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Review Paper

Integrated Advanced Medical Information Systems (IAIMS): Payoffs and Problems

Abstract: IAIMS (Integrated Advanced Information Management Systems) is an initiative to improve the access to information needed to provide patient care, health-oriented education, biomedical research, and management of large medical center environments. This paper will review the goals, history, and accomplishments of the IAIMS initiative. Shortcomings and frustrations, lessons learned, and the future of such initiatives will also be discussed.

Keywords: IAIMS, Workstations, Integration

Introduction

If a student sitting in one of the great research libraries "knew" the content of all the library resources and had the wisdom to know when to apply that knowledge, remarkable results would be achievable. Timing and content of information access seem to be the crucial elements. "Just in time" delivery has revolutionized some manufacturing processes by providing what you need, where you need it, at the time you need it. Such capability could not exist without tightly integrated information systems, but the manufacturing domain (warehouse parts inventory) is such a straightforward example that it is commonly used to illustrate the features of relational database technology. The task of providing just in time delivery of information to those providing healthcare, educating providers, and pursuing medical research falls at the other end of the complexity spectrum because much of medicine is still referred to as an "art."

History

In the late 1970s, the potential benefits of conveniently obtaining pertinent snippets of desired information, whenever and wherever they are needed, were envisioned and discussed among a group which included Marjorie Wilson, Jane Elchlepp, Martin Cummings, Richard West, William Cooper, Nina W. Matheson, and John A.D. Cooper who collaborated to find ways to accomplish that vision. In 1980, as an outgrowth of their interest in assessing the role of the library of the future, the National Library of Medicine funded a study of the evolving role of the library in managing the information needs of an academic medical center. The study was undertaken by the Association of American Medical Colleges with Marjorie Wilson as project director and William D. Mayer as chair of the advisory panel. In 1982, Nina W. Matheson (who had become the principal investigator of the project) and John A.D. Cooper (who was the President of AAMC) produced a seminal report of the panel which had been assembled [1]. This report suggested a totally revised vision of integrated information resources which came to be referred to as "a library without walls." The information resources could be as diverse as a genome map or the accounting applications needed to manage an institution or project. Dr Cummings, the Director of the NLM, dedicated resources to demonstrate achievement of the vision. In 1983, the National Library announced the IAIMS (Integrated Advanced (in those days "Academic") Information Management Systems) program and awarded planning funds to Columbia University, Georgetown University, the University of Maryland, and the University of Utah. In 1984, IAIMS became part of the NLM's extramural research program. Institutions and professional organizations could apply for support for planning, prototyping and implementing the system. Since that time, grants have been awarded to 16 additional applicants: the American College of Obstetricians and Gynecologists, Dartmouth University, Duke University, Harvard University, Johns Hopkins University, Rhode Island Hospital, Tufts University, University of Cincinnati, University of Maryland, University of Michigan, University of Missouri, University of Pittsburgh, University of Washington, University of Virginia Vanderbilt University and Yale University. In addition, the Oregon Health Sciences University was funded through a separate legislative mandate. Six institutions (Baylor, Columbia, Duke, Georgetown, Oregon, and Washington) have received funds for full-scale implementation ($500,000 - $750,000/year for five years). Through 1994, the National Library of Medicine has awarded a total of more than $34 million to these 21 institutions.

It should be recognized that it is not just these 21 institutions or organizations that have been affected by the IAIMS initiative. At the 1984 IAIMS symposium sponsored by the National Library of medicine, 76 organizations were represented; two years later at a similar symposium 85 institutions were represented. The Association of American Medical Colleges holds an annual summer retreat for medical school executives in which the IAIMS experience is described and discussed. It is interesting to note that Linkøping University in Sweden has begun an IAIMS effort. In reality, most would agree that all major medical centers throughout the world are moving in the IAIMS direction although they might not consider themselves part of that initiative. As described by Gerry Hendrickson [8], "The IAIMS process per se acts as a stimulant for change."

