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**FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**  
**Report of the Kansas Task Force on Internet Access for Schools and Public Libraries**

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intentionally left blank.

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## **THE CHARGE TO THE TASK FORCE**

The Task Force on Internet Access was appointed by the Commissioner of the Kansas State Board of Education and the Kansas State Librarian. Its goal was to investigate the state of Internet connectivity among Kansas public libraries and schools, to form conclusions about the problems faced by public libraries and schools in Kansas regarding Internet connectivity and related issues, and to recommend solutions to those problems, including the problem of providing a satisfactory level of Internet connectivity to Kansas public schools and libraries at an affordable and equitable cost.

## ACKNOWLEDGMENTS

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The cooperation of many people and organizations has been essential to the work of the Task Force. We deeply appreciate the cooperation of the Kansas public librarians, and public school superintendents, principals and teachers who responded to our surveys and attended our focus groups. We also wish to thank the Golden Plains, Neodesha, and Olathe School Districts, which contributed time and information for the case studies that were undertaken. We also thank all those who took the time to testify before the Task Force.

The research that supports this report was conducted by the Institute for Public Policy and Business Research at the University of Kansas under the leadership of Charles Krider, Director. The research was funded by Kansas, Inc. and by the University of Kansas. Research team members who led the drafting of this report were: David Burress, Norman Clifford, Charles Krider, and Patricia Oslund. Research economists who worked on the supporting studies were: David Burress, Norman Clifford, Bob Glass, and Patricia Oslund. Michael Grobe and Larry Hoyle provided specific expertise on networking methods and costs. Diana Carlin conducted the focus groups with educators and librarians. Jeff Livingston, Sharon Eicher, and Jennifer Meents served as research assistants. Klissa Rueschhoff provided secretarial services and took the minutes of the Task Force meetings.



## EXECUTIVE SUMMARY

- Broad Internet access for schools and libraries is important for economic competitiveness and educational quality.
- At present in Kansas and the US, availability of Internet access is widespread, but of limited effectiveness. The most important limitation on Internet access is the restricted amount of access time presently available per user.
- The cost-effective provision of adequate access time per user depends on the use of direct connections rather than dialup modem connections, and it requires the use of area networks and many computers. At high levels of service, computers are the limiting cost.
- Effective use of the Internet depends on technical support, planning of changes in curriculum and library operations, training of teachers and librarians, and shifting of staff time towards use of the Internet.
- Kansas generally lags behind Arkansas, Iowa, Missouri, Nebraska, and the US as a whole, in areas of:
  - i. statewide planning and provision of Internet-related services
  - ii. provision of direct dedicated connections to the Internet
  - iii. provision of area networks
  - iv. numbers of Internet connections per user
- Kansas is about average in provision of dialup modem connections.
- Internet access in Kansas tends to be inferior in school districts which are rural, small and/or spread-out, low in assessed valuation per capita, and/or having lower-than-average school budgets. Also, some districts are more aggressive than others in installing Internet connections.
- The Task force recommends as a minimum standard that, by the year 2000, at least one computer with a direct Internet connection should be provided for each teacher, for each librarian, for each thirty students, and for each 2000 persons in the library population served.
- Internet technology will continue to change rapidly. The Task Force recommends that software and equipment be replaced after no more than five years, so that Kansas Internet technology is no more than 2.5 years behind the cutting edge on average.
- Provision of the minimum standard of access throughout Kansas would cost around \$80 million per year for all costs, including the value of staff time utilized. However, a third of this amount either is already provided, or would replace other items in existing local budgets.

- The Task Force recommends that the State Board of Education Advisory Committee and the State Library Advisory Committee and Department of Administration, Division of Information Systems and Communications (DISC), should develop a plan, “the Internet Connect Plan,” to provide statewide delivery systems, aggregate Internet demands, and reduce costs.
- The Task Force recommends that the state should establish a “Public Internet Initiative.” It should provide technology funds of \$11.5 million per year for local schools, and \$1 million per year for local libraries. The state should also provide \$2.5 million per year for statewide networking costs. These funds would leverage local funds to get most districts close to the minimum standard. The state should also establish an Educational and Library Technology Endowment, possibly based on the Kauffman tax-windfall.

## FINDINGS

*The following findings of the Task Force are based on:*

- a review of the literature concerning the use of the Internet in public schools and libraries - see IPPBR report 229B.
- the experiences of other states in the region - Iowa, Nebraska, Missouri, Arkansas, Colorado, and Oklahoma - see IPPBR reports 229B p. 39-47, 229C, and 229E.
- four surveys in Kansas of school superintendents, principals, teachers, and librarians - see IPPBR report 229D.
- two focus groups - one for public school representatives and one for public librarians - see IPPBR report 229E.
- major case studies with on-site visits of Neodesha, Olathe, and Golden Plains, and less intensive studies in two communities - see IPPBR report 229E.
- an economic analysis of the Internet access costs in rural versus urban areas of Kansas - see IPPBR report 229F.
- testimony to the Task Force by, and interviews with, representatives of Kansas schools and libraries and by major telecommunications providers - see Appendix 1 of this report and appendix 1 of IPPBR report 229G.
- an economic analysis of the general costs of providing Internet access - see IPPBR report 229G.
- a report showing potential sources of funding for local and statewide Internet applications - see IPPBR report 229H.

*The findings of the Task Force are described below.*

### **A. Internet Access.**

*1. Connection in Schools: Connection to the Internet is essential if Kansas schools are to provide quality education that is competitive with other states. Schools without Internet access will fall to a second-tier status (229B p. 12-14).*

The Internet is an important means for locating and retrieving information. For example, it is becoming the preferred means by which teachers locate new instructional materials. It helps students to search out new information available nowhere else (229B, main body and Appendix 1).

The Internet is an important medium for teaching and learning. It is effective for motivating many students who cannot be reached by any other means; it helps lead them to read, to formulate ideas and write them down, to use a keyboard.

The Internet is an important means for communicating. It allows teachers and students to seek out and communicate with peers and experts in distant places. It allows fast and inexpensive transfer of student records when students change schools.

Students who leave the K-12 education system without proficiency in the use of computers and of the Internet for communications and information retrieval will be at a disadvantage in employment and in higher education.

In Kansas, substantial majorities of teachers (87%), principals (96%), and school superintendents (76%) believe that access to the Internet in schools is important (i.e., either “moderately important,” “very important,” or “extremely important”). Seventy-six percent of teachers think it is important that connections be in the individual classrooms. Sixty-four percent of superintendents have personally used the Internet (229D).

*2. Connection in Libraries: Connection to the Internet is essential for libraries that seek to provide high-quality service (229B p. 14-17).*

Reference searches by librarians on the Internet can uncover some materials available by no other method. Internet connections in public areas of libraries provide an effective means for patrons to perform their own reference searches. The Internet provides the most effective way for libraries to make their card catalogs available off-site. The Internet can provide an efficient means for handling interlibrary loans. The Internet can provide a useful way to gather and disseminate community information.

Libraries are now seeking to provide universal access to the Internet, just as they have historically provided universal access to books. Library access supplements school access, because many libraries are open during evenings, weekends, and vacations. Nationwide, some libraries are beginning to provide email addresses to individual patrons, and some see this as an essential service. This activity is viewed as an important contribution to the national information highway program.

72 percent of Kansas librarians rank Internet use as important for staff; about 71 percent think it is important for patrons (229D).

*3. Competitive Advantage: Communities that have high quality Internet access in their schools and libraries will have a significant advantage in the competition for economic development (229B p. 48-49).*

Many employers want to hire employees who already know how to use the Internet effectively. Many entrepreneurs want to live in communities where their children attend schools that are ahead of the technological curve. Many small business people need to consult the Internet at their local library.

Email over the Internet is a new and different form of communication with many advantages over other forms. Each message is exceedingly cheap to send. Messages can be sent worldwide instantaneously to any number of recipients. Messages are in written form, and a permanent record can be kept on disk-space. Collections of messages can be searched for key words almost instantaneously. Sending the message takes no effort beyond typing it; it can be sent directly from the word processor. Messages can be easily forwarded to other



recipients and easily copied. Email is poised to become the standard form of communication in education, business, and government in the U.S.

Internet access contributes to the quality of life in a community. Advanced communities across the nation are now connecting schools and libraries with community colleges, local government, hospitals, community groups, and homes into a communications-web which is housed on the Internet.

*4. Connection Status of Kansas: Kansas lags behind many other states in planning for and providing Internet access, including Iowa, Nebraska, and Missouri (229B p. 39-47, 229C, 229E).*

Planning. Kansas has a user-funded statewide connection system (KANREN), but lags behind most states in planning for Internet access in schools and libraries. Nearly all states have some kind of plan and/or a statewide support system for schools and usually for libraries as well. Most plans aim for Internet connections in all schools and libraries. The majority of plans provide some kind of support for local networks and computing. Most plans provide for funds from state sources.

