MATHEMATICS RESOURCES ON THE INTERNET

Sun Sook Noh(Rutgers University)

The purpose of this study is to determine the type and amount of math education related information that is available on the worldwide Internet computer network and to summarize the ways of using the network to its fullest potential for mathematics education research. The survey and analysis of the network shows that a great deal of information covering a broad range of subjects regarding mathematics education exists on the network. The type of information ranges from simple mathematics study plans to the complete mathematics education assessment database for grade school and high school students in the U.S. In addition to the wide ranging information, the network is also valuable as a communication link for exchanging ideas and obtaining feedbacks from educators and students around the world. Through the use of electronic mail, the Internet offers the ability to communicate with over 20 million users around the world.

INTERNET BACKGROUND

Internet is simply a network, of a network of computers that can share information with one another. Although the concept is very simple, Internet is proving itself today to be the working prototype of the information superhighway envisioned for the future because of its tremendous size and growth. The electronic network began in 1969 as ARPANet with a group of four computers in the U.S. linked to send messages and to share data for research purposes. The network grew gradually at first with other government agencies and universities joining the network. In the 1980s, other networks started to join and began internetworking, hence the term Internet was born. The Internet is currently estimated to be composed of over 20,000 computer networks covering over 60 countries and over 20 million users worldwide. The U.S. currently accounts for more than half of the connections with several million computers connected to the network. The total number of users worldwide is growing at 10% to 20% per month. At this rate, the total number of users could double within the next year to reach 40 million users.

The recent growth in the number of users is due to three main factors that improved the accessibility of information over the network. First, the technical advances in data trasmission rate between networks made the retrieval of information quicker and therefore more convenient. Second, the development of the gopher client-server computer program made it easier to search for information on the network for the average user. Third, the recent development of the World Wide Web protocol and the Mosaic computer program allows for even easier to search for information on the Internet and and at the same time view the information in a multimedia environment including pictures, and sounds.

In the past, information on the Internet could be searched and retrieved if the user had fairly good computer skills. The development of the gopher client-server program simplified the procedure by providing a subject based menu system that guides the user to the desired information. The user only needs to start the gopher client program on the users computer to gain access to other gopher server sites around the world. The gopher server sites provide the menu tree that organizes the information and links the user to information in still other gopher servers.

In 1993, the ability to search information on the Internet was even more enhanced by the introduction of the World Wide Web (WWW) protocol and the Mosaic program. Using a graphical interface, Mosaic program allows the user to retrieve text, audio and video information in a true multimedia format. Currently, the program can be run on the graphical environment of X-Windows, Widows and Macintosh based computers.

Since most of the computer terminals are still only text based, this study concentrated on the text based gopher search program for mathematics education resources on the Internet.

MATHEMATICS EDUCATION RESOURCES ON THE INTERNET

I. Communication Resources

E-MAIL (electronic mail) The most direct use of the communication capability on the Internet is the use of the mail command to send and receive messages and files from anyone on the network worldwide. The number and type of people who can be contacted on the network is growing everyday as new users gain access to the network. Since Internet began as a research and education based computer network, most of the large universities, research centers, professional organizations and government agencies are on the network and anyone with an account can be contacted by E-mail. Recently, more and more elementary and secondary schools are joining the network providing an opportunity to communicate directly with teachers and students.

The ability to communicate with other mathematics educators, researchers and even mathematics students of all grade levels around the world is a valuable resource. Using E-mail, a person on the opposite side of the world can send messages without worrying about the time zone difference. E-mail is better for communicating in certain situations than the telephone because the sender and the receiver have complete freedom and privacy in writing and reading the message. For example, using E-mail to contact a mathematics educator with whom you have not met is much easier and convenient than using the telephone or writing a letter. Calling a person without knowing the person generally requires that you need to have a substantial topic of discussion. Writing a letter is less intrusive but receiving a reply may take weeks or even months. The E-mail is easier to reply using the keyboard on the computer than answering a letter.

LISTSERV Although E-mail is a good communication tool, it is limited by the ability

to contact only specific people. A more general way of communicating with a group of people who share the same area of research interest is to join a Listserv (list service) group on the Internet. After joining the Listserv group, sending a message to the Listserv group sends the message out to everyone in that group. The reply can then come from anyone who is in that group directly to the person who sent the message or to the Listserv group. If the reply is to the Listserv group, everyone in the group can also view the reply. In this way, a discussion on the subject can be seen by everyone in the group and each person in the group has the option to participate electronically in the discussion.