Models for Achieving the IAIMS Goals

Before we examine the accomplishments which resulted from this initiative, it is important to spend some time defining the operational goals of the IAIMS initiative. A group at the University of Arizona defined their mission statement as: "Easy, consistent access to information which is comprehensive, credible, accurate, and relevant, anywhere, anytime consistent with standards of confidentiality." Others have emphasized "one stop shopping," but the overall goals of each institution are essentially the same. In spite of common goals, it is illuminating to realize that each institution has come at things from slightly different starting points. In this regard, Broering [4] states: "The institutional mission must be consistent with IAIMS planning and project emphasis. this explains why IAIMS can be different at each medical center." When one considers just those six institutions that have reached the funded implementation phase, it would be fair to characterize Georgetown and Oregon as initially focussed on library resources. Columbia, Duke, and Washington were broadly balanced across library and clinical applications. Baylor focussed primarily on meeting the needs of laboratory researchers. As accomplishments began to surface, the planning that characterized the successful applicants began to be evident as a breadth of information resources began to emerge in all sites.

Significant Accomplishments

When leaders of IAIMS initiatives were surveyed, the two that had been funded the longest (Columbia and Georgetown) both indicated that they considered their most significant accomplishment "actually doing it." Other institutions that were still in earlier phases, listed a common network and a common organizational structure as their most noteworthy accomplishments to date.

From the larger perspective of the National Library of Medicine, there seem to be several accomplishments. It is generally agreed that universities and other organizations would have installed networks eventually even if there had been no IAIMS program. What was different about the IAIMS initiative is that the participants and others attempted to study the process rather than just building a one-of-a-kind system. Systems were built that relied upon standards and modular architecture. There has been analysis of models for distribution of information, security, sharing, and financial support of information resources.

Finally, there has been construction of a few systems where enough critical mass has been reached that students, administrators, caregivers and researchers have begun savoring the fruits of conveniently available information. These institutions are demonstration sites where decisionmakers can come and see the impact, talk to users, ask about acceptance and cost. On the system at Columbia Presbyterian Medical Center (CPMC), one can see clinical information (medications, clinical laboratory test results, radiology reports, operative notes, discharge summaries, all cardiac test results, real time fetal monitoring tracings, the surgery schedule, pathology results, neurological examination findings, the results of endoscopic examinations, Ob/Gyn admit notes, a clinic visit profile which contains problem lists, medications and allergies, and computer-generated alerts, suggestions and warnings). The scholarly material includes but is not limited to MEDLINE and other bibliographic searches, Physician's Desk Reference, five textbooks, nursing policy and procedures manual, the automated card catalogue of Columbia's library as well as those of 11 other institutions including the Library of Congress, an on-line encyclopedia, dissertation abstracts, access to full-text journal services, class schedules and student's grades and access to the WWW and Gopher Internet resources. The administrative systems include the hospital's registration and financial systems, purchasing, material's management, faculty appointments and credentialing, fund raising databases, faculty practice plan, billing, etc. Each workstation can support local applications (e.g., 3-D protein structure renderings, word processing, spreadsheets, and graphics programs). In spite of the work that has been accomplished at CPMC, there are several desired functions that do not yet exist: order entry, widespread physician data input, medical center wide appointment scheduling, nursing charting, and integrated financial reporting capabilities.

At Georgetown, the network-based library resources are broader and more comprehensive than at any other medical school library in the world [4]. Enumerating them does not reflect the impact of seeing the environment and heavy utilization by students and faculty. It appears that library resources are easier to transport across institutions and to share than are billing and purchasing systems, patient records, and other databases which have highly localized and dynamic content. WWW, WAIS and Gopher provide unlimited augmentation for scholarly resources. As we move to the era of multimedia, library-based electronic offerings are bound to escalate in a spectacular manner. The cost of content becomes cheaper as networks evolve.

Shortcomings and Frustrations

When we asked about the main frustrations at each IAIMS site, there were two main issues raised: Funding and the pace of progress. The same respondents indicated that their major challenges were: funding (this problem shows up everywhere!), organizational resistance to change, getting everyone to cooperate, selling the vision and maintaining credibility.

From the global perspective, I think that the major shortcomings are two-fold:

1. There have not been definitive evaluations of the benefits of IAIMS investments, and
2. None of the IAIMS sites distinguished themselves as leaders among those institutions who are on the forefront of developing content for computer-assisted learning efforts.

Evaluation is very difficult and someone once said that we don't study economic benefits of elevators and telephones. Our evaluation is the marketplace; if people buy and use the product, it must be useful. While use by bright, busy, individuals is certainly a measure of utility, the question of "is it worth it?" still arises— I am sure that we would all use Mercedes Benz automobiles if they were furnished to academia. The question of worth will be addressed later in the section on costs.

