Liroff address to Institute of Museum and Library Services group, 12/2/03

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National Science Digital Library Programs
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Joyce Ray asked me to talk about how public media organizations such as public television and radio stations are being transformed into cultural heritage organizations and digital libraries, and how universities, museums, libraries, archives and these public media organizations might work together to take advantage of each others' expertise, resources, and audiences. Joyce also asked me to address how the expectations of our various user constituencies are changing as they experience new ways of accessing digitized content.

Thanks to initiatives undertaken by both IMLS and the Corporation for Public Broadcasting, I've had the privilege in recent months of spending an increasing amount of time with colleagues from traditional cultural heritage institutions, first at the IMLS WebWise conference last February, then at the end of August at a workshop focusing on digital resources for cultural heritage, convened - with the support of IMLS - by the University of Denver Penrose Library - and most recently, a little more than two weeks ago, at a "partnership for a nation of learners" summit, jointly sponsored by IMLS and the Corporation for Public Broadcasting.

In their invitation to the November summit, CPB president Bob Coonrod and IMLS director Bob Martin invited participants to join in supporting community-based collaborations that foster learning and civic engagement, growing out of a "belief in the value of lifelong learning; in the potential of collaborations . . . . to serve learners in new ways; and in the positive impact that both can have on community priorities and civic engagement."

It was at this most recent conference that I first encountered the term "free choice learning" which describes the kind of informal lifelong learning activities in which most of us in this room are engaged both on a professional as well as a personal level. Later on in the conversation, I heard former IMLS acting director Beverly Shepherd refer to "an emerging industry of informal learning", and the need to find language to describe what this is. I was also introduced to this report – "Partnerships for Free Choice Learning – Public Libraries, Museums and Public Broadcasters Working Together" – published by the Urban Institute and the Urban Libraries Council, with the support of IMLS.

This is "the playbook" for those of us who are interested in forming partnerships as a way to increase our offerings, as well as in developing ways to reach new constituencies. I recommend it to you highly.

WHO WE ARE – PUBLIC BROADCASTER IN BOSTON

You may know WGBH best as the public television station which produces approximately one-third of the primetime and children's television programs distributed nationally by the Public Broadcasting Service. You may know us best these days for public television programs like Arthur, Zoom, Between the Lions, Antiques Roadshow, Nova, This Old House, New Yankee Workshop, Frontline, American Experience, Masterpiece Theater, Mystery, and numerous others - and their related web sites on PBS.org and interactive media – as well as for our work in making content accessible for hearing-impaired and visually-impaired viewers through our Caption

Center, Descriptive Video Service, and the National Center for Accessible Media. We also are a leading producer of educational programming, particularly in the area of teacher training.

A very few years ago, all of us would have wondered what someone from public broadcasting would be doing at a meeting talking about digital libraries, and making common cause with the universities and libraries represented here this morning.

After all, broadcasting was an ephemeral medium, not known for permanence. For all of us who grew up with the medium, it was about being there when it happened or missing out entirely. Until about twenty-five years ago, anyone who wanted to watch television was totally dependent upon the broadcasters' real-time delivery of programs. If you weren't available on - say - Tuesday night at 8PM to watch NOVA, you didn't watch NOVA - unless the station chose to repeat it.

Given the ephemeral nature of the medium, the notion of a television station housing a "library" simply didn't make sense. Most local stations saw little value in keeping the content they created after it was broadcast. It just took up space. Early in her career, PBS president Pat Mitchell worked at the Westinghouse station in Boston. She recalls when that when the station converted its news operation from film to videotape, the film library was thrown into dumpsters and hauled away. They were hardly alone in this kind of aggressive "housekeeping". Later, it became almost universal practice in the industry for stations to re-use videotape to save money, to record over content which was deemed at that time to have no further value.

Fortunately, in a few instances, some of our foresighted predecessors anticipated that there might be a use for these materials, and began at least to warehouse them. I consider myself fortunate to be at one such institution. At WGBH, we have audio and video materials dating back more than fifty years. The real jewels in the collection are not only the completed programs – many of which remain to be catalogued beyond the "item" level, and preserved - but the original field tapes and film from which they were made. We know that we have the field original interviews from which excerpts were pulled for series such as Vietnam: A Television History and The Nuclear Age, with key players, many of whom are now long-gone. These days, we try to put that content on the web when the programs are broadcast, but I'm getting ahead of myself.

So it's no wonder that for many of us, conditioned by the way things used to be, the notion that universities, museums, libraries and archives could and should join with public broadcasters to develop partnerships for free choice learning doesn't come readily to mind.

