

MAURICE J. FREEDMAN
Westchester Library System

BEHIND THE KEYBOARD: The Ongoing Impact of Automation on the Library Staff

Let's talk about the keyboard in the larger context of what it really represents, and of which it is a small but vital part, the computer.

I will take a look at how the computer, and the exercise of its inexorable power and logic library automation, has affected the library user. I prefer to discuss the impact on the broader group, the user, because the staff is part of the user base. Considering what we do without reference to its impact on the public we serve tends to distort our focus from the overarching mission of the library. That mission is to serve the public by meeting its broad range of information needs.

1. The ONLINE CATALOG

I will begin with the catalog. *Teaching the Library Staff to Help Users with Public Access Catalogs* is one of the major topics of this afternoon's discussion. To give us a reasonable framework for the discussion, let's be clear about what a catalog is and what it is supposed to do.

One instructor taught that it is the catalog which makes a random agglomeration of books a library. The catalog is the organization of the collection such that one can know what materials there are by a given author and on a given subject, and if a specific work or item by a given author or on a given topic is in the library. Hence the catalog serves as the guide to the library's collection.

The older folks among us worked with the card catalog long before the keyboard became a primary means of catalog access. The card catalog is scorned these days and not entirely without reason. Its fundamental clumsiness, inertness, and its relative non-susceptibility to change make its loss hard to lament.

But it's terribly important to understand that there were principles that applied to that card catalog and how it was created. Those same principles, 150 years in the making, apply to the online catalog, and had they been applied to the creation of the data comprising the online catalog your job teaching its use would be a hell of a lot easier, not to mention your own ease and **success** in the use of the online catalog.

Let's get back to the computer. The late Ernie De Prospro, my doctoral research instructor at Rutgers, was very fond of teaching the *Law of the Instrument*. Simply put, if you give a kid a hammer, he or she will find something to bang with it. Well along came the computer, and librarians along with everyone else wanted to automate. The computer couldn't just be available without our finding something to bang with it.

This reminds me of what Tom Wicker had to say in writing about the Attica rebellion in *A Time to Die*. The longer the troops stood outside of Attica with their guns in their hands, the clearer it was that they had to be used. The gun itself, just by dint of its being there, became the reason for its use.

MAURICE J. FREEDMAN
Behind the Keyboard...
April 3, 1992

The continued presence of the computer made its use in libraries inevitable.

Four major library automation developments shape what is going on in our libraries today. And out of these developments that we have the good, the bad, and the ugly in today's online catalogs.

The four of them are, the creation of the MARC format, OCLC, The New York Public Library's original automated system, and the CLSI pioneering use of the minicomputer to automate public library. Each of these developments are fundamental to and shape what goes on or should go on in public library online catalogs.

Because I am a bad guy, I am going to focus on the failures for a while. The two biggest developments contributing to the major failings of today's online catalogs are the MARC format and OCLC.

1.1. MARC, which is the acronym for *MAchine Readable Cataloging* was invented and thought of as a medium for storing and distributing cataloging data. It has largely been a success but it is a failure in that it took too little account of the cataloging process, focusing instead on the largest aspect of the final product, the information found on and relating to the catalog card. Some of its critics say that it permanently enshrined what already was a grossly inadequate catalog record.

One problem of MARC's not being developed in the context of a cataloging system was that MARC deals poorly with sorting data in our computers. For example, the much disparaged and maligned phone company-deservedly so-files the name *47th Street Photo* with the Fs. Your online catalog cannot do what the phone company does in the Manhattan directory. *47th Street* is found interfiled with the numeric entries, i.e. the 4s. MARC only dealt with the most trivial part of the filing problem, the arrangement of *titles* with leading articles. I.e. the, an, a, le, la, les, etc.

For leading articles in an author entry our catalog filing poobahs solved the problem by lopping off the leading article of the author's name. So, the author entry, *The Club*, becomes *Club*, in order to get *Club* to file with the Cs. Why not take liberties with the author's name in order to have our inadequate catalog display systems correctly sequence the names?

The point here is that the computer can be made to serve the library user. But it won't unless the library user speaks up and demands that our systems be made to serve our legitimate needs.

Our professional standards and service requirements have been abused by programmers who neither took the time to understand the problems, issues and complexities of library records, nor exercised the intelligence, imagination or professional responsibility to meet the needs of library users. And in the creation of the current filing rules, the catalogers were their more than willing accomplices.