The lack of distinguishing activity in producing educational content is unexplained, although most IAIMS sites have accomplished support for education by building micro-computer classrooms, installing available educational software, etc. One answer might be that the traditional library role is not to write the textbook, but to house a collection of them. On the other hand, Broering [4] relates: "The most visible impact of IAIMS at Georgetown can be seen in the enhancements to health education." Georgetown has inculcated specific computer-based competencies (literature searching, use of diagnostic aids, preparation of automated history and physical examination reports) into the medical school curriculum. Teaching students problem-solving skills is not the result of having them use one particular CAL application, but rather immersing them in an environment where they can easily and conveniently pursue answers to questions which arise.

Lessons Learned

In the following paragraphs, we will examine the lessons (many of which are self evident) that have been learned by those who have attempted to build IAIMS.

Vision and Institutional Commitment

As the IAIMS review committees have made site evaluation visits, it has become increasingly clear that the number one priority they seek to discern is the level of institutional unity, and commitment. Because of the need to commit resources other than National Library funds, the commitment of the institutional leaders is paramount to the success of the initiative. There are, however, many institutional disincentives to building an IAIMS capability. The information access problem is chronic and many other issues that a Dean, CEO, or Provost will face are acute. The length of time to construct the system will span a decade; a period which is longer than the tenure of many leaders. It is difficult to anoint a single leader-especially if multiple organizational (hospital, medical school, library) entities are involved. Costs are substantial and there are no commercial products that can be installed as a "shrink wrapped" package. Finally there is little evaluation of the benefits of such systems. In the face of these disincentives, an executive officer must envision the potential benefits while assessing the extent to which organizational changes can be made and leadership and direction established. When everyone understands the direction and commitment to get there, money plays a major role in determining how fast progress is made. In the following paragraphs, we will discuss the collective experience regarding each of these impediments.

Organizational issues are transcendent to technological solutions. Investigators at Vanderbilt [12] expressed this challenge as "deciding where we want to be, the techies can decide how to get us there." To help us show institutional leaders, cooperating applications developers, and end users at Columbia (even after five years of planning) the vision of what IAIMS could accomplish, one of our fellows (Robert Sideli) created a realistic and detailed prototype of what one stop information shopping would provide. This prototype was spectacularly successful in getting leaders to generate financial support and to allow our own and collaborating developers to see how their applications would fit into the ultimate solution. This common vision allowed many people to work independently and in parallel towards a common goal.

Leadership

After the question of institutional commitment, the most crucial organizational decision is the question of leadership. Who sets policies on security and access? Who owns the data? How will two different applications exchange data? Is there a dictionary for defining terms? Who is in charge of the network and the requirements for the protocols and workstations that sit on the network? Who gives out passwords and instructions for network operation? Who answers the "HELP" line when things break? Those "information architecture" decisions (which are more organizational than technical) will strongly influence the architecture of the applications without requiring direct control over the developers. Committees don't provide sufficient leadership. While strong individual leadership does not guarantee IAIMS success, there are no instances of achievement without a strong designated leader (or co-leaders). Robert Greenes discussed the issue of bottom-up organizational models in the 1986 IAIMS symposium [2]. In order to make things happen, someone must get out of bed in the morning with the primary task of seeing IAIMS succeed. As mentioned before,this person does not have to control everything. There is a recognized difference between a leader and a manager. However, the leader(s) must be anointed and recognized at the highest levels of the institution(s).

The most common problem this author has seen at IAIMS and aspiring IAIMS sites is the lack of committed cooperation between organizational entities. As Nancy Lorenzi stated: "There are a multitude of 'turf' issues raised by the IAIMS planning process.... Our issue is clearly not computing; our issue is information - ownership and control of it, access to it, and autonomy of its users" [5]. This lack of cooperation can be between the medical school and the hospital, the hospital systems and the library, or between different computing groups within an organization. New groups which develop needed and appreciated applications will always emerge. The question is how to assimilate those applications.