Direct Connections. Kansas schools lag substantially behind schools in many other states in direct full-time connections to the Internet. As of February 1996, only 8 percent of Kansas school buildings and 9 percent of school districts had any a direct connection to the Internet. Sixty-four percent of school buildings in Nebraska had a direct connection. Forty-eight percent of school districts in Missouri had direct connections. Iowa hopes to have all buildings connected by 1997. As of Fall 1995, around 20 percent of all schools nationwide had direct connections to the Internet, and rates of utilization were increasing rapidly.

**Table 1**  
**School Buildings with a Direct Connection to the Internet**

Region	Percent	Date
Kansas	8	2/1996
Iowa	33 *	2/1996
Missouri	48 *	2/1996
Nebraska	64	2/1996
U.S.	20	Fall 1995

\* school districts, not buildings.

Sources: 229C, 229D, Heaviside, Farris, Malitz, and Carpenter 1996.

As of February 1996, only about 4 percent of Kansas public libraries had direct connections to the Internet. In Missouri, 47 percent of the 32 largest public libraries had direct connections as of February 1996. In 1994, 7 percent of public libraries nationwide had direct connection, but the rate is expected to be significantly higher now.

**Table 2**  
**Libraries with a Direct Connection to the Internet**

Region	Percent	Date
Kansas	4	2/1996
Iowa	NA	
Missouri	48 *	2/1996
Nebraska	NA	
U.S.	7	Spring 1994

\* refers to 32 largest libraries

Sources: 229C, 229D, McClure, Bertot, and Zweizig 1994.

Modem connections. The one benchmark in which Kansas is comparable to other states, is in obtaining connections via modems on dial-in telephone lines. However, as we explain below and in Appendix 3, modem access is limited for the uses the Internet serves. Its most important limitation is cost-ineffectiveness, which severely restricts availability. Buildings with direct connections typically have many connected workstations with unlimited connection time; buildings with modem access typically have only a few workstations and meter connection time.

A majority of schools in Kansas and elsewhere now have some capability to dial-in to the Internet using modems on ordinary telephone lines. As of February 1996, 53 percent of Kansas schools had modem access or direct access (45 percent had modems only). As of Fall 1995, half of the schools nationwide had modem access or direct access, and 74 percent of schools without access were planning to get it. This shows that most schools do place a high value on Internet connectivity. However, in many cases the current quality of connectivity is low and many staff members lack the skills to use it.

As of February 1996, about 64 percent of Kansas libraries had modem or direct access to the Internet (60 percent had modems only). This shows that most libraries do place a significant positive value on Internet access. However, some small part-time libraries in rural areas with small budgets had not been able to obtain any Internet access at an affordable cost. Ninety-six percent of libraries with technology expenditures above \$1700 per year had Internet connections, while only 53 percent of libraries with technology expenditures below \$1000 per year had Internet connections.

While recent nationwide data were not available, we project that a majority of libraries across the US now have modem or direct access to the Internet. In mid-1994, about 21 percent of all U.S. public libraries had modem or direct Internet connection available to library staff, mostly by modem. Among libraries serving more than 100,000 in population, a majority had modem or direct access. Other surveys show that rates of library access to the Internet increased very rapidly during 1994-96.

Hands-on access. As of February 1996, 51 percent of libraries in Kansas provided some form of Internet access for staff, but only 30 percent of libraries allowed *patrons* any access (229D).

In the Spring of 1994, 13 percent of libraries nationwide allowed access to patrons. As of 1995, 28 percent of the 369 metropolitan libraries in the U.S. allowed patrons some form of hands-on access to the Internet. Both rates were expected to increase rapidly.

Only 2 percent of Kansas schools have a majority of *classrooms* with access to the Internet. In Nebraska, around 70 percent of schools have most classrooms connected. As of Fall 1995, 9 percent of instructional rooms nationwide had some kind of access to the Internet. This was up from 3 percent a year earlier and is projected to be much higher in 1996. It is a major goal of the National Information Infrastructure Initiative to connect all classrooms in the U.S. to the Internet by the year 2000. Missouri and Nebraska have similar goals. Iowa seeks to put a computer on every *desk* by 1997. Missouri's MOREnet aspires to put a computer on every desk by the year 2000, although that is not a formal goal.

**Table 3**  
**Public Schools with the Majority of Classrooms Connected to the Internet**

Region	Percent	Date	Goal	Target Date
Kansas	2	2/1996	none	-
Iowa	NA	-	100	1997
Missouri	NA	-	100	1997
Nebraska	70	2/1996	100	2000
U.S.	9 *	Fall 1995	100	2000

\* percent of schools connected, not percent of classrooms

Sources: 229C, 229D, Heaviside, Farris, Malitz, and Carpenter 1996.

A majority of students in Kansas do receive some hands on access to the Internet, but the intensity of access is low. Sixty-one percent of superintendents said their students received "some" access, only 3 percent said they used it "extensively."

A related problem is that of providing email addresses to users of the Internet. Without an individual address, a user will find it very difficult to receive incoming messages. The problem extends to teachers, librarians, students, and library patrons. Existing data are rather spotty, but provision of addresses to teachers appears to be more advanced nationwide than provision to other groups of users. A relatively low percentage of teachers in Kansas have email addresses, but what is more significant is that Kansas has no goals to provide them with addresses in the future.

**Table 4**  
**Public School Teachers with Email Addresses**

Region	Percent	Date	Goal	Target Date
Kansas	NA	-	none	-
Iowa	NA	-	none	-
Missouri	NA	-	100	1997
Nebraska	>50	2/1996	100	2000
U.S.	NA	-	*	2000

\* the US goal is "universal access."

Sources: 229C, 229D, Heaviside, Farris, Malitz, and Carpenter 1996, Office of the White House 1994.

Leading nearby states. In varying degrees, Missouri, Iowa, Nebraska, and Oklahoma are all ahead of Kansas in organizing to provide Internet access to schools and libraries.

Iowa: Iowa owns its own fiber-optic backbone, Iowa Communications Network (ICN). This network, a \$100 million program, extends into every county in the state and supports schools, libraries, and government units. Eventually every high school in the state will be connected by fiber, which carries video and tele-education and long distance telephone calls, all in addition to T1 (very high capacity) Internet connections. High schools pay a flat \$100 per month. Grade schools and middle schools will be connected to high schools through area networks. ICN also provides central computing services (e.g., email addresses) which reduce local costs. In the meantime, schools without fiber can be connected by direct telephone lines under a state program called EDNET. Iowa also has a \$6 million annual technology fund for schools, but the legislature is expected to increase it to \$30 million. However, Iowa lags somewhat in statewide support and training delivery systems.

Missouri: Missouri Research and Educational Network (MOREnet) is a state-assisted Internet access provider for schools, libraries, government units, the legislature, and local communities. Around two-thirds of its costs come from state funds, and one-third from local funds. MOREnet seeks to put an Internet connection in every classroom and library before the year 2000. They aspire to put a connection on every *desk*. MOREnet provides extensive support services and training down to the district level. There are also annual state technology funds available to assist procurement of local networks and computers in schools (\$4 million) and libraries (\$1 million). MOREnet provides an active user-support system.

Nebraska: The state government has a statewide high capacity backbone and a state-assisted Internet access provider for schools, libraries, government units. Nebraska also has a \$13 million technology fund which seeks to put two Internet connections into every classroom by the year 2000. There is also a half-mill property tax levy to pay for connecting schools.

Oklahoma: A capital bond issue of \$8 million was approved in 1992 for a fiber-optic backbone. A statewide service provider called ONENET makes Internet access and a broad range of other telecommunication services and staff training available to essentially all public agencies in Oklahoma. Their goal is to provide an Internet connection to every school and library in Oklahoma; as of 1996, all schools and libraries do have an opportunity to be connected, though not all have used it.

Lagging nearby states. Colorado is roughly comparable to Kansas, and Arkansas is slightly ahead. All three lag behind other states in organizing to provide access to the Internet.

Arkansas: The Goals 2000 planning committee is developing a statewide Internet plan for K-12 schools. The Arkansas Internet Master Training Program provides teacher training for using the Internet. Thirty percent of schools now have connections to the Internet. The Arkansas Public School Computer Network will provide networked computing services for school management and database functions. Library Network Services provides similar services to libraries. The Arkansas Educational Telecommunications Network (AETN) provides distance learning through satellite services.

Colorado: Educational Internet plans are being developed through the Goals 2000 Planning committee, and in the state legislature. Existing networking efforts are segmented. There is a sizable network connecting libraries around Denver and research libraries to FreeNet and to the Internet. There is a program for rural telecommunications.

*5. Our Charge: The challenge now is to provide widespread access to direct Internet connections for all classrooms and students and library patrons. Meeting the Internet challenge in Kansas will require many different types of resources from different levels of government (229B p. 18-26, 229C, 229G p. 4-9).*

A majority of Kansas school districts and libraries have made a start with modem access to the Internet. Most do not have direct connections. The next step is to provide direct connections.

Making effective use of direct connections requires many resources, all of which may not be obvious at first. These resources include:

- an Internet access provider;
- wide area network equipment to distribute the access within a district or region;
- telecommunications services or other links to reach the provider and to support the area network;
- local area network equipment to distribute access within a building;
- computers at each workstation;
- technical support at the state, district, and building level to keep the networks running;
- training of staff, teachers and librarians on use of the Internet;
- planning and redesigning curricula and operating methods;

- time for individual personnel to use the Internet.