The disservice done to the user is the underlying issue. In the lambasted and not-so-lamented card catalog, all numbers, whether spelled out as they sounded, or printed in their numeric format, were filed together as if they all were spelled out. In this way the user could look in one place and find all the titles beginning with four, forty or any other number.

In the online catalog the user will look in the "front" of the catalog and find the sequence of numbers expressed numerically. If the person finds a few entries, he or she might mistakenly believe that they have examined *all* of the libraries' holdings beginning with that number, not knowing and thus being deprived of the entries in a different part of file in which the given number is spelled out.

One O'Clock jump and *1 O'Clock Jump* should appear together. Filing the two versions in separate places virtually guarantees the user's only getting one of them.

The user that doesn't understand that the librarian is no longer organizing files of numbers as they did in the past will think they found everything if they get hits in the first of the two possible places to look.

MARC made no provision for alternate filing forms because it dealt with the catalog record with little reference to the other catalog records and entries with which that record would appear.

I don't want to belabor this issue, but the fundamental point is that the good and sound principles of service and the ideology underlying the library catalog were made vulnerable to compromise and worse by LC's and the profession's solutions to encoding data, and the less than sophisticated systems built to serve the unsuspecting user.

As a result or as a concomitant, such a critical concern as establishing sensible filing rules for the machine environment was demeaned, rejected and sadly compromised in the prevailing systems in today's market.

1.2. OCLC

The second major development was OCLC. OCLC would not have been possible, let alone successful, without the MARC format and the Library of Congress's distribution of its cataloging in the MARC format.

OCLC, the single largest library network in the universe, took the problem a giant step backward and both singlehandedly and rightfully can take credit for the fiascos masquerading as catalogs in most, if not all, the local systems around the country.

OCLC was built as a system independently of any notion of what constituted a catalog other than reams upon reams of juxtaposed pieces of paper commonly called catalog cards. OCLC is/was the computer solution, and a brilliant one, to the complex problem, "How do I get lots of sets of catalog cards cheaply, efficiently, easy to file, and with maximum flexibility in what appears on the card?"

Well folks, the catalog cards are in the dumper but that rat's nest called the OCLC online database is alive and well, and having headings corrected at the rate of 30,000 per day. My question is, "who is going to fix the local online "catalogs" filled with records containing the previous used and uncorrected versions of these 100s and 100s of thousands of changed headings?"

What do you tell your online catalog user when 3,4,5, or more versions of Jean-Paul Sartre's name appear in the catalog? What do you tell your user when some books on *airplanes* are under *aerplanes* rather than *airplanes*?

OCLC was designed as an online catalog card editing and ordering service. Its success as a card editing and production facility is deserving of every bouquet and honor it has received.

As an online catalog, it is a disaster.

I do not revile it lightly. The job of the catalog is to present to the user everything; by an author, on a given topic, and to allow the user to find a given work or item when the author, title or subject is known. Because there was absolutely no control over the headings entering the OCLC database, or ensuring that even the MARC file of Library of Congress cataloging remained internally consistent, typos, mistakes, truly bad cataloging and bizarre data are found in the OCLC online catalog.

Giving Kilgour his due, OCLC was not intended to have the kind of cataloging integrity we used to be taught about in library school. (With Ben Weintraub retired, who is teaching the Rutgers students the name of Antonio Panizzi and his 91 cataloging rules?) Fred was perfectly comfortable with libraries adding and doing as they pleased.

In any case almost all the academic and research library databases in the U.S. emanate from the uncontrolled OCLC online catalog, and suffer accordingly.

For those in the audience who don't care about the integrity of the catalog and having inconsistencies abound therein, and think my concerns are effete, precious, antediluvian or downright dumb, so be it. My response is you either don't understand the problem, or worse you don't give a damn about the minority of library users whose information needs exceed the *New York Times* best seller list and the outhouse bookshelf, needs that Charlie Robinson so ignorantly disparages and rejects.

I believe that these people are entitled to service and should not have to make half a dozen searches to find what the library has on a given topic. It is the cataloger's job to organize and control subject headings so that one search is enough, rather than one search gets the user to some of the materials, leaving the person to walk away thinking he or she searched them an.

We must build our catalogs so that we can successfully search for more than the books of Danielle Steele.