Kent Spackman quotes [6]: "Davenport [13] [who] identifies five models of information politics including monarchy, feudalism, technocratic utopian, anarchy and federalism. Federalism characterized by the use of negotiation to bring potentially competing and non-cooperating parties together, is one of the more effective models..." When there is genuine cooperation and organizational direction, things move forward even in the absence of dedicated IAIMS funding. At CPMC, we have resisted the "central control" approach as unworkable. "In any alliance, it is common goals and objectives that provide the catalyst..." [6]. If institutional leaders can define those common goals, then diverse computing groups need only worry about the "how to get there" issues. That is ultimately the role of an architect. In other words, it is the first letter ("I") of IAIMS which presents the most challenge. Peter Drucker contrasted the model of the German Army General with the orchestra conductor. In the latter case, the first violinist can choose her own instrument, when to practice, etc., but must adhere to certain group requirements (selection of music, rehearsal and performance schedules and attire). There must be some leadership to avoid anarchy but control should be minimized. The best part of the IAIMS money at CPMC was the ability to leverage cooperation by promising someone two new PCs if they would not just do it.

Organizational Structure

It does not appear that any IAIMS sites have identical organizational structures but each of the successful ones has an identifiable leader or co-leaders. That leader may be a librarian (Cincinnati, Georgetown, Washington), a vice-president/dean (Maryland, Vanderbilt, Virginia), a vice-president/ Chief information officer (Baylor, Yale, Michigan, Oregon), a Chief information architect (Columbia) or a faculty member (Duke, Missouri, Utah). It appears that the actual organizational structure does need to be broad based. When everything ran on one big mainframe, it was probably appropriate to have one person in charge of all applications. The network model has mandated organizational change.

In many institutions, the network (core resources) group is application neutral, i.e., that group is not responsible for the development and content of the applications any more than the person in charge of the phones is responsible for the people who use the phones. In Columbia's case the health sciences network group was originally tightly linked with the Center for Medical Informatics which leads the IAIMS effort. After the IAIMS money finished, the network group became institutionalized and now reports jointly to vice presidents in the University and in the Hospital as well. This issue of network support is not quite cut and dried because in many instances, the powerful administrative application (mainframe) computing groups who may not buy into the "institutional network" continue to support their own traditional proprietary point-to-point networks. Someone must insure that the critical applications become available on the network. This often requires high-level-administrative direction to reverse decades of established practice and installations.

Benefits

A key issue in the success of IAIMS initiatives is the goal to meet real needs. The Baylor group has stated: "No matter the technical sophistication or merit of an implementation, an IAIMS that does not support the strategic goals of an institution and which cannot be demonstrated to support those goals is doomed to be perceived as a failure" [3].

Now that IAIMS has become a routine part of life at some medical centers, it is instructive to ask users about the benefits of the IAIMS. The rank and file will answer "clinical results review, MEDLINE searching, and E-mail," but everyone has some subset of disparate smaller applications that have become a part of their daily routine. Administrators, researchers and residents will talk about the time savings in getting information that they need. At Columbia, more than 3000 different users log-on to the clinical part of the IAIMS system each month. At Georgetown, more than 2500 different individuals used the system during the January-March quarter of 1994.

Costs

Columbia has determined [10] the costs of an IAIMS system to be $7 per user per day. Georgetown [4] put the cost at $5.05 per user session (which may include access to many different resources). To put a PC on someone's desktop (hardware and maintenance only) costs between $3.00-3.50 per day ($3000 purchase for hardware and software, $150-250/yr maintenance, five year useful life). For an additional $3.50 per day one gets the connectivity and IAIMS content. These costs compare to a charge at Columbia of about $3.00 per day for having a telephone. This charge also compares to the cost of pulling a patient's chart of approximately $7.00. The annual, identifiable incremental IAIMS costs at Columbia represented 1/3 of one percent of the medical center's annual budget. It is also interesting to note that the $3 million annual cost of IAIMS at CPMC is in the same ballpark as the annual budget of the Health Sciences library.

Georgetown estimated a total IAIMS cost of $25 million. CPMC estimated $32 million in their phase III IAIMS application and came in at about $30 million for the seven-year period since 1987. Vanderbilt published an estimate that it would take $20 million to rewire the Vanderbilt University Medical Center [14]. Vanderbilt estimated $1.5 million for a backbone, and another $2 million to install the vertical risers. At Columbia our initial backbone costs were estimated at $30,000 per building to get the fiber into the basement and install bridging electronics. The Vanderbilt and Columbia Presbyterian estimate of network costs to a single user (horizontal wiring from the wiring closet to a private office), once the vertical wiring has been installed, is between $250-600.