Thus providing a local Internet access point entails only a small part of the cost. Much more significant requirements are the local hardware, and especially the costs of personnel training, technical support, and organizational adaptation.

## **B. Hardware Issues.**

1. *Dial-in Modem Connections: The heavy reliance of Kansas on modems, rather than direct connections, puts Kansas at a serious competitive disadvantage (229B p. 7-8, 229C).*

In comparison to a direct connection, dial-in service is problematic for several reasons:

- high cost;
- limited access time per client;
- loss of synergy with area networking;
- limited types of service (e.g., no complex pictures or sounds or animation);
- slow transmission speeds;
- frustration with busy signals.

These issues are explained more fully in Appendix 3.

2. *Initial Investment: Kansas schools and libraries require substantial additional investments in computer equipment and area networks in order to make fully effective use of the Internet (229G p. 5-9).*

Full integration of the Internet into the curriculum depends on the presence of Internet connections in almost every classroom.

Cost-effective delivery of direct Internet connections depends on existence of local area networks to connect computers within buildings, and wide area networks to connect buildings within a district to a single Internet access point. This configuration easily supports high speed transmission capabilities.

At the same time, area networks are becoming critical for administrative purposes, such as maintaining centralized databases and communicating data between buildings. There is a synergy between Internet access and other networking purposes.

3. *Ongoing Investment: Investments in computers and Internet hardware are a recurring cost item, rather than a one-time expense (229B p. 18-26).*

Internet technology has continued to change rapidly for as long as the Internet has been in existence. Newly emerging technologies include real-time sound, animation and video, remote computing, and “virtual enterprise” systems for managing entire business or research projects over the Internet.



Network providers believe that they will have to upgrade the capacity of their networks on a regular basis. These upgrades require changes in technology.

In the current market, new computing equipment technology is surpassed by significantly more advanced technology in about three years.

We estimate that computing equipment in Kansas schools is being retained for approximately thirteen years, and averages six or seven years behind the current technology (229B p. 21-22).

Sixty-four percent of classrooms and 71 percent of libraries in Kansas do have computers now that can be connected to networks (229D). At this time, computers do not represent a large *start-up* cost item for networking efforts; rather, they represent a large ongoing *replacement* cost item as networks get more advanced.

### **C. Organizational and Funding Issues.**

*1. Direct Connections: Introduction of direct connections to the Internet will be an incremental process in most school districts and libraries (229E).*

The process normally begins with the introduction of non-networked computers into the curriculum or into library operations. The next steps include creation of area networks. In all cases, fully effective use of the Internet will require changes that integrate it into the curriculum and the teaching methods of teachers, or into the operational methods of librarians. These changes will require extensive planning, training, management, and changes in ways of doing things. Some staff will be uncomfortable with the changes.

Training for librarians and teachers is essential for the potential benefits of the Internet to be realized.

*2. Equity Issue: The current piecemeal approach to Internet access in Kansas means that larger, wealthier, and more compact school districts and library areas are finding it easier to get access to Internet technology than those districts with less financial resources or higher costs (229F p. 7-9).*

There is an increasing division of Kansas schools and libraries into information “haves” and “have-nots”. There could divide Kansan students and library patrons into the information-rich and the information-poor. A major goal of the National Information Infrastructure is “preserving and enhancing universal services to provide equal access to information (Office of the White House, 1994, Section I).

The problem of equity across school districts and libraries has five important dimensions (229F, throughout):

- Population base. The fixed costs of making a basic connection in the district are shared between a smaller number of pupils or patrons in smaller districts, and between

a larger number of pupils or patrons in larger districts; therefore costs per client fall with district size.

- Urban/rural telecommunications charges. Because of the existing structure of telephone access charges and long distance charges, the cost of bringing a basic connection into the district is higher in some rural areas than in most urban areas.
- Intra-district telecommunications charges. Telecommunication costs for a wide area network may be higher when buildings are spread across different towns than when buildings are close together or in the same town.
- Wealth and income. Even with full equalization of the tax base, a given levy rate tends to absorb a smaller fraction of personal income for typical households in high income districts than in low income districts. Moreover, bond issues to support infrastructure are not subject to full equalization under statewide school formulas; therefore high wealth districts can afford more new equipment at a given levy rate than poor districts. At the same time, special weights in the equalization formulas provide extra funds to districts with small numbers of students and may override these effects. However, there is no equalization at all in the case of levies to support libraries.
- District attitudes. Students and patrons in forward-looking districts have better Internet access than those in more slowly-moving districts.

Roughly 10 percent of metropolitan school districts in Kansas had direct connections to the Internet in February 1996; but only about 3 percent of non-metropolitan school districts had direct connections. However, it appears likely from the data that differences in attitudes are more important than differences in resources or location in determining whether to adopt direct Internet connections. (229F p. 7-15).

In 1992 the Olathe school district adopted what may still be the most advanced Internet and technology plan in Kansas. The school district is spending \$24.9 million over 10 years for 16,000 students, or about \$160 per student per year. A bond issue has been approved by the voters. Each student will have an email address. By the year 2002, all students in all grades will have daily access to networked computers in all classes and subjects (Source: Wimmer, All, and Tully 1996.)

*3. Investment Costs: There will be substantial costs for introducing direct Internet connections into Kansas schools and libraries (229B p. 18-26, 229G p. 10-32).*

A *minimum* standard for achieving useful Internet access to students is one computer per teacher and one computer per thirty students, with all computers networked to the Internet. This is the minimum number of computers needed for students and teachers to use the Internet in an educational setting. This will allow each student about *one hour per week* on the computer, including Internet use. Estimated costs for the workstations, assuming \$2,000 per computer, \$500 for associated software and networking equipment, and a five-year life-cycle, would be somewhat less than \$50 per student per year. Total equipment costs for all schools in the Kansas would be around \$23 million per year. This does not include communications lines, Internet access fees, or personnel, training, and support costs. The total including all costs statewide would be around \$80 million per year, but much of this is



contained in current budgets. For example, significant expenditures are already being made on computers and on teacher time that would be re-allocated to Internet-related uses.

A *moderate* standard for schools would be one computer per teacher plus one computer per six students. This standard would allow each student about *one hour per day* on the computer, including Internet use. This goal is now being achieved in Olathe and Neodesha. Equipment costs would be around \$120 per student per year. The moderate standard would lead to Kansas-wide equipment costs of around \$55 million per year.

A *high* standard for schools would be one computer per teacher plus per computer per student, or, “a networked computer on every desk”. Equipment costs would be around \$500 per student per year. This goal has nearly been achieved in the Golden Plains School District. A high standard would lead to statewide equipment costs of around \$250 million per year.

Based on figures estimated at 1995 prices, an advanced system of networked computers in a major public library with thirty-eight workstations and associated personnel costs in four branch libraries would cost around \$350,000 per year, or \$9000 per workstation. A system using three modem connections and eight inexpensive terminals in a smaller library would cost around \$35,000 per year, or \$4000 per workstation. More than half of these cost figures cover personnel training, support, and staffing. These cost figures also include equipment costs and Internet access fees, but they do not include additional costs associated with creating an online catalog. (McClure, Bertot, and Beachboard 1995: 23-30)

*4. Centralized Internet Service: Statewide approaches can lead to substantial economies of scale through the aggregation of demand. They can also provide new services and level the playing field (229B p. 39-47, 229E, Testimony by Guy McDonald in Appendix 1).*

In Missouri, the statewide Internet access provider (MOREnet) uses its buying power on behalf of schools and libraries to negotiate for the provision of data bases at advantageous prices. One thousand on-line journals and newspapers are made available to schools, libraries and state agencies at a cost of about \$.5 million per year; the cost would exceed \$20 million per year if negotiated individually. This provides an important incentive for local units to join the statewide network.

In the State of Kansas, INK has already provided statewide access to Kansas-specific databases.

KANREN has offered to install an Internet access point in 100 school districts and maintain it for one year, at a cost of \$2 million (229H, Appendix 2 of this report). However, this cost includes only limited training and support, and does not provide centralized databases. KANREN states that it is able to reach all 304 school districts over a three year period.

Iowa and Nebraska have developed flat-rate access fees. Missouri access fees depend only on size of the district, not its location. KANREN connection fees also depend only on the size of the district and not its location.

## CONCLUSIONS

### A. Internet Access.

*1. Competitiveness: To be competitive, all Kansas public schools and full-time libraries (those providing 40 or more hours of public service per week) should have direct Internet connections by the year 2000.*

The Task force strongly recommends that every school and every full-time library be connected to the Internet, in the bandwidth (i.e. transmission speed) that is appropriate for the district. Part-time libraries should have the opportunity to be connected either by modems or by direct connections. State assistance should be provided to help each school and library prepare to be connected.

The Internet provides a great opportunity for school districts throughout the state, but particularly for rural districts. The Internet will bring to all schools the opportunity for students to communicate throughout the world at a low marginal cost and to access current information in the same way as students in large urban districts. The obstacle of distance will be diminished.