This morning, I want to talk about

- how the role of public broadcasters is being re-defined, thanks to new technologies which enable the pursuit of new opportunities to provide service to our communities

- What's changing on "the supply side" - in how content is created, packaged, distributed, stored and retrieved for later access

- What's changing in consumer expectations.

And then conclude with a very brief recap of several collaborative efforts underway, review the "to do" list we share in common, and make the case that we're much better off working together than working apart.

THE CHANGING ROLES OF PUBLIC BROADCASTING

Public broadcasters began as broadcasters because that was the only technology available in the early 1950's – no cable or satellite, no home video, internet or broadband.

Now we are becoming platform independent – some of us say “platform agnostic” - public telecommunications organizations, with historic commitments to education, to life-long learning, teacher training, and community service

We're no longer tied to the dictates of single channel, one-way distribution of content to an audience which is anonymous to the communicator and to other members of the audience.

Perhaps most significantly, the ephemeral nature of broadcasting has been replaced by an ever-increasing array of new technologies - most notably the Internet and DVDs, and most recently by Personal Video Recorders such as TiVo, and Video on Demand - which extend the shelf life of content for years beyond the normal broadcast window.

It's now clear that in many cases, the broadcast program is the executive summary of the materials collected by a producer in the course of preparing a program for broadcast. And that the first broadcast of a program is the beginning of its useful life, not the end. Using the Internet, we now have the means to provide access to those materials, whether they're full length interviews, extensive additional resources in the form of text, graphics, audio, video. PBS.org - which counts WGBH as one of its major contributors - is reported to be the most visited .org site in the world, logging 2.3 Billion page views in 2002 alone. And what's there keeps getting better - check out www.pbs.org/commanding heights to check out one of our recent "best in show" efforts, which we expect to top.

THE CHANGING PROCESSES OF CONTENT CREATION, PACKAGING, DISTRIBUTION, STORAGE AND ACCESS

It is now the norm, rather than the exception, that newly-created content is "born digital". This is no less true in the world of audio and video, which most frequently these days is acquired on digital tape, but moving rapidly to "spinning disk" as the original acquisition medium. The move to digital formats throughout the life cycle of content, its storage and retrieval, reversioning, and distribution is the key to exploiting - in the public service sense - the full value of the content.

The migration to digitized content and infrastructure creates opportunities to realize enormous efficiencies in workflow as well as new opportunities for collaboration and linkage.

How totally the infrastructure of broadcasting and cable have migrated to digital technology is perhaps best illustrated by a few reports from the field:

Here’s one from a field trip which I – along with several of my public broadcasting colleagues – took to the NBC Network Operations Center at 20 Rockefeller Plaza in NY, not far from where the Today Show originates each morning.

When I visited there I was surprised to find that there wasn't a single tape machine in sight. It looked like an I.T. operations hub, with rack after rack of video servers. Because the whole operation was server-based and automated, the previous standard crew complement of 15 was now down to three technicians.

Thursday night's episode of ER - which the NBC operations center distributes to all NBC affiliates around the country - arrives there only a few hours before air time as a file transfer from the studio in Burbank, over a dedicated data line.

As part of what we're calling "The Next Generation Interconnection System", PBS is moving to a similar technology, involving not only the replacement of videotape with file servers, but a migration away from real-time feeds between the network and the stations. For all but timely news and public affairs programs, programs can be fed to stations on a non-real-time basis, to be

stored on servers at each local station for broadcast at the appropriate time. It's analogous to downloading files from a website.

Producers will be delivering their programs to PBS the same way. This summer, as part of the prototyping test, an hour-long Evening at Pops program was uploaded as a video file from Boston, to PBS in Alexandria. We didn't miss a note.

Within the next few months, we will agree on a technical standard for exchanging files. We have no rational alternative - the cost of non-interoperability among these players is simply too high.

What's driving these changes are the plummeting cost of digital storage; Moore's Law; improvements in compression algorithms which allow more content to be delivered with fewer bits; the ability to move content at speeds both faster and slower than real time; and the development of metadata schema which facilitate the cataloging, tracking and retrieval of digital content.

And once in digital form, content can be efficiently retrieved, re-used and re-versioned to meet the particular needs of end users.

We're not very far from seeing a local station program scheduler controlling what is broadcast on the local station using a "drag and drop" graphic user interface, placing individual program titles into a schedule grid, then having an automation system download the programs from a central digital repository onto a local server, and play them out for broadcast at the appropriate time. I've come to think of the local television station of the future as an industrial-sized TiVo box, automatically recording and playing back a lineup of programs determined by the station's program scheduler.