It should be kept in mind that the network and workstation costs (including maintenance) at CPMC [10] were only 0.1% of the total medical center budget [10}. The costs of content (applications) is twice that amount. Since most applications will be purchased/developed anyway and some sort of workstation (or terminal) access to the servers that host those applications is necessary anyway, it seems there should be no question about the benefits of installing a network. The labor to pull wires is more expensive than the cable itself. This observation leads to the conclusion that networks are a necessary utility just as heating, air conditioning, telephones, electricity, and plumbing. Investment in network infrastructure is extremely likely to be rewarded.

Every institution has spent almost as much time agonizing about mechanisms for financial support of the network as was required to solve the organizational problems. Libraries have traditionally been supported from central funds or taxes levied on all citizens regardless of the individual level of use. Even libraries depart from this model when they begin to charge for mediated searches or photocopying articles. On the other hand, newspapers and telephones charge for access to information according to the level of use. Is the network similar to heating, ventilation, and air conditioning which should come bundled with office space?

The University of Virginia has voted a "tax" of 1% of all indirect costs recovered from grants that are awarded to the Health Sciences. Duke University levies a surcharge on the phone bill of each user. At Columbia, the hospital paid for the network, but the University initially tried to charge users a monthly fee for being attached to the network according to the telephone company model. This model was not well received and backbone, vertical wiring and maintenance were absorbed by the university health sciences. We still charge a user an initial $200 hook-up fee and have users pay for the cost of horizontal wiring from the wiring closet to their office.

Length of Time

Columbia and Georgetown started planning for IAIMS in 1983. In spite of this on-going 11 year effort, neither institution would claim to be finished. Vanderbilt has estimated in advance that the process would require seven years. Washington completed a three-year planning process before being awarded a five-year implementation grant [7]. These time periods are in agreement with the initial estimates of the NLM (12-18 months for the planning phase, 2 years for prototyping, 5 years for implementation, equals 8½ years). NLM programs now support a planning and implementation phase for a total time of up to 6½ years.

Technology is not the issue. When one realizes that the first DOS-based IBM PC was introduced only two years before the original IAIMS planning grants were awarded, it becomes obvious that technology will change faster than one can implement an integrated system in a medical center. Religious wars about Macintosh versus DOS are now obviated by operating systems which can run both types of applications. Routers can switch tokens to packets without the end user being aware.

There are only five major mistakes that one can make on the technical side:

1. Choosing an architecture that is so proprietary that no one will cooperate. IBM has been a big supporter of the CPMC IAIMS initiative. If we had restricted our architecture to proprietary products that IBM was pushing at that time we would have had SAA, OS/2, and token ring exclusively. If we had chosen to work exclusively with Apple, we might have had Appletalk and would never be able to use any applications which ran on Novell.
2. Choosing an architecture that is rigid. As the previous example illustrates, the technology will change faster than an institution can install an IAIMS. Words such as Taligent, Power PC, RISC or Nextstep were unheard when we began planning. One major university made significant investment in Unix operating systems, servers and TCP/IP protocols while departmental applications were being developed on Appletalk and Novell networks. The end result was wasted dollars and the ultimate departure of the leader. The best approach is to plan on heterogeneity and support a limited number of individuals or groups who want to explore promising new and different platforms and protocols. This exercise will force an institution to keep the information architecture sufficiently flexible that even though all of the experiments do not pay off, it will be positioned to support those products that do emerge as de facto standards. Perhaps the most important issue is being able to support mainstream applications which the endusers will buy, regardless of what the technology guru says. In relying on TCP/IP one still has to offer a solution for Novell protocols.
3. Neglecting to use standards. At CPMC, we are extremely reticent to buy any clinical product that does not use HL-7 or SQL to connect to the outside world. At the University of Washington: "The following network technology standards are the norm: Ethernet connectivity..., TCP/IP protocol suite, authentication by Kerberos, Unix is the operating system of choice for multi-user systems and shared servers... Client-server computing is the predominant approach for long-term development of systems. Four general types of desktop computing environments are supported: PC, Macintosh, Unix workstation and X terminal" [7]. In spite of this fairly well defined architecture, Washington and CPMC support access to mainframe applications and VAX servers via terminal emulation software.
   Perhaps the most important standard is a dictionary. The University of Washington has proposed a "Unified Institutional Data Dictionary" [7], while CPMC has extended the UMLS into the clinical domain to act as a Medical Entities Dictionary [11]. Other emerging standards are CORBA, OLE, Kerberos, Mosaic, Gopher, WAIS, WWW, Jpeg, MPEG, UMLS, ATM and ARDEN.
4. Another mistake is developing applications which do not separate back-end data retrievals from front-end presentation layers. For example, applications can talk to a database using API's (application programmer interfaces). At CPMC, we have three varieties of these API's for our clinical repository, SQL, HL-7, and table based query for those that will not conform to one of the first two standards. If we ever want to change that database from DB/2 to Oracle, Gemstone or Sybase, we just have to write three new API routines/objects and many of our present applications will work. If we want to have results review run on Macintosh instead of Windows, we just have to call the appropriate presentation layer routines/objects if the rest of the code is written in something portable like C or C++.
5. The final mistake is failure to choose an architecture which reflects a vision for the applications which will be running a decade from now. One might choose a network wiring convention that will not support (via some modest level of upgrades) full motion video. One might choose a repository that is not scalable and extensible; ultimately performance will limit growth.