The Internet provides a great opportunity for libraries throughout the state. Full-time libraries need to have Internet access in order to allow staff to provide information to patrons that is timely and cost efficient, and allow patrons to have direct access to the Internet. Part-time libraries with access the Internet will be able to provide improved levels of service.

The Internet provides new technologies to support the public library's historic functions. It also provides qualitatively new services. The Internet provides an opportunity for small libraries in the state to supplement their limited collections with other information sources, on an equal basis with large libraries.

Connecting all classrooms and libraries to the Internet is a national goal under the Information Infrastructure Program. It is a statewide goal in many other states. Connectivity can provide an opportunity for all citizens to make use of one of the most important technological developments of our time.

*2. Access: Internet access should be extended to the level of the individual classroom, the individual student, and the individual library patron. Email addresses should be provided as widely as is feasible.*

Direct connections to the Internet should be provided to all school districts so that most classrooms, teachers' computers, and laboratories can all be connected. Every full-time public library should also have a direct connection. This sets a moderate standard of access as the minimum; however, it is anticipated that some organizations will reach the high standard of "a networked computer on every desk." This conclusion differs somewhat from the Kansas

State Board of Education Goals 2000 Planning Guide, which calls for *equal* access at an *adequate* level of service; see Appendix 2 of this report.

By the year 2000 there should be a networked computer for every teacher and library staff person, and one for every six students. This would permit about one hour's use per day for each student of a computer linked to the Internet. There should be sufficient computers available to library patrons so that they rarely have to wait for significant periods of time. There should be an email address for every teacher and librarian.

Use of electronic networking is a powerful way to improve reading, writing, and keyboard and communications skills. This form of experience should be made universally available.

## **B. The Relationship of Internet Access to Area Networks, Computing, Training, and Administration.**

### *1. Internet Development: Building high-capacity Internet connections should be planned as an incremental process.*

An Internet access system has three different components which must be coordinated:

- providing an access point or connection in the region;
- providing networks and computers to distribute access to individual users;
- providing planning, training, organization, and technical support for organizations and staff.

Most organizations should become comfortable with computers before they build area networks. They should become comfortable with area networks before they add direct Internet connections.

Each step in this incremental process has substantial benefits for schools and libraries, but it also has substantial costs. Computers and area networks are needed for their own sake, as well as to support Internet connections. Any statewide Internet plan should address schools and libraries at each stage in this process. It must be recognized that personnel and support costs, including organizational planning, are at least as important as, and usually more important than, hardware costs and access fees.

Schools and libraries should be strongly encouraged to have a comprehensive technology plan. (This conclusion echoes the Kansas State Board of Education Goals 2000 Planning Guide; see Appendix 3 of this report.) Plans should:

- cover a 3-5 year horizon;
- indicate how buildings and classrooms would be wired;
- indicate how computer equipment and other hardware would be acquired, deployed, operated, supported, and upgraded;
- indicate how personnel would be trained and supported;

- indicate how curriculum or operating methods would be redesigned;
- indicate how the plan would be updated and evaluated.

In the foreseeable future, computing, networking technology, and regulatory and market conditions will continue to change rapidly. If Kansas is to remain competitive, it must be prepared to upgrade its technology on a regular basis. We believe that Kansas should plan on a useful life cycle for equipment that less than five years, so that our average level of technology is no more than 2.5 years behind the cutting edge.

Local school and library authorities should take responsibility for preventing abuses of the Internet service. Networks will need to be designed with “firewalls” (i.e., sentinel computers) that prevent unauthorized access. Students will need rules and supervision to prevent unethical or potentially damaging activities (e.g., harassing messages). School districts may want to install “site blockers”, which are programs that prevent access to sensitive information available on the Internet (e.g., sexually explicit materials).

*2. Networks: Internet access should be structured as a network of networks.*

The configuration that accomplishes Internet connections should usually start with a wide-area network in each district, which is attached to a single direct Internet connection in that district at an appropriate bandwidth. Each building in turn should have a local area network that is attached to the wide-area network. Experience in schools and libraries has shown that, except in the very smallest organizations, dial-in service is an inadequate technology.

Because substantial cost savings can be possible, public schools and libraries in each school district should be strongly encouraged to jointly operate a single wide-area network that distributes a single Internet connection to both schools and libraries. So as to achieve economies of scale, it is desirable to provide connections jointly with community colleges, local governments, hospitals, and community groups as well. However, we recognize that conditions differ between places, and that local arrangements will not be uniform across the state. (This conclusion is consistent with the emphasis upon community cooperation in the Kansas State Board of Education Goals 2000 Planning Guide; see Appendix 3 of this report.)

A statewide comprehensive Internet networking effort is needed for reasons related to cost efficiencies. In particular, both the state’s government telecommunications network under DISC and its network support system under KANREN can already be used by schools and libraries. There is no need for the state to support two or more telecommunications networks or support systems.

**C. Funding and Organization.**

*1. Funding: Internet connections should be funded through combined local and statewide sources.*

The major part of funding for Internet technology will continue to come from local government sources. Because of Kansas’s tradition of local control, participation of school

districts and libraries in any statewide plan should be strictly voluntary. However, statewide services, such as databases, and statewide funding should be designed so as to make participation highly attractive, so that eventually nearly all school districts and libraries do participate in a state-wide delivery system.

A comprehensive statewide approach to Internet access for school and libraries is needed for equity reasons as well as efficiency reasons. Senate Bill 555 has proposed significant elements that would be helpful, but additional structure is needed. State funding should address problems of equity and incentives to get started by providing:

- start-up funds;
- funds that support costs of the basic connection;
- funds related to intra-district telecommunications;
- funds related to fixed costs per clients;
- funds related to district wealth or income.

In particular, the state should provide start-up funding for Internet connections for both school districts and libraries. School districts and libraries should also pay part of the start-up costs. Our conclusion is that school districts and libraries should mainly invest in the computers and networks that are necessary while the state pays the cost of installing the Internet and the first year's operating cost. Average first year's cost should be no more than \$20,000 per district. However, additional technology grants from the state are needed to help some districts over the initial hurdles. Spread-out rural areas may also need help in leasing the lines that connect the wide-area network. Regulatory policies may also be needed to ensure the cooperation of local telephone companies.

Local business groups should also assist the local Internet effort. Economic development is a main goal of the Internet plan. If the plan succeeds, then many local businesses will benefit. Local business are a major potential source of resources, and local businesses are in a position to provide the community leadership needed to make the plan work.

Statewide and local agencies should aggressively seek out grants. But because Kansas is starting rather late, it should not plan on supporting a major fraction of its costs through grants (229H).

*2. Planning: Statewide planning is needed in order to manage Internet access efficiently. The existing advisory committees for the State Board of Education and the State Library (hereinafter referred to as the "advisory committees") should coordinate planning for Internet access.*

School districts and libraries should be strongly encouraged to form technology plans. The advisory committees should establish recommended standards for technology plans.

School districts should be encouraged to plan for:

- providing every teacher with an email address by the year 2000;

- providing Internet access into every classroom by the year 2001;
- providing every student with an email address by the year 2002;
- making the Internet accessible to persons with disabilities;
- fully integrating the technology into the curriculum. The district should analyze if and how the current curriculum needs to be changed to incorporate technology;
- adapting the teaching process to the introduction of Internet services. The district should analyze how the teachers will need to be retrained, how with this retraining will take place, and how Internet services can be fully integrated into teaching process.

(For more complete suggestions, see Kansas State Board of Education 1996.)

Libraries should be encouraged to plan for:

- providing every library staff person with an email address by the year 2000;
- providing direct Internet access to the public by the year 2001;
- providing every patron who applies for one with an email address by the year 2002;
- putting an on-line catalog on the Internet;
- making the Internet accessible to persons with disabilities;
- integrating the technology into library operations and services. The library should analyze how staff will need to be retrained, how with this retraining will take place, and how Internet services can be fully integrated into library activities.

The advisory committees should encourage the creation of, and set standards for, joint wide-area network operating agreements:

- joint operating agreements should provide that no more than one wide-area network and no more than one main Internet access point be provided in a physical area, typically a school district;
- joint operation should refer only to the physical network, and not to particular services such as email addresses or web sites or on-line catalogs.

The advisory committees should work towards including higher education, hospitals, local government units, non-profit community groups, and tele-medicine and tele-education providers in the statewide plan and in the joint operating agreements. By increasing the level of aggregation, both the state and local communities should be able to reduce their networking costs.



## RECOMMENDATIONS

*The Task Force recommends that:*

### **A. Statewide Agencies Be Responsible for Aggregating Internet Demands & Provide Services.**

*1. Aggregation of Demand: It is recommended that the Department of Administration, Division of Information Systems and Communications (DISC), be responsible for aggregating Internet demand from public schools and libraries. Consideration should also be given to local and state government agencies, higher education, and hospitals and non-profit community groups. DISC should have over-all responsibility for contracting with outside vendors for connection services and support services. The advisory committees (described above) on Internet Access should form a plan for organizing and administering the delivery systems, including training and technical assistance.*

The State Board of Education Advisory Committee and the State Library Advisory Committee and DISC should develop a plan, "the Internet Connect Plan," by December 31, 1996 for providing Internet opportunities, training, and support to all public schools and libraries through a single statewide network by the year 2000. The plan should provide for:

- organizational structures;
- specific goals;
- deadlines for implementation;
- procedures for determining contracts;
- detailed budgets.

