem. While most multi-terminal editing systems provide some security to users and their copy, often this is imperfect. Allowing instructors access to all student files, yet keeping students secure from each other can be difficult with simple systems. With more complex systems, where one shares system facilities and software with printing plants or word processing users, the difficulties can be great in keeping multiple operations apart. Special training of users and software modifications may be needed to resolve the difficulties.

The solution to the above demands at the University of Washington evolved over three years and are still being worked upon to varying degrees. Our first choice was to use existing computer resources on campus -- enhancing them to fit our requirements. To obtain the desired features on a system completely our own would have been impossible from both fiscal and support standpoints. Our second decision was to develop a system cooperatively with the University's printing plant. By so doing, we are able to share their maintenance personnel, spare parts and programmer. The School of Communication, as a result, encounters little recurrent expense for upkeep of the system. In return, terminal equipment used at the School provides backup and an overload buffer to the printing plant. The capability of the system's software to do word processing is available to all campus users. In short, the disadvantages of a large system were mostly countered by using existing computing resources and other university departments to help diffuse the cost of support.

Our presence on a major University computer opened the full resources of that machine to our students. Beyond editorial needs, bibliographic systems, computer assisted instruction, statistical processing and other analytic capabilities became available. Network linkage among major university computers and with area newspapers expand resources even further.

But dependence upon University computer facilities also meant expense in buying computer time. To reduce this outlay, we use small local (mini and micro) computers to carryout routine editing functions. The host machine is reserved for more complex functions which occur much less often in the course of an editing session. Thus we are able to absorb much of the expense of computer time on equipment owned by the School. Complex tasks are reserved for leased time on a central computer too large and expensive for us to maintain on our own. In all, with high volumes of use, editing expense rarely amounts to more than $.50/hour per terminal. Accounting for depreciation of the equipment and its overhead, hourly costs probably approximate $2.00/hour. Both rates are quite competitive compared to many commercial, non-distributive systems having fewer features.

Complexity of the system is greater than stand-alone devices dedicated solely to editing. Consequently somewhat more training time is required than on simpler systems. Too, the need to keep major users separate (classes vs. printing plant vs. word processing users) is considerable and only partly solved. The bookkeeping of large masses of files, of apportioning costs also pose recurrent management problems. Computer systems also seem in a constant change of state -- to add new functions, to increase the efficiency of software. But the changes make careful planning essential and retraining a constant need.

The system is intrusive in the classroom setting. It requires new logistics to accommodate students on limited terminals and instructional consideration to the problems of novices using sophisticated electronic gear. Little is know of ideal teaching techniques with such equipment. We are, of necessity, experimenting. Needless to say, there is the concurrent problem of educating instructors in use of this equipment. This is a slow process, often more traumatic for them than for the students.

What this description has attempted to relate is the importance of (1) using existing resources -- human and computer; (2) planning use objectives to make sure the capabilities are not excluded by system design; (3) to carefully consider recurrent expense and its minimization; (4) to consider innovative design engineered to local costs and needs; (5) to consider human and organizational problems in configuration and use; (6) to especially consider the utilities of computing equipment beyond routine text editing. Our solution to preparing students to deal with communications technology is the result of involved compromise peculiar to our needs. What is perhaps more valuable in this description are the steps or kinds of considerations we made in arriving at a solution rather than the solution itself. We hope they are helpful to you.

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