The decriers of the position I advocate say that keyword and Boolean searching make it unnecessary to waste the investment formerly made in creating so-called "good cataloging". Indeed for those who did their retrospective conversion on OCLC and did not have the resultant catalog file subjected to a rigorous authority control process thereafter, please follow closely as I indicate why keyword and Boolean searching are not guarantors of success.

With the help of someone who continues to catalog everyday and who over the years has provided me with myriad examples, Sanford Berman, Head Cataloger of the Hennepin County Library, I suggest we talk about *pay equity* and *comparable worth*, two synonymous concepts identifying an idea which should be of great concern to library workers. Since we are a predominantly female group, we are underpaid accordingly.

If you do a keyword/Boolean search of the online catalog under pay equity you won't get any of the works which contain comparable worth in the title, and *vice-versa* if you search under comparable worth. However at about the book, *A Secretary and a Cook: Challenging Women's*

Wages in the Courts of the United States and Great Britain or Women, Power and Policy or Job Evaluation Practices and Their Impact on Equitable Pay for Women?

Using a title keyword/Boolean approach none of these would have been found. All of them however will be found in the Hennepin County Library catalog when one searches the subject heading *Pay Equity*. Also if the subject search was made under the term *Comparable Worth*, Hennepin has a reference directing the person to *Pay Equity*.

I am not trying to beat good cataloging into your heads, but the whole point of this is that libraries around the country are being confronted with the fruits of the lousy database called OCLC, and the virtually uncontrolled cataloging emanating from OCLC that resides in online catalogs around the country.

Unfortunately the result is that what should have been a pair of complementary and potent tools, the controlled vocabulary of librarian-established headings and the keyword indexes amassed and searchable from the natural text describing the item, are only half there. The controlled vocabulary is a mess, and natural language by its nature is a mess, which is why we introduced the controlled vocabulary in the first place.

By not designing its cataloging system as a cataloging system, but as an online card production service, OCLC provides virtually no control over the accuracy or quality of the data being entered onto the network.

1.3. The New York Public Library (NYPL)

NYPL took a totally different approach. Instead, NYPL decided to automate and to maximize machine support of the catalog process. The whole notion of authority control is embodied in the NYPL system that was built about the same time as OCLC. With NYPL if a catalog record enters the system and there is a typo in the middle of a long subject heading., that heading is kicked back to the cataloger for review. Unmatched headings are marked as such and are reviewed by the cataloger.

As a result, the odds of mistakes getting into the database are reduced dramatically.

Second, when LC decided in the 1970s to stop being ridiculed for using aeroplanes instead of airplanes, it only took a change in the authority record for NYPL to change the hundreds of occurrences of aeroplanes to airplanes. The world changes, and concepts are expanded, revised or become outdated.

We must have a way to have our online catalogs be responsive to the language of our users. It is only through machine-based authority control, the ability to change 10s, 100s, indeed thousands, of instances of a term to another one that will provide the users the catalog access they need.

Even though NYPL is in the process of perhaps abandoning its Rolls Royce cataloging system, its paradigmatic implementation of authority control is represented almost universally in the design or installation goals of every online turnkey vendor today.

One of the saddest comments on our failure as librarians is an information sheet that the Pike's Peak Library provides for its online users. It instructs the searcher to look up materials by a given

author under all of the versions of the author's name found in the online catalog to ensure that they find what they need.

In the card catalog, the filer would never notice that the I and t in the middle name of William Butler Yeats are transposed. The card with the typo would be interfiled with all of the other works by Yeats. In an online catalog, William Bulter Yeats is in a separate place. The work with the misspelled heading could be lost to the person forever unless he or she is willing to look further after dealing with all of the hits under the correct form of Yeats's name.

The upshot is that if we started with the best of both OCLC and NYPL our online catalogs would have been vastly superior as service tools to what we display for our users today. Instead through our turnkey vendors and third party authority control processing firms we are trying to retro-fit the quality control that should have been built into the systems in the first place.

The online catalog will be improved but it could have been and should be a lot better.

Incidentally, in relation to filing, NYPL set up separate filing fields for words or titles which should file differently than they appear. Thus *one* and *l* appear in the same sequence rather than two different ones.

The one-time greater effort by programmer and the cataloger to get the computer to file reasonably, saves NYPL's hundreds of thousands of catalog users the problems previously described. The procrustean bed solution of destroying data to get it to file right is surmounted by the exercise of professional responsibility, rather than its avoidance.