Some examples of the Listserv groups related to mathematics and mathematics education are listed below.

1. ALGCOMP: algebra
2. ALLSTAT: statistics
3. COM-ALG: commutative algebra
4. CTI-MATHS: computers in teaching mathematics
5. EDTECH: technology in education
6. EDNET: educational potential of the Internet
7. EDPOLYAN: education policy analysis
8. EDSTAT-L: statistics education
9. K12ADMIN: K-12 school administrators
10. KIDSPHERE: international network for children and teachers
11. L-MATH: history and philosophy
12. NA-NET: numerical analysis
13. NMBRTHRY: number theory

The procedure for joining a Listserv group can be found in the Internet resources gopher which can be accessed from most of the gopher servers around the world. Examples of

gopher sessions will be described in greater detail in the gopher resources section.

USENET   The Usenet is a more open communication forum for discussion than the Listserv. The Usenet is also a message posting system with hundreds of different subject groups. The difference between Listserv and Usenet is that Usenet subject groups can be read by almost anyone on the network by entering the command "readnews newsgroup name" without having to join that group. The two news group names related to mathematics and mathematics education are the "sci.math" and the "k12.ed.math". The sci.math group handles all type of general mathematics related discussions. One example of an interesting message that was posted to sci.math was by Dr. Wiley of Princeton on the subject of Fermat's last theorem. In December of 1993, he posted a message of explanation on the status of his work: "During the review process a number of problems emerged, most of which have been resolved, but one in particular I have not yet settled..." Since the proof of Fermat's last theorem was a discussion topic of interest for mathematicians around the world, Wiley used sci.math to communicate the status of his work.

The k12.ed.math Usenet group is a discussion group for anyone interested in elementary and secondary school mathematics education. One recent posting to the group asked for information on whether anyone has done an evaluation of the leading k-12 math and science programs in the U.S. The question was quickly answered by next day by an educator from the University of Hawaii. In general, most of the postings to this group

deals with questions and comments about teaching techniques in mathematics.

II. Gopher Resources

There are two basic ways to search for information on the gopher servers around the world. One method is to start from a local gopher server and go through the menu items in search of the desired information. The user can easily spend hours and even days searching through the various menu items that leads the user to other gopher sites which in turn contain more menu items that leads the user to even more gopher sites. This most common experience for Internet users is called "net surfing". This method of searching is not the most efficient way of searching the network, but the gained experience can help the user develop an understanding of the organization of the various gopher sites which in turn can help the user find related information on a desired subject matter.

A more efficient way to search the worldwide gopher servers for math education related information is to use the gopher searching program Veronica with the search words "math education". The Veronica program is usually accessed from the Internet resources menu on most gopher servers. For example, a Veronica search from the University of Koeln gopher server produced the following list which is only partially shown.

1. Re: Education, Math & Reason Book.
2. Math and Science Education Resources.
3. EDUCATION: Ohio Math & Science Discovery Project/
4. 2065 Arkansas Science and Math Education.

5. Abraham R., et al.: Visual Math: a Fantasy for the Future of Education.
6. Marine Sciences, Harriman, Physical Education, Science Math & Tech...
7. Math & Science Education; T.C.O'Haver; v1.2; 10/29/93.
8. Math and Science Education Resources.
9. Math Education/

....

The Veronica search produces a list of search word related files in gopher sites around the world. Thus, the advantage of using Veronica is the ease with which the information is found. The disadvantage of using this method is that the source server of the information is not directly accessed using this method. Since gopher sites are usually organized by subject matters, knowing the source of the information can usually help to find other related information that does not show up on the Veronica search.

After investigating most of the mathematics education related gopher sites around the world, 5 central gopher servers that contain most of the information were determined. The 5 gophers are

1) American Mathematical Society,
2) Mathematics Archive,
3) The Hub: Resource for Math and Science Education,
4) NYSERNet and
5) U.S. Department of Education.