The purpose of the plan is to aggregate telecommunications and Internet demands from K-12 schools, higher educational institutions, libraries, and to centralize contracting, leading to:

- statewide RFPs as needed;
- lower costs;
- leveling of costs across regions and organizations;
- intensified demands that encourage private provision of new services and new technologies.

The plan should organize a statewide service delivery system with:

- databases;
- training;
- resources on utilization methods;
- a connection to one wide-area network in each region of the state;
- wide-area network support at the district level;
- centralized purchasing of local network communications lines;
- modem access as a transitional service;
- optional support services available down to the building level.

*2. Inter-governmental Cooperation: Establish a partnership between state and local governments for funding Internet access.*

The state should provide funds to prime the pump, to get a basic connection installed in a district, and to level the playing field for small, rural, spread-out districts. Local government should provide ongoing funds to distribute the connections into the buildings and classrooms.

District and library fees for the first year should be funded from the start-up program and the operating program described below. After the first year, fees for a connection should increase with the population that is served, using a formula designed to help level the financial playing field without being noncompetitive for large districts and libraries. The cost for service should be equalized for all school districts and libraries. Direct connections should be provided at a bandwidth that is appropriate for the school district or library. The higher capacity connections should be provided at the required additional cost to the districts or libraries in which they are appropriate.

The partnership should be strongly committed to the idea that the wide-area network and Internet access point in each region is a *community* resource. It will initially be available to schools and libraries, but it is intended that it should ultimately be shared by local government units and community groups. Creating a working relationship between schools and libraries and other agencies will certainly require some organization adaptation. The immediate payoff is in cost-effectiveness, because only one long-distance high-capacity connection is needed for government users in a community. The long-run payoffs might include enhanced multi-lateral cooperation on a variety of undertakings.

**B. Legislature Should Fund a Public Internet Initiative.**

*Phase 1 - The Start-up Program: This is the first priority. This program should provide all participating public schools and libraries with direct Internet connections by the year 2000. (\$2.5 million per year for three years, beginning in fiscal year 1997.)*

The state should fund school districts and libraries for the start-up cost of obtaining a dedicated Internet access point and the first year's cost of the Internet access. The school district or library should provide matching funds that would be spent on computers, local area networks (within buildings), wide-area networks (across buildings) and local personnel costs. To be eligible for state funding a school district or library would need to have an approved technology plan in place. The school district and the full-time local public libraries contained within it should be strongly encouraged to have an agreement to jointly operate a wide-area network.



*Phase - 2. The K-12 Education Technology Fund: This program should upgrade the level of technology in Kansas' K-12 schools. (\$11.5 million per year for three years, beginning in fiscal year 1998.)*

The purpose of this fund is to bring the level of computing technology in public schools up to a minimum standard. However, there should be no penalty for a district that was an early starter, i.e., districts that already meet or exceed the minimum standard should be eligible for funds on a matching basis. The total cost of maintaining this minimum equipment standard in Kansas is \$23 million per year, of which state would provide \$11.5 million, with the rest of the funds coming from school district matches.

The Education Technology Fund should provide matching grants to K-12 public schools for purchasing computers, buying software, installing local-area networks and/of wide-area networks, supporting the networks, and training teachers on the use of computers and the Internet. To be eligible for a Technology Fund grant, a school district would need to provide matching funds and have in place a technology plan. Priority should be given to school districts having a joint-operating agreement with libraries for a wide-area network.

For example, in one year this fund could provide:

- planning grants for 50 districts;
- 2000 computers;
- 3 days training for 1000 teachers;
- hardware for 100 local-area networks;
- hardware for 20 wide-area networks;
- technical support staff for 1 year for 20 districts.

However, detailed allocations should be determined under criteria set by the advisory committees.

*Phase 2 - The Library Technology Fund: This program should upgrade the level of technology in full-time Kansan libraries and their branches. (\$1 million per year for three years, beginning in fiscal year 1998.)*

Libraries do not have internal sources of capital and are not able to levy taxes for capital expenditures. Therefore, the Library Technology Fund should provide matching grants to public libraries to be used for purchasing computers, buying software, installing local-area networks and/or wide-area networks, and training staff on the use of computers and the Internet. To be eligible for a Technology Fund grant a main library would need to:

- provide matching funds;
- have an approved technology plan.

Any branch libraries covered within a main library's grant, should be connected to it by a wide-area network. Priority should be given to libraries having a joint-operating agreement with school districts for a wide-area network.

For example, in one year this fund could provide:

- planning grants for 10 libraries;
- 150 computers;
- 3 days training for 100 librarians;
- hardware for 10 local-area networks;
- hardware for 5 wide-area networks;
- technical support staff for 1 year for 10 libraries.

However, detailed allocations should be determined under criteria set by the advisory committees.

*Phase 2 - The Operating Program: This program should cover some centralized costs, and take steps to create incentives to participate and to help level the playing field between districts.*

Such a program would allow the central Internet provider to provide access to centralized databases and training and support services for local technical personnel. The state could also provide grants for leased lines for wide-area networks in districts that are spread out. This fund could also be used for special studies approved by the advisory committees on Internet Access. In addition, Technology Fund Grants could be designed so as to help equalize financial differentials between urban and rural districts; large and small districts; or rich and poor districts, by varying the matching requirements.

### **C. The State Should Create an “Educational and Library Technology Endowment.”**

For example, the endowment could be based on the \$31 million Kauffman tax-windfall, plus matching funds from other grant making agencies. Income of the fund after maintaining the real value of the principal could be used for purposes similar to the K-12 Education Technology Fund and the Library Technology Fund.

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## APPENDIX 1. MINUTES OF THE KANSAS INTERNET TASK FORCE MEETINGS

### Minutes, Kansas Internet Task Force, Tuesday, January 25, 1996:

Present: Fred Boesch, Rob Little, David DeMoss, Leroy Gattin, Ron Rohrer, Rhonda Moeller (representing Duane Johnson), Charles Krider, Norm Clifford, Jerry Crow (observer), Jerry Niebaum

Absent: Jeff Fraser, Andrew Scharf

#### 1) Call to Order and Introductions.

The meeting was called to order by Fred Boesch and Kansas Internet Task Force members were introduced. Fred Boesch announced that the House Telecommunications Committee and the Joint Committee on Computers and Telecommunications had been informed about the task force and would be invited to attend the meetings. It was decided to send similar letters to the House and Senate Education Committees.

#### 2) Time Frame and Discussion of Goals.

The time frame is such that the final Kansas Internet Task Force Report must be completed and forwarded to the legislative committees by the end of March. The report will be forwarded for approval through the Interim Commissioner, Board of Education and the Kansas Information Resources council. The report will include recommendations for a "best-fit" model for delivering Internet services and other action necessary for successful implementation.

An informal discussion of what the Kansas Internet Task Force feels its objectives and concerns are and the issues primarily related to providing Internet services to schools and libraries throughout the State of Kansas followed. It is generally accepted that the Internet is a valuable tool and that access to the Internet is considered to be an issue of democracy as well as technological and communication advancement. Historically, schools have recognized the importance of access to information. Access to communication in the classroom is as important as access to information. Other concerns besides technical issues, such as social issues and the power of these technologies must also be addressed. The group should develop a plan for grass-roots development.

Other issues discussed included: rural versus urban access and cost; the importance of equity in Internet access; and the need for adequate staff training. It was a concern that a number of different groups were going in different directions, and perhaps, streamlining the process would be beneficial.

It was suggested that one of the goals of the Kansas Internet Task Force should be to create a minimum requirement to avoid costs which occur because of poor background research and planning. If this Task Force could create certain priorities, it could make the best use of available resources.

Another area of concern is the personal commitment of key education and library administrators to understanding the Internet as an asset to the organization. To accomplish this, access to the Internet must be affordable, efficient, and easy to use. Costs may vary throughout the state and this could be a major issue. If the task force can identify the major costs up front it may make developing Internet access more approachable since people would have a clear sense of the financial commitment. It was suggested that the marketplace might resolve issues of cost and training as less expensive and more competitive access to the Internet is achieved.

There was a discussion about the difference between libraries and schools and it was indicated that they primarily had the same needs, with the exception that public libraries have the additional dimension and responsibility for public access. One issue is whether the public could have access to the Internet through a publicly-supported network.

It is hoped that from the discussion the Kansas Internet Task Force can create a draft to be reviewed. Members should provide a brief report on what they view as problems, issues, and suggested solutions. These comments should be forwarded to Dr. Krider.

### 3) Presentation of Research Study.

The Kansas Internet Task Force reviewed the proposed research study, and Charles Krider outlined each step of the process. As part of the research, a literature review will be conducted. Krider will visit various educational administrative offices to review other approaches to Internet use and access. Additionally, a survey of teachers, principals, superintendents and public librarians will be conducted. The survey questions will be provided the week of January 29 and provided to task force members for their review and comment. The goal will be to determine Internet usage barriers, not just technical issues. The IPPBR will conduct the research and define the current level of Internet services in schools and libraries, the problems, issues and barriers, and develop the potential models for delivery of Internet services with advantages and disadvantages. The Kansas Internet Task Force will discuss and agree upon the issues and potential models and will determine the "best fit" model to be recommended for Kansas. The IPPBR and this Task Force will develop other recommendations that may be needed for successful implementation.