The same tools are becoming available to consumers - to control what they want to watch, and when, and where, and at what level of quality.

One consumer electronics device which is gaining popularity is called a "PVR" - personal video recorder - or a "DVR" - a digital video recorder, and is best known these days as a "TiVo" box. This is the device which enables the user to pause live television, to easily skip over commercials, to search television schedules for programs which meet the user's individual interests, and then record them for later viewing. It's the device which "learns" about the user's program preferences - just as Amazon.com suggests books you might be interested in reading, and records programs you didn't ask for so you can check them out.

It's a revolutionary, stunningly subversive technological development, what Clayton Christensen at the Harvard Business School might refer to as "a disruptive technology", because it changes the fundamental assumptions about how the marketplace works, and threatens the incumbent players.

If you ask people who have personal video recorders - there are already several million of them - how they like their PVRs, they will say - without prompting - "It has changed my life". Especially parents of young children, who delight in the ability to free themselves of the tyranny of television schedules to attend to their kids' needs. And people with very busy schedules, who delight in the ability to instruct the box to record a specific program or series, and then watch it at their convenience.

PVRs are now being incorporated into satellite and cable set-top boxes, and they're being built into DVD players as well. These integrated PVRs already far outnumber the stand-alone boxes. As the cost of computer processing and storage continue to plummet, it appears likely that consumers increasingly will expect - as a default feature of consumer electronics devices - the ability to control what they watch and when.

It appears that PVR penetration may be approaching the same sales trajectory as DVD players – which are the fastest selling consumer electronics product in the history of the category. DVD players are now in more than 50% of US households and readily available for less than $50 at retail. This year, sales are running 35% ahead of last year.

And at the same time as PVR penetration is increasing, cable companies are rolling out video on demand services, providing individual subscribers will complete VCR-like control over hundreds of hours of movies and television programs.

Here's how Comcast is promoting the roll-out of Video-on-Demand in New England.

(SHOW SPOTS)

An estimated 9 million cable subscribers now have access to Video on Demand, and that number is likely to grow to 20-30 million in the next 2-3 years.

So with video on demand, personal video recorders, DVDs, and the availability of video streaming and downloads on the Internet, increasing numbers of consumers now expect to be able to search for and access specific video programming to watch at their convenience.

Kids who are growing up in this environment will wonder why anyone ever sat around waiting for a program to begin. It's like my son's reaction when I told him that when I was a kid, microwave ovens hadn't been invented yet. "Then how'd you make popcorn?" he wondered.

And this isn't just about kids' expectations. My wife and I bought a TiVo box a few months ago. She's no techie, but within a few days she easily figured out how she could watch West Wing - which NBC broadcasts at 9PM on Wednesday - beginning at 9:15 - and by skipping over the commercials and the packaging, she could be out by ten. It's a time machine. She watched the EMMY Awards - from the top - an hour after they began, and by skipping over the commercials and most of the "I'd like to thank my mother"'s, she was out in time to watch the late news. She no longer has the patience to watch live television, reflexively reaching for the TiVo remote control to skip over the commercials.

I'm sharing this with you because it has a a direct bearing on consumer expectations for how they will access digital content in the future. The notion of "looking up a program", the way one looks up a book or searches for content on line, is revolutionary to most people. For kids, it is becoming the norm.

So given all that technology, it won't surprise you to know that several public broadcasters have seen an opportunity to serve the needs of teachers and school children more effectively by creating on-line services which can deliver text, graphics, audio and video content on demand to homes and schools.

At WGBH, we've created a service called Teacher's Domain, which my colleague Mike Mayo will demonstrate during the upcoming break at 9:45. As you will see, Teacher's Domain is a multimedia digital library with emphasis on science education for K-12 teachers and students, providing access to a robust collection of classroom-ready digital resources, as well as multimedia lesson plans and professional development resources. Each resource is tailored to specific grade levels and correlated to national and state standards. (You're welcome to visit at www.teachersdomain.org) . It's a collection of the National Science Digital Library, funded by the National Science Foundation.

Teachers select their grade level and discipline and have access to content, much of which was created originally for general audience broadcast. They find links to commonly-taught topics, as well as to classroom and professional development resources.

And soon to be added to the Teachers Domain is “The Civil Rights Movement: 1950 to the Present”, a prototype digital library collection - funded by an IMLS grant - being developed by the WGBH Media Library partnering with the Birmingham Civil Rights Institute (BCRI) and Washington University. Both the completed product and the collaboration itself will serve as models for other museums and libraries seeking broadband solutions to the challenge of matching rich media archives with educational needs.