In this study, the client gopher was started from the department of mathematics computer at Rutgers University. The gopher program for the desired server is accessed by entering "gopher sitename" on the computer terminal. For example, entering "gopher e-math.ams.

org" on the terminal acceses the American Mathematics Society gopher server in the U.S.

AMERICAN MATHEMATICAL SOCIETY (gopher e-math.ams.org) The American Mathematical Society (AMS) gopher server contains a wide range of useful information for mathematicians and mathematics educators. The root menu of the AMS gopher gives the following menu choices.

American Mathematical Society Root Menu

1. About this Node.
2. e-MATH Login Facility <TEL>
3. Welcome Information from the e-MATH Login Facility
4. Mathematical Publications/
5. Mathematical Preprints/
6. New Publications of the American Mathematical Society/
7. Mathematical Discussion Lists and Bulletin Boards/
8. General Information of Interest to Mathematicians /
9. Professional Information for Mathematicians/
10.Mathematical Sciences Meetings and Conferences/
11. AMS National Policy Statement (1994-95)
12. National Science Foundation Gopher (STIS)/
13. Other Scholarly Societies/
14. Other Math-Related Gophers/
15. Other Gopher Services/
16. Swarthmore Geometry Forum/
17. Instructional Materials/
18. World Wide Web (Lynx Client)/

Most of the menu items are self explanatory. Based on the available choices, the next item of interest is chosen by entering the item number of the desired item and then pressing the enter key. The menu items with a back slash (/) at the end of the line leads you to a next level of menu with more items to choose from. For example, choosing item 12 (National Science Foundation Gopher) gives you the following list of menu items.

National Science Foundation Root Menu

1. About this Gopher.
2. About STIS/
3. Index to NSF Award Abstracts <?>
4. Index to NSF Publications <?>

....

Here, the menu items with the <?> leads you to a searchable program where the desired subject matter can be searched. Following the menu items through the menu tree will eventually lead you to a readable text file, a compressed text file, or a binary computer file on the subject matter. Most of the information files on Internet are readable text files and they can be read directly on the screen using gopher and then transferred to the users own computer system and saved if desired. Some large text files such as database files are in a compressed format and they cannot be read on gopher. These files need to be saved on the users own computer system and then decompressed with the appropriate decompression program to produce a readable file. tHE Binary files can contain images, sounds or computer software that needs to be transferred and saved on the users own computer system for use.

In general, the AMS gopher is a useful resource for finding out about the latest news in mathematics and linking to other math related gophers.

MATHEMATICS ARCHIVES (gopher archives.math.utk.edu) The Mathematics Archives gopher located at the University of Tennessee, Knoxville is a good place to start in looking for materials relating to mathematics education. This gopher is funded by the National Science Foundation, the State of Tennessee Science Alliance, the Department of Mathematics at Calvin College and the University of Tennessee, Knoxville. The materials on the gopher are computer software and other information on the Internet which can be used in teaching mathematics at the pre-college and the college level. The gopher also provides convenient links to other gophers which are related to mathematics.The root menu of the Mathematics Archives gopher gives the following list of menu items. (Only partial menus are shown to save space)

Mathematics Archives Root Menu

1. About the Mathematics Archives Gopher.
2. Organization of the Mathematics Archives Gopher.
3. Sofware (Packages, Abstracts and Reviews) /
4. Teaching Materials and Other Information/
5. Other Mathematics Gophers and Anonymous FTP Sites

....

Here, selecting item 3 (Software ...) gives the following menu.

1. ******** Macintosh Software
2. Macintoh Software arranged by subjects
3. Search Abstracts and ReadMe files of all the Macintosh Software
4. List of all Macintosh Software
5. ******** MSDOS Software
6. MSDOS Software arranged by subjects

7. Search the Abstracts and ReadMe files of all the MSDOS Software
8. List of all MSDOS Software
9. ******** Other Platforms

....

Hundreds of commercial software reviews, abstracts and softwares related to teaching mathematics are available on the Internet. The non-commercial softwares are either free or shareware and they can be transferred (downloaded) to the home computer and tested. The free softwares can be used by anyone at anytime and the shareware softwares can usually be tried out for a period of time before deciding on purchase and making the purchase payment. The area of mathematics covered by the software section is extensive as shown by the menu for item 6 (MSDOS Software arranged by subjects) shown below.