### 4) Meeting Dates, Locations and Suggested Topics.

Several users and providers will be asked to attend the February 23 meeting to discuss issues related to the Internet and telecommunications in schools and libraries. This will give the task force an opportunity to have actual case studies to assist in their evaluation.

Future meeting dates were determined as follows:

February 23 - 4th floor conference room.

Presentations from representatives of schools/libraries and discussion by Kansas Internet Task Force.  
(9:00 a.m.-12:00)

Presentations from providers such as KANREN, Sprint, etc. (1:00 p.m. - 4:00 p.m.)

March 5 - 13th floor conference room. (9:00 a.m. - 12:00 noon)

March 13 - 4th floor conference room. Continue data review (1:00 p.m.- 4:00 p.m.)

March 25 - 4th floor conference room. Review final draft (9:00 a.m. - 12:00 noon)

All meetings will be held in the Security Benefit Building

5) Adjournment.

The meeting adjourned at 1:45 p.m.

## **Minutes, Kansas Internet Task Force , Tuesday, February 23, 1996:**

Present: Leroy Gattin, Rob Little, David DeMoss, Jerry Niebaum, Charles Krider, Duane Johnson, Fred Boesch, Jeff Fraser, Harry Herington

Absent: Andrew Scharf

### 1) Call to Order, Approval of Minutes and Announcements.

The meeting was called to order by Fred Boesch at 8:50 a.m. David DeMoss made a motion to approve the minutes of the previous meeting and the motion passed unanimously. Chuck Krider announced that there may be an opportunity to visit TCI in Denver. A great deal of interest was expressed, and he indicated that he would check into the possibility of a visit. Representatives from TCI will be here March 5. TCI has one system wired in Salina, Kansas.

### 2) Presentations by Users and Vendors.

#### ***A. Jane Hatch, Southwest Kansas Library System***

Ms. Hatch discussed the importance of having the Internet available in every public library and school and to every person. Information flow in every community was not a luxury nor add-on capability, but a baseline requirement. She indicated concern that conductivity and policy issues have to be addressed, including multi state connectivity. Other specific concerns listed included: thorough access; local-area networking with connection to wide-area networking through dedicated band widths; training; and full-motion, interactive video for face-to-face communication to enhance information-exchange among districts.

Funding concerns were discussed in detail and included the following issues: annual assistance in funding, promotion of technical advancement, provision of incentive grants, one-stop shopping for computer arrangements, and the need for specification guidelines with future advancements in mind.

Ms. Hatch also addressed the importance of supplemental support for training, flat rate access fees, availability of technology consulting, and the possibility of giving tax incentives to businesses who support implementation of technology in schools and libraries.



### ***B. Patti Mersmann, State of Kansas Library System***

Ms. Mersmann echoed the concerns expressed by Ms. Hatch and pointed out that the public library is a point of access for information for everyone. (Libraries change to reflect the needs of the client.) She discussed the difficulties in keeping technologically up-to-date caused by fast pace change compared with available funding. She gave the example that the government printing services released requirements for electronic transfer of information; even our state printing service doesn't meet their basic requirement.

Current needs of libraries were outlined including high speed, high band width without assessment of a distance penalty. Ms. Mersmann indicated that libraries and schools should not be charged business rates, because they can't put the cost back on their clients. She gave examples of the use of the Internet to a variety of possible users, from children to a business owner. She indicated that use of the Internet in the library systems is important because access to information is a social issue.

### ***C. Olathe School District - Ron Wimmer, Superintendent, Patricia All, Assistant Superintendent, and Kathi Tully, Director of Instructional Technology and Information Systems.***

The Olathe School District presentation centered on the actions the district has taken to make the Internet available in all schools. The representatives discussed how they involved the community, how they set up task forces and the assignments they were given, and how a bond issue was passed for technology funding for the schools. They discussed the costs involved and what had been done to address ongoing technical upgrades. They noted that each student K - 12 has an email address assigned by number to protect privacy. They explained how communication was the number one priority from beginning to end, and they described how the public supported the issue because of their involvement in the decisions. Equity of access, innovation, futuristic planning, security, and adequate and continued training were important concerns.

### ***D. Kay Ludecke, Dan Boeth, Jonnie Martin, MCI***

The MCI representatives discussed what they can do to offer Internet services, and what the issues and concerns was from their point of view. The Internet cannot be provided to everyone in a uniform "one-size-fits-all" system, because of the demographics and difference of each school district in the state. MCI had a wide range of tools and plans available and could design custom plans for different situations.

Concerns addressed included the realization that many groups would have to contact and work with each other and that freedom of choice for the best fit ought exist. Libraries and schools did not have time or expertise to research all the needs of the areas they needed to serve. There were 45 local exchange carriers in Kansas.

The speakers indicated that MCI had invested more than other providers to create a backbone. They had not done a study to determine what they could do for the entire state but had looked at different situations. The concern about a flat rate fee was that cost depended on the local exchange



carrier. The cost to smaller schools was much greater and the technology of equipment was very different depending on its location. The MCI method of access would not be uniform. The representatives discussed the costs and what the charges would cover including equipment, line charges and connections.

A good way to reduce cost would be to coordinate purchases throughout the state. Before any solid figures could be offered to the state MCI would have to do a great deal more research and have more information available.

#### ***E. Dick Veatch, Pioneer Telephone***

Pioneer represented a telephone provider of Southwest Kansas. Mr. Veatch passed around a copy of the network as it is currently laid out. Pioneer became a limited Internet provider approximately two years ago. Mr. Veatch discussed Pioneer's involvement with providing Internet connections to six schools and two libraries in southwestern Kansas. He indicated that three schools have chosen at this time not to be connected to the Internet, but he was unsure of their reasons. He discussed the costs involved including the connection charges. He indicated they have fibre facilities where they meet AT&T, MCI, etc., terminal locations. He further discussed costs related to equipment and the possibility of working in partnership with schools.

Mr. Veatch questioned if the state would serve as an Internet provider as opposed to some of the available providers. He also briefly discussed the effect of the Telecommunications Bill and its mandate to provide the Internet to schools and other public agencies but stated that the role of telephone companies was not to subsidize schools and/or libraries. Schools should think of technology as a continuing "replaceable" cost, such as photocopy machine.

#### ***F. Jeff Russell, Mark Cosby and Jerry Smith, Sprint***

The representatives from Sprint announced that the Sprint tariff is ready to be filed with the state. They outlined the access fees and what equipment will be available. Most of their service was to the rural areas. They discussed some of the equipment concerns (coils can not effectively handle high-speed data) and what would be done to resolve those concerns. They addressed issues and concerns related primarily to schools and libraries, which may also relate to other community users. Currently 25 percent of the high schools in rural and remote locations were served by Sprint.

Two state experiences were described: North Carolina, which, like Iowa, invested in a statewide network and used the ATM approach and Oregon which set up a statewide network through a frame-relay on which schools and libraries across the network could piggy-back. This structure employs an intra-Internet structure which includes the set up of a Web site in schools for selected subsystems, creating options and allowing some control. Involving other state agencies saves a great deal on costs.

The Sprint representatives outlined Sprint's interest and capability to serve Kansas and how the Oregon model could work using KANREN or something similar. They briefly touched which technology would work best in which areas and what could be done to account for growth in those areas.

Sprint is not currently providing much service in Kansas. They will provide a list of what they have done to the Task Force and indicate what kinds of packages and estimated costs they could provide for the state.

***G. Jerry Crow, KANREN***

Mr. Crow described the current involvement of KANREN in the schools in Kansas and the rates and services provided. He indicated that not having Internet active in schools and libraries will rapidly increase the equity barriers that currently exist in schools and libraries especially with the advancement of technology. He indicated that KANREN could have 100 schools on line in the most cost effective way currently available. He further discussed in detail what KANREN could offer and what would be included such as maintaining routers and what training KANREN would provide.

***H. Bob Kocour, AT&T***

Mr. Kocour announced that AT&T had committed \$150,000,000 to 200 access points in public schools, which includes 100 free hours of dial-in time, free browser, software, and on-line help.

AT&T would like to expand backbone services to schools and libraries.

***I. Rob Little, Superintendent, Phillipsburg***

Superintendent Little indicated that there are five major issues related to technology which concern many schools. The issues were outlined on a handout of testimony given to the Select Committee on Telecommunications. He outlined the geographic and physical circumstances of his district, the financing available, and the equipment currently being used. Superintendent Little then discussed the issues noted above in detail.

**3) Discussion About Next Meetings.**

There was a brief discussion of what was to be accomplished in the next two meetings. Concern was expressed that the report needed to be written and ready to present. Drew Flemming, from TCI, and Andrew Scharf, from DISC were scheduled to present at the March 5 meeting and Southwestern Bell will make a presentation on March 13. The March 5 meeting would be held in the 13th floor conference room.