1.4. CLSI

CLSI was the great democratizer and innovator. Through its use of Digital Equipment's PDP ter line in the 1970s it brought the benefits of the computer to the public library. Heretofore library automation was virtually the exclusive province of the major universities and other institutions with access to mainframe computers.

That was the good news. That was also the bad news. By squeezing library operations onto a machine not quite big and strong enough to accept them, the compromises and creativity left CLSI users, ultimately 100s of them, having to buy new computers and convert their already converted databases yet again.

The minicomputer became the instrument of choice for local automation solutions. The combination of price and emerging performance have reinforced yet again the truism that the technology far surpasses our ability to use! it. The capacity of the minicomputer to store and process authority files along with the other turnkey functions has been there for several years—the vendors in most cases have yet to provide the software functionality.

Perhaps this is enough on the online catalog. It certainly is more and probably much different than you bargained for, but it was shorter than my doctoral dissertation.

I don't envy you having to get users to unlearn some of the positive things they were taught about the card catalog, and having; to explain why Mozart's name is repeated so frequently—each time slightly differently—in the online display.

The balance of my presentation will get to some of your nut and bolt concerns.

2. Other Topics

2.1. Concept, Funding, and Support

There are several things to be said about funding, but the main one is I wish the best to those who are trying to raise money during these financially troubled times.

In Westchester we funded our automation efforts during the period the U.S. was being converted from the largest creditor nation to the biggest debtor nation in the world, the Reagan-Bush legacy. The money wasn't really there, but was being spent like crazy anyway. Now both the real money and the play money are all gone.

In New York State the public libraries are much the same as those in New Jersey. The major difference between the two States is that New York State in the late 1950s created a strong system of public library systems to enhance the quality of service and operations of the public libraries in the State. These public library systems are major service centers for the public libraries they serve, in some cases directly serving the public as well, and in other cases serving as a headquarter support system for its member public libraries.

WLS the agency with which I am associated is the latter. For the 1980s, WLS's main mandate from its constituent public libraries was their automation. This was an interesting problem for a library system that had at its geographical center a community named Armonk. Some of you might know that Armonk is the location of the corporate headquarters of the International Business Machines corporation otherwise known as IBM, Big Blue, International Bull Moose, etc.

Aside from the facetious names, the problem with which we were confronted is one perhaps similar for other communities which also have a great density of high tech business. According to estimates a few years old, i.e. before IBM started to substantially reduce its staff, approximately 35,000 IBM workers lived in Westchester County. This meant that almost every library board of the 38 public libraries in the County had an IBM employee on it or consulting for it in some way or another.

What this really meant was several things.

2.2.1. Whatever we did, there was always someone at a public meeting who wondered what kind of computer we were going to use. There was a great deal of pressure to use IBM hardware, but the unfortunate truth was that the only IBM systems available, NOTIS and DOBIS ran on ludicrously expensive mainframes. Hence, no IBM.

2.2.2. IBM's 35,000 Westchester workers weren't all systems or information engineers working on the problems of automating public libraries. I dare say I never met a one who worked on public library automation. Nonetheless, it didn't in any way limit the IBM experts on real estate, accounting, conference planning or any of the other non-related jobs telling us how to go about the automation of the County's public libraries.

The most charming incident was when a member of a public library board in 1987, told us we should automate the half-million bibliographic records and 4,000,000 items comprising the libraries' collections onto a PC. I told him it really wasn't feasible. His fall back position was,

how about giving him a tape of his local library's holdings and putting that on a PC that could be used there.

We succeeded in getting his library to participate in the system, as have all 38, but he was representative of the kind of unanticipated problem that we encountered in getting community support for the project.

1.2.3. From being considered as having some expertise in the area of library automation and a history of technical services positions, found that for the better part of four or five years my chief responsibilities were political and that much of my time was spent fund raising on behalf of the local public libraries.

The concept of automation was agreed upon by all. It was WLS's job to come up with a reasonable plan. Funding it was another story.

We developed a funding strategy that has worked successfully for the Westchester Library System. Several factors contributed to its success.

1.2.4. First, our underestimates of the cost of the project and the participation of the libraries favorably balanced out. The greater participation more than paid for the resultant costs.

1.2.5. The real key to the success was our willingness to meet with every public body and official who wanted to meet, and tell them our plan and the projected project costs, especially what it would cost for each library.