The project will feature multimedia assets from all three organizations, highlighted by the extensive oral histories recorded by the BCRI, and the encyclopedic resources of the Henry Hampton Collection housed within the Film and Media Archive at WU, including the seminal Eyes on the Prize documentary films. The collection will also draw from related broadcast, interactive, and video programming at WGBH, including such award-winning series as The American Experience, Frontline, and Say Brother/Basic Black.

The overarching goal of this project is to produce an easily accessible means for getting high quality media into the hands of educators and students in a form that is directly targeted to their teaching and learning needs, in effect “unlocking the vaults” of civil rights-related resources within each of the partnering institutions.

For those who appreciate historical symmetry - WGBH traces its history back to the 1830's, when a bequest from a member of the Lowell Family funded public lectures for the citizens of Boston 115 years later – in 1951 - WGBH Radio went on the air with the assistance of that same Lowell Foundation, and its programming included the Lowell lectures, which continue to this day. Now - flash forward to 2003:

The WGBH Forum Network (at wgbh.org) now provides on-demand audio and video streaming of public lectures and panel discussions in collaboration with:

JFK Library and Museum; MIT; Harvard Graduate School of Education; Boston College; Cambridge Forum; The Ford Hall Forum; Mass Historical Society; The Museum of Afro-American History; The Museum of Science; The New England Aquarium; and others – a total of more than twenty leading cultural and educational institutions in the Boston area.

More than 165 years after the start of the public lectures for the citizens of Boston, this on-line collaborative service provides access via the World Wide Web to these lectures presented at these leading cultural and educational institutions to thousands of visitors each month. And the effort continues to be supported by the Lowell Institute, a direct lineal descendent of the original funder. Check it out at < wgbh.org/forumnetwork >

So public broadcasters are morphing into digital libraries. But clearly we need to get our house in better order.

At WGBH we’re working on a major digital asset management initiative, in partnership with Sun Microsystems and Artesia Technologies. With Sun, we’re creating a reference architecture for DAM for use within organizations with digital assets they'd like to manage more effectively and efficiently.

Along with you, we’re grappling with the challenge of Digital Rights Management, in an effort to control the use of intellectual property while providing broad access to it.

As part of the growing awareness of the imporance of digital asset management issues to the future of public broadcasting, CPB has been supporting the development of a Public Broadcasting Metadata Dictionary.

"PB Core - The Public Broadcasting Metadata Initiative: Progress Report" was accepted for presentation at the 2003 Dublin Core Conference in late September in Seattle.

It's been a cross-disciplinary effort, involving not only public television and radio, but participants from the academic and library community, (including Grace Agnew from Rutgers, who will be presenting right after lunch today) - and Judy Brown from the DoD Academic Co-Lab at the University of Wisconsin, and Efthimis Efthimiadis from the Information School at the University of Washington.

WHAT'S ON OUR COLLECTIVE "TO DO" LIST?

So public broadcasters are late in coming to the conversation about digital libraries, archiving, digitization and preservation. We have an enormous amount to learn from those of you who have been laboring in these fields for many years, and much to be gained by making common cause.

All of us still face the vexingly difficult question of digital preservation – these digital files and the media on which they are stored are as perishable as tomotoes - not only the physical media, but hardware and software as well.

Together, we face the challenges of developing public awareness of the need for new investments in these areas; of developing economic models; of sustainability; of interoperability; of policies concerning intellectual property; of understanding user needs and their information seeking behavior; of technical infrastructure; of the role of metadata and metadata standards.

And I will say, perhaps immodestly, that there is considerable potential for universities, libraries, museums and archives to benefit from making common cause with public broadcasters. As the technologies which enable all of us to better fulfill our missions converge, we can only benefit from making common cause.

Perhaps it's now clear what someone from public broadcasting would be doing at a meeting like this one, talking about digital libraries, and making common cause with the universities and libraries represented here this morning.

We're working on many of the same challenges and opportunities, serving many of the same constituents and community needs. We are like-minded, public service institutions, committed to lifelong learning and education.

From the perspective of the future looking back, it is appropriate to consider what our successors will make of our efforts From fifty thousand feet, this is all one large project, an enormous opportunity for us to better serve our communities and our constituents.

These days, literally billions of dollars are being invested by for-profit companies in building out the global telecommunications infrastructure. We have to know that when those who are accountable for those investments get up in the morning, the first thing on their minds is not "How do we better serve the public interest." No, that's our job.

What these companies will do, however, is to provide the technical wherewithall for us to extend our services to every neighborhood in our communities, and to every corner of the globe.

At long last, the technology is catching up with our missions. Let's make the most of the opportunity by working together.