**4) Adjournment.**

The meeting was adjourned by Fred Boesch at 4:00 p.m.

## **Minutes, Kansas Internet Task Force, Tuesday, March 5, 1996:**

Attending: Fred Boesch, Jerry Niebaum, Ron Rohrer, Leroy Gattin, Andrew Scharf, Charles Krider, Rob Little, Duane Johnson

Absent: David DeMoss, Jeff Fraser

The meeting was called to order by Fred Boesch at 8:50 a.m.

### 1) Welcome and Approval of the Minutes.

Mr. Boesch passed out materials on MOREnet information and House Bill 3030. Introductions of the task force and Guy McDonald were made. The minutes were approved without change.

### 2) Presentations.

#### ***A. Guy McDonald, Kansas Corporation Commission***

Mr. McDonald acquainted the Kansas Internet Task Force with the Kansas Corporation Commission's current actions relating to Internet access. He indicated that their focus is on the Public Switch Network and that currently there are two activities which the KCC is following closely: Southwestern Bell's "One + Saver Direct" filing and a recent CURB filing.

Mr. McDonald discussed both programs and indicated that the "+ Saver Direct" Plan introduced by Southwestern Bell was currently suspended so that more research with recent usage data could be completed. The suspension will end in late-May. He also indicated that CURB filed a request that the Commission investigate a calling plan to benefit primarily rural users. Mr. McDonald discussed private initiatives going on in several areas, including Colby, Goodland, Hesston, Herington, and Oskaloosa. He briefly discussed KIN-Net, Pioneer, and one other company, which either offered Internet access or was considering offering the service. All of the initiatives were taking place without regulatory oversight or control.

Mr. McDonald briefly discussed the involvement of KCC in Bill 3030 but did not know what direction final actions will take. He also indicated that passage of HB 3030 would influence the Southwestern Bell filing. Mr. Boesch noted that this bill was introduced after AT&T offered Internet access of five hours for \$5.00. It was important to note that in addition to the cost of connecting to an Internet provider, the provider would also have their charges. There was discussion about the effect of aggregating the demand for community schools and libraries and how that could impact Southwestern Bell, local companies, and initiatives currently underway.

Mr. McDonald indicated that the effect was that economy would be gained in two ways: first was justification of a higher capacity technology (i.e., DS-1) and thus lower cost per circuit mile compared to individual circuits and second, a volume discount that the State already realizes through competitive bidding.

There was a discussion about the \$64 million TeleKansas II investment commitment from Southwestern Bell and if some of the money there that could be tapped. Mr. McDonald indicated that approximately one-half the funds had been invested primarily for interactive two-way Tele-video. Southwestern Bell filed a tariff revision proposing elimination of a \$565 per month interconnection charge for independent company connectivity. It was anticipated that this revision would stimulate additional deployment of distance learning video service, thus fulfilling the TeleKansas II commitment. There was a brief discussion of pricing structures and what was included in each price.

***B. Jane Rhys, George Wolf - Kansas Council on Developmental Disabilities***

Ms. Rhys briefly described the Kansas Council on Developmental Disabilities and its interest and involvement with the Internet and accessibility issues. She indicated that it was very difficult for a person with a disability to take advantage of all the Internet had to offer unless that person had the equipment at home. The Internet was a very valuable accessibility tool because of the information and communication advantages it created - this was especially true in rural areas. Both Ms. Rhys and Mr. Wolf stressed the importance of including accessibility issues in planning for the addition of the Internet to public schools and libraries. These considerations were related to geographic location of Internet access, as well as, options that should be available with Internet connection. They provided a list of Internet addresses with information about accessibility considerations.

***C. Drew Fleming, Kent Doll, Bill Severn, Roger Shanafelt, Greg Harrison - TCI***

TCI, a cable company, is looking at the future of the Internet and working with @Home Network as an Internet provider. Their intent is to provide a service that can run much faster than dial-in, over a private, high-speed backbone connection through cable rather than telephone lines. This service entails more than just a connection to the Internet since it can include interactive two-way video and other features.

Roger Shanafelt, from “@Home,” presented a video introducing @Home and then discussed in technical detail how their product worked, the advantages to cable connection, and costs. He described the current difficulties with using cable, noting that the technology was still very young and that in areas such as rural Kansas there were schools and libraries with no local cable provider. @Home could neither connect through Primestar nor did they have an anchor tenant in Kansas. @Home could connect with other cable providers. TCI and @Home had different groups which could address a school and library situations and provide a one-stop shop approach to Internet connection.. Pricing of the @Home service and what could be provided to different places depended on individual situations. Mr. Boesch noted that this company did offer a one-stop approach. Other carriers had that capability, such as AT&T, but did not present that as part of their plans.

#### **D. Andrew Scharf - DISC**

Mr. Scharf explained the role of KANSAN which included providing statewide connectivity for statewide agencies and other groups who were public funded. He anticipated that it would soon include nonprofit entities as well. Major nodes and "slightly less" major nodes were provided in various place throughout Kansas. They had T-1 connections in some places and provide voice, data and video connections. The number of data connections was growing rapidly. Mr. Scharf talked about current KANSAN connections and where they were being used. The basic rate included two 56 Kbps and some additional bandwidth. All rates were subject to change and most likely would decrease as usage increased. It was likely that to service all libraries and schools in the state that some hybrid solutions would be used and could include KANSAN, which had the physical capacity to address growth. He also briefly discussed various rates and what they include.

#### **E. Charles Krider - Report on Findings, Conclusions, and Recommendations - Draft**

Dr. Krider passed out a copy of the draft report prepared by staff from the Institute and said there would be a number of changes before the report was ready. Because time was short, he asked the Kansas Internet Task Force to review specific pages, beginning with Legislative recommendations (page 10).

Questions arose including whether or not the role of the Kansas Internet Task Force was to tell the Legislature which schools and libraries actually needed money and how much would be needed, including the funding for infrastructure improvements.

Dr. Krider indicated that recommendations included the continuation of the Kansas Internet Task Force in an advisory role. It was recommended that (a) DISC and KANREN have a plan in place by July 1st, or (b) the task force design a plan and go out to bid, including TCI, MCI and others requesting a comprehensive plan of costs and service provided. The issues discussed also included the possibility of leveraging off of the KANREN system or looking to other sources. It was determined that a statewide effort was preferred and that funding could be provided as incentive. It was recommended that the legislature would have to find the funding, but that the task force should recommend areas which could be reviewed as sources for the funding (such as the money remaining in the Southwestern Bell project).

It was noted that every school was likely to get an equitable access but that some schools and libraries were more prepared than others and that Internet connections might be done in a phase-in time sequence. It was essential to indicate that without Internet access, Kansas' public education would become second-tiered school system. It was important to assure that funding was used for technology.

Mr. Boesch noted that there had to be a factual basis for the figures presented in the report and that it needed to be in place before the report was presented to the Legislature. Each Kansas Internet Task Force member was asked to further review the report and note any additions or changes that would be useful.

Jerry Niebaum requested that the goals outlined in the 2000 Technology report should be added to page 9 of the report.

3) Adjournment.

Mr. Boesch adjourned the meeting at 12:20.



**Minutes, Kansas Internet Task Force, Tuesday, March 13, 1996:**

Present: Fred Boesch, Leroy Gattin, Rob Little, Dave DeMoss, Jerry Niebaum, Charles Krider, Ron Rohrer, Duane Johnson

Absent: Andrew Scharf, Jeff Fraser

1) Call to Order and Welcome - Fred Boesch.

The meeting was called to order at 1:10 p.m. by Fred Boesch

2) Presentation.

***A. Southwestern Bell - Barbara Wilkinson, Cinda Vining, Mark Connolly, C. C. Metzler and David Nichols***

The representatives of Southwestern Bell discussed their interest in the Internet, which Southwestern Bell viewed as an excellent opportunity for business.

All Southwestern Bell customers had Internet access if they have the required equipment (computer, modem) and public or commercial access. Barbara Wilkinson discussed what services, related to the Internet, Southwestern Bell could offer. There were three areas in which they categorized these services: consulting, content and connection. She indicated that there were several plans that they would begin to market in the next few months; the various services will be available at the beginning of 1997. The primary goal of Southwestern Bell was to serve as a one-stop shop for Internet users.

The effect of the Telecommunications Act of 1996 on Southwestern Bell was also discussed. The Act did impose some restrictions on how Southwestern Bell could offer Internet services; however, it was noted that while the effect was significant, product development continues. Some of those products were being offered to businesses and public schools.

Southwestern Bell representatives were questioned about their filing and waiver to offer services to education and the effect of the Telecommunications Act on the waiver. The waiver might not be required. The question was whether, if that were the case, would the same service be offered to libraries, hospitals and other public services? A Southwestern Bell representative indicated that under federal guidelines some waiver may be offered to other places besides education. He also indicated that it was possible that any discount may go to some type of universal federal fund.