It was in this regard that I learned so well how political my position was. From library boards to town supervisors to friends of Friends groups, each meeting had a little something special. Sometime it was a ranking phone company official; one time an IBM person rhapsodized about a particular display device, plus we were forced to sit through two or three demonstrations of IBM's DOBIS system even though it could not meet our requirements; another problem was the County itself.

The local community college had automated on the County mainframe using the PALS system. We were urged by some members of the community as well as the County data processing management to use PALS and save a great deal of money. Our wish to preserve our autonomy and the absolute priority of our users' needs were the basis for rejecting the County offer.

In addition we were forced to do a lot of writing to stave off similar efforts from the data processing head of one of the larger towns who wanted us to use a particular computer system he favored. That problem was eventually solved by that person's being indicted and tried for some irregularities in his department.

Overall, several principles emerged. There is no substitute for a well-thought out and researched plan. One has to be respectful and pleasant regardless of how rough or seemingly unreasonable the people with whom one meets. Patience and forbearance are necessary.

Forgive me if I am telling you something you already know, but one point I made and was careful to never equivocate upon, was that the automation of the County's public libraries *would not save money*. Library automation except under very specific circumstances does not save money.

Library automation improves the quality of service. Library automation helps control rising costs. Typically people will be freed to do tasks that otherwise were not getting done, or were getting done badly. Lastly it is a funding and public relations positive.

Funding agencies are much more amenable to approving one-time capital costs which will help limit ongoing operation costs, than they are to personnel increases.

As far as public relations goes, computerizing is something the public likes to see. For whatever reason, once justified and funded, automation is perceived as a positive and progressive step. It shows that libraries are getting with it. I'm not asking you to believe this, but it is a perception that was encountered several times.

3. Managing the System

There are a variety of issues involved in managing the system. Let me highlight several of the most urgent ones.

First, it is essential and beyond argument that there be a maximum of participation by everyone concerned. From the planning stage through all steps of the implementation process and the ongoing operations, people must be trained, listened to, and have a say in what is being done.

Each library has to have a single person responsible for the project in that library. In preparation for this talk I interviewed in depth a library director and the project manager for that library about what worked for them.

This library did not rush to be among the first to circulate online. Its staff initially were hostile to the project, and when I met with them they surprised me with the depth of their resistance. The director informed me that once his initially resistant board understood the extent of the service benefits for the public, it enthusiastically committed over \$100,000 to the project.

Only when this fact of the library's participation was established by the board did the staff enthusiastically pitch in. Interestingly, the director, who came from a smaller library, decided that he should learn and do every task before assigning the work to his colleagues. This can be a plus or it could be a disaster depending on how the director handles the job.

For the long term there was a realization that one person had to be responsible. It took replacing the first person he selected as project manager with another to get someone who was competent to manage automation of the library on a day-to-day basis.

The participative, planning process had been carried out so well that when the library began to circulate books online it was an anti-climax.

The story that I found most interesting was when there was a disk failure on a Saturday. Because three key central site people were all out of the office the following Monday, it wasn't until Tuesday that the diagnostic reports message of a disk failure was discovered. This was one of three libraries whose transactions for the affected period were completely lost.

What was so surprising was the equanimity of the library's project manager. She said that the staff were on top of what they were doing, instituted special procedures for the materials that were affected by the data loss, and overall rolled with the loss. They also were satisfied with the

explanation they were given by the central site project manager, but warned that they would not be as sanguine about another such foul-up.

The make their adjustments when problems arise so that they don't recur, and they expect the WLS staff to do likewise.

On our end, we took immediate and long-term steps to deal with the problem. First, all operators including the part-time evening and weekend people were trained to read the diagnostic reports and how to recognize the message that indicated there was a disk failure. That was the short term solution which assured that the detection of a disk failure would never go beyond one shift, rather than the three days of failure with the original incident.

The long-term solution involved a hardware investment that was part of a capital upgrade program to take us up to a 500 terminal capacity. The disks, and thus all of the files and records on our system, are completely mirrored. Every single transaction and record are duplicated on another disk.

This means that the user will not even know a disk failure occurred because the disk's mirrored image partner instantaneously processed the transaction which otherwise would have been lost when the disk failed. We should be relatively safe because the odds are minimal that two mirrored disks fail at the same time.

Because we are a cooperative service agency funded in largest part by the members of the system, there is a broadly representative users' group steering committee which we meet with regularly. Policy, budget and operational matters are dealt with in largest part on a consensus basis. It can get sticky, but by and large everyone is counted in and feels that it is their system.