Future Directions

Even as we struggle with organizational politics, funding and ten year installation time frames on campus settings, technology has leapfrogged past us! The future is obviously Integrated Advanced Information Management Systems that span the world rather than a campus. WAIS, Gopher and WWW and the clients to access those servers allowed the author to read about ski conditions and recommendations for lodging in Utah, get a map and history of Parma Italy, and obtain information about the average annual salary of University professors in the USA at one sitting.

The effort to foster the High Performance Communication and Computing System within the USA and elsewhere, will also mean that all of this information is available in one's home not on just the campus network. This information will be increasingly of the multimedia variety with full motion video available. I may see the ski resort and be taken on a walking tour of Parma in spite of the low salaries offered to university professors! The breadth of a medical library's collection may diminish as that breadth can be obtained by virtual inter-library (i.e., inter-server) loan from a Digital Library. How are the libraries of the future going to divide up this work so that duplication of intellectual effort is avoided? Will there be an organizational structure or will authors gravitate to servers that support their areas of activity regardless of institutional affiliation? Can the "anarchy" model, which was so devastating on a campus level, flourish on a global scale or will a federalist organization emerge?

The big intellectual challenges of the next decade will be knowledge base management and information retrieval; not installation of networks. Issues of privacy, security, user authentication, robustness and epidemiologic analysis of community databases will occupy our time. Can you imagine medical and nursing students taking tests using Mosaic (as we have now allowed them to use their calculators) while we finally test problem solving ability rather than memory. The applications that run on the medical center network can be located anywhere on the gigabit network that we see emerging. Images, teleradiology, virtual house calls, and remote surgery will all flow over the network. The availability of knowledge and computer-based care plans and practice guidelines will reduce the geographic variance in the way patients are treated and may substantially reduce the cost of health care.

In summary, given that it takes ten years to transform the information environment in a medical center, those institutions which were successful are remarkably well positioned to take advantage of the explosion of knowledge resources on the Internet. For those who did not, the lesson is that they must focus on connectivity, not content. The "library without walls" is coming to us faster than we are able to figure out how to browse the content. The starkly emerging realization is that while Internet and local scholarly resources are substantial, clinical and administrative systems are lagging sadly behind. The electronic patient record is not yet a reality and it is still impossible in my institution to submit a purchase requisition electronically.

How will the legacy systems for management and patient care ever catch up? Based upon network connectivity to myriads of WWW, WAIS, Gopher and other types of servers, the librarians in many ways have exceeded their initial vision of what might be available, even though we all recognize that access must become still more convenient. The difference between the availability of library resources and institutional-specific clinical or administrative systems lies in the words "institutional specific". One MEDLINE application can be used in multiple institutions with no (or very little) local customization. Even though it may take several years to develop the content of a Gopher server, there are literally hundreds of groups working in parallel. Thus, we have hundreds of resources available to the worldwide community at the end of the development period. The institutional-specific developers are still bound in "the highly customized, one-of-a-kind" applications development mode. Perhaps we should gather a group of administrators, educators, nurses, and physicians to try and duplicate the vision of that initial group of far-sighted librarians.

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