To date, Southwestern Bell had not provided complete Internet service to any of the schools in Kansas but would do it on a project-specific basis. One of the task force members expressed his concern that access points to the entire state could be provided and how that provision would be accomplished. Southwestern Bell representatives indicated that they had two plans that would meet the needs of the State. Both plans would include strategy for growth, technical training and backup. They indicated that they could not be specific about the prices but that both packages would be very

competitive. They also said they would look at some hypothetical situations and provide generic packages for review by the Kansas Internet Task Force .

There was a brief discussion about Southwestern Bell's activity with tele-video services to schools and if any money from that project would be available for Internet connections. Apparently there would be very little, if any, funding remaining after the tele-video project was complete.

### 3) Report Discussion - Charles Krider.

At the direction of Charles Krider, the task force reviewed the draft report of the Findings, Conclusions and Recommendations. Board members recommended several specific changes, which were noted and were changed in the most recent version of the report.

Under the heading of recommendations there was extensive discussion about various roles of various players, primarily DISC and KANREN. There were concerns about who would provide what portion of service, for example, technical services, aggregation, etc. Recommendations were noted by Mr. Krider, who indicated that those report recommendations would be revised and would be discussed when the Kansas Internet Task Force reviewed the draft of the report.

There was discussion of ways to fund the Internet project. Specifically, it was suggested that the task force might recommend use of the Kauffman tax-payment as an investment to set up a technology fund.

### 4) Change in Meeting Time and Location - Fred Boesch.

Mr. Boesch requested that the Kansas Internet Task Force meet March 19. Most of the members indicated they could attend. The meeting was to be held in the Kansas, Inc. Conference Room (632 SW VanBuren, Suite 100) from 1:00 - 4:00 p.m.

### 5) Meeting Adjournment - Fred Boesch.

The meeting was adjourned at 4:10 p.m.



## **APPENDIX 2.**

### **GOALS 2000 TECHNOLOGY MISSION, VISION, OBJECTIVES, AND OUTCOMES**

from: *The Kansas Goals 2000 Technology Planning Guide*,  
by The Kansas Goals 2000 Technology Task Force  
Kansas State Board of Education 1996.

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#### ***Mission.***

To Increase the use of current and future technologies with the intent of enhancing learning as well as teaching.

#### ***Vision.***

For Kansas to be an education leader, with world-class learning opportunities, providing all Kansans with the knowledge and skills necessary to exercise the rights and responsibilities of citizenship, and with the ability to thrive in an international contemporary economy is necessary.

- A. All Kansans will have equal and adequate access to comprehensive information resources.
- B. All educators will have the technology, tools and resources they need to provide students with superior knowledge and job skills.
- C. All segments of the Kansas educational community will work together with a common sense of purpose to achieve this vision.

#### ***Objectives.***

To achieve this vision, the following objectives were identified by the task force:

- A. Provide educational entities a planning guide to assist them in developing their own technology plan.
- B. Promote higher student achievement through the use of technology in education.
- C. Ensure participation of all educational entities in the state, especially those schools and districts with a high percentage of disadvantaged students.
- D. Support the development and implementation of a cost-effective, high-speed, statewide, communications technology support system for all Kansan educational entities.

- E. Promote shared use of equipment, facilities and other technology resources during after-school hours.
- F. Provide educators a planning model to enable them to develop their own local plans for effectively using technology in education.
- G. Assess the status of technology integration within the educational entities and make recommendations on resource allocation.
- H. Develop alliances with community agencies, institutions of higher education, business, industry and the public to help our state become a leader in education.

***Technology Outcomes.***

These seven technology outcomes should not restrict educational entities as they develop their specific technology outcomes for each level and academic area. Rather, by their general nature, local control and flexibility are maintained.

- Students will understand the role of technology in human development and the economy.
- Students will understand the importance of developing future technologies
- Students will compare and contrast technologies and decide appropriateness for any given task
- Students will apply and assess a vast array of technologies (scientific material and human processes) used to achieve academic goals.
- As consumers, students will make prudent decisions regarding the purchase of technology software and hardware.
- Students will be prepared to implement technology in the workplace.
- As citizens, students will use technology to improve their quality of life.

### APPENDIX 3. LIMITATIONS OF MODEM ACCESS

The Kansas Internet Task Force found that modems are not an adequate substitutes for direct high capacity Internet connections in most schools and libraries. Several states have formed plans based on modem connections, and then decided in the light of experience it was a mistake. The main issues are these:

High cost. For multiple users or intense use, dial-in service is not cost effective. Each simultaneous user needs a separate telephone line paid at business rates. Each user pays a separate Internet access fee. In many rural areas there are additional long distance charges for each user.

Limited access. Consequently, regions relying on modems are committed to relatively low levels of access. Students and library patrons will have a small number of minutes of exposure per week. Most classrooms will not have connections.

Lost synergies. Except for personnel costs, the largest cost of distributing a direct Internet connection to a given region consists is the cost of area networks. However, at present Internet connections are *not* the most important reason for providing area networks. Nationwide, as of Fall 1995, 85 percent of public schools had some computers attached to area networks, most of which were *not* directly attached to the Internet. Area networks are used to provide local communication and shared resources such as printers and CD-ROM drives. Once a high speed area network has been set up, adding a direct Internet connection is a relatively inexpensive next step.

Limited uses. Modems on telephone lines are limited to relatively slow transmission speeds. Those speeds make many emerging uses of the Internet impractical. Large or detailed pictures cannot be transmitted in a reasonable amount of time. Digital sound cannot be transmitted in real time. Animation and video cannot be transmitted. Simpler but important uses, such as net searching, are sufficiently time consuming as to discourage use. Remote computing may not be practical.

Lockout from new sites. Even routine Internet applications are coming to rely more and more on high-speed transmission. Thus, web sites increasingly utilize detailed pictures and are starting to use sounds.

Busy signals. Difficulties in dialing in and making a connection can be a barrier to use of modems. Because of the high costs of providing for peak loads, most access providers have time periods when all modem ports will be in use. (Because area networks “multiplex” many different signal streams into a single signal, this problem generally does not arise with direct connections.)

## APPENDIX 4. COST ESTIMATES FOR THE PUBLIC INTERNET INITIATIVES

### A. Costs for K-12 Schools.

#### *1. The Start-Up Program. (\$2.5 million per year for three years, beginning in fiscal 1997.)*

This program brings an Internet access point into each school district. KANREN estimates it can connect all 304 school districts in three years. \$2 million would pay for the installation and the first year of service (source: 229H, Appendix 1). An additional \$.5 million is allocated for libraries and WAN support. Subsequent service would be paid by the district, in some cases with help from the Technology Fund.

#### *2. The K-12 Education Technology Fund. (\$11.5 million per year for three years, beginning in fiscal 1998.)*

This program provides funds for computers, networking, and training. Its purposes are to help schools make technology transitions, and to help level the playing field.

Hardware costs alone for a "minimum level of service" will amount to approximately \$23 million per year for all schools in Kansas. (Source: calculation by IPPBR.) Assumptions:

- 1 computer per 30 students and 1 computer per teacher @ 16 students per teacher;
- \$2000 per computer;
- \$500 for associated networking hardware and software;
- 480,000 students in Kansas; and
- 5 year hardware replacement cycle.

It is proposed that the state pay half of this cost, or \$11.5 million. That incentive should be sufficient to encourage most school districts to participate in the plan.

Some school districts already have made comparable or superior hardware investments on their own. Nevertheless, it is proposed that grants be available to those districts, because

- otherwise it creates a perverse incentive that penalize districts making great efforts on their own;
- because of rapid technology change and obsolescence, hardware costs are a recurring cost, not a one-time cost;
- funds could be applied to technical support and connection fees as well as to hardware.

Hardware costs for this level of service amount to some \$50 per student per year. Staffing and support costs are expected to exceed hardware costs. A program already being implemented in Olathe costs \$160 per student per year; that figure includes some though not all staffing costs and provides a higher level of service. (Source: Olathe 1994.)

One purpose of this fund is to make networking more available in districts with small numbers of students, where costs per student are higher than elsewhere. It is estimated that the state's cost for *exactly* equalizing costs per student for district wide-area networks would be about \$12 million per year. (Source: IPPBR Report 229F p. 18). It would cost an additional \$9 million per year to *exactly* equalize the cost of local-area networks in small buildings. However, the state's cost to achieve a *practical* level of equalization is estimated at less than \$4 million. With that allocation, \$8 million would be left for motivating startups and technology transitions in larger districts.

## **B. Costs for Libraries.**

### *1. Non-additional Costs.*

Most of the costs of providing statewide assistance for libraries are already contained in the estimates provided above for schools. In particular:

- libraries would use the same Internet access point and wide-area networks;
- libraries would use the same database of periodicals;
- libraries would use the same statewide technical training and support systems.

### *2. The Library Technology Fund. (\$1 million per year for three years, beginning in fiscal 1998.)*

This program would upgrade hardware and training in libraries.

The size of this program should be substantially smaller than the corresponding technology program for schools, because:

- there are only one-fourth as many libraries as public schools;
- numbers of workstations in libraries will be much less than numbers of workstations in schools. About 100,000 workstations are projected for public schools under the moderate level of service. About 3,000 workstations are projected for libraries. (Source: IPPBR calculation);
- the school technology fund would be used partly for wide-area network costs, which benefit libraries as well as schools.