The fiduciary responsibility rests solely with the WLS Board of Trustees, but there has not been a single issue brought before the WLS Board that wasn't thoroughly aired and approved in advance by the users' group.

Documentation

The documentation provided by the vendor is never adequate because at best it is generic and meant for all installations, and at worst either lousy or non-existent. We have compensated for this by providing a numbered memo series which deals with system-wide problems. Some of these memos dealt with important functional issues that had to do with the early stages of implementation, and some are responsive to minor concerns which many users might ignore. Nonetheless these memos have become a body of valuable information that well complements the manuals and documentation (or lack thereof) provided by the vendor.

Our view early on was that training was crucial. We quickly learned that our vendor was going to meet its contractual requirements to us, but we were going to come up way short in terms of what we needed. You can't always get *everything* you want (to slightly change the Rolling Stones' song title.)

At that point we added the full-time documentation person; and, overall the project has worked extremely well. We have been waiting for an online catalog for over four years, but we know that our vendor will deliver it eventually.. or so we pray.

To conclude this discussion, the key elements are:

- (1) There must be someone who is clearly in charge at each site;
- (2) There must be as much cross-training participation in the operation and management at each site as is practical. The greater the investment here, the more successful the implementation will be.
- (3) There must be a system-wide single point of coordination for training, documentation and questions.
- (4) The users must be committed to and involved in the planning and management process.

4. Black-outs, Phone lines, Downtime and Other Crises

Because of TANDEM equipment being our hardware platform, it makes us a little different when it comes to downtime. The TANDEM architecture and the fully-mirrored drives basically mean that there is virtually 100% computer uptime.

Black-outs and brown-outs we have tried to plan for by the purchase of a UPS, an *Uninterrupted Power Supply*. The UPS does two things. It conditions the electrical power so that the irregular up and down current entering the UPS comes out of it and goes into the computer perfectly pure and flat—no spikes, no dips.

The second thing it does is provide the computer and all of the associated machine room equipment with protection from a black-out. The UPS we purchased will keep all of the equipment in the computer room running for at least one half-hour in the event of a black-out or total loss of electricity.

That is more than enough time to achieve a soft shut-down of the equipment. Practically speaking it means that the computer is well-protected from electrical problems.

Which leaves the last area: communications. This is the least controllable and the most frustrating area. We bought a telecommunications system separately from the turnkey system. Everyone separately buys their local phone service from the phone company.

At one point TANDEM, DCA (now RACAL-MILGO), and New York Telephone (a NYNEX subsidiary) each pointed the finger of blame at the other for all of the communication problems we were experiencing. It ultimately took our demanding that top technical people from each of the three companies come to our site and not leave until they resolved the problems. Things were not completely better, but they were vastly improved.

We currently have three people on staff with significant telecommunications experience and expertise. That coupled with vigorous follow-up on problems has tended to minimize the amount of time we are down.

It sounds nice and clean and antiseptic the way I have discussed it here. Working with the phone company is anything but that. First, you deal with a different salesperson whenever new equipment or problems are discussed. And, no matter how good our people are, nothing they can do at our Headquarters is going to spare the local library down-time when it is hit by lightning or for any other reason the phone line goes down.

Second, the local repair guys-the people who check the lines, go to the local libraries, come to the central site, etc., must have the most secure jobs in the world. They really don't seem to give a damn. It is a tribute to the patience and personality of the project manager, Stan Ploszaj, that we get the service from these people that we do. All I can say is give them cookies, coffee, and grin and bear it as they screw your eyes out.

However my message is don't take it from the people above them. The closer you get to higher-up management the more effective righteous anger can be.

And believe me, when we had top systems people from TANDEM, DCA and NYNEX in our machine room, we had documented the problems and all of the failures of each of those companies in their individual efforts. They wanted to be free of us just as much as we wanted them to straighten out the shared mess they made for us.

I am pleased to report that we no longer have serious telecommunication problems.

Assuming that the turnkey system purchased is relatively sound, I will unqualifiedly tell you the most vulnerable link in your system is the communications system, primarily the phone lines connecting the central site computer to the terminals at each of the participating libraries. I wish you well in keeping those lines up.

I hope and trust I have presented something of value today. You have my warmest and best wishes for a productive afternoon.

Thank you.