1. Advanced Calculus
2. Advanced Differential Equations
3. Calculus
4. College Algebra
5. Complex Variables
6. Discrete Mathematics
7. Dynamics
8. Fractals
9. Geometry
10. Graphing Programs
11. K-12
12. Life Sciences
13. Linear and Matrix Algebra
14. Miscellaneous
15. Modelling
16. Modern Algebra
17. Number Theory
18. Numerical Analysis
19. Numerical Partial Differential Equations
20. Ordinary Differential Equations

21. Partial Differential Equations
22. Probability
23. Statistics
24. Teachers' Utilities

Going back up to the root menu and choosing item 4 (Teaching Materials and Other Information) provides the following menu.

1. "Fermat's Last Theorem" (from AMS) /
2. "Fermat's Last Theorem" (from SUNY Albany)/
3. Bibliography/
4. CHANCE Database/
5. Calculus Reform/
6. Celebrating progress in collegiate mathematics (from MAA)/
7. Discrete Mathematics/
8. Geometry Forum (Swarthmore College)/
9. Graphics Calculators (Under Construction)/
10. Interactive Mathematics Text Project (Univ of Pennsylvania)/
11. Lessons and Tutorials/
12. Life Sciences/
13. Maple/
14. Mathematica/
15. Mathematical Images/
16. Mathematics Archives Monthly Downloads Reports
17. Mathematics Archives Newsletters
18. Matlab
19. NSF Awards in Mathematics Education Abstracts

....

The menu again shows a wide ranging subject matter related to teaching mathematics. The first two files are the latest news on the activities surrounding Dr. Wiley's attempt to prove the Fermat's Last Theorem. Most of the other menu items such as

Calculus Reform and Geometry Forum are self explanatory as to their contents. The CHANCE database located at Dartmouth University contains instructional materials from a developing introductory statistics course. This course uses current chance events as reported in daily newspapers and journals to teach probability and statistics. The Mathematics Archives Monthly Downloads Report contains summary of accesses to the archive. For example, in July of 1994, there were 22182 files accessed from the Mathematics Archives. The most number of file access was from the MSDOS/Calculus section with 2107 file transfers. The three greatest number of direct access request from outside the U.S. came from Germany, United Kingdom and Canada. The NSF Awards in Mathematics Education Abstracts is a list of all the recent NSF awards in math education. For example, by browsing through the files one can learn that in 1993, Boston University received $219,501 in a 1.5 year grant to revise the traditional sophomore-level ordinary differential equations course to emphasize qualitative theory with a distinct dynamical systems orientation.

Going back to the root menu of Math Archives again and choosing item 5 (Other Mathematics Gophers) gives a list of the following mathematics related gopher sites.

1. Electronic Journals
2. Electronic News and Discussion Groups
3. Journals (published)
4. Mathematical Institutes and Centers
5. Mathematics Departments
6. NSF – National Science Foundation Gopher (STIS)
7. NSF Awards in Mathematics Education

Abstracts
8. NSF Research Experience for Undergraduates Sites (Math) – 1994
9. Other Mathematical Software Sources
10. Other Mathematics Information Sites

………

The above menu items provide access to other types of materials relating to mathematics such as journals which are published on the Internet electronically and gopher links to university mathematics departments.

THE HUB: A RESOURCE FOR MATH AND SCIENCE EDUCATION (gopher hub. terc.edu) Another central source of information for mathematics education is the Hub operated on behalf of the Regional Alliance for Mathematics and Science Education Reform by TERC. The stated goal of the Northeast regional alliance is to transform the technological potential of tele-communication into a usable service for students, educators, administrators and policy-makers by providing a central communication and information channel. TERC is a private, nonprofit education resarch and development organization committed to improving mathematics and science learning and teaching. The funding for the TERC comes mostly from the U.S. Department of Education and the National Science Foundation. In addtion to running the Hub, TERC is involved in many educational projects such as developing new grade school mathematics curriculums, educational computer softwares, and putting together supporting packages for elementary and middle school teachers. The details about the various projects and initiatives can be found in the

Hub gopher. The root menu for the Hub shows the following menu list.

The Hub: Resource for Math and Science Education Root Menu

1. About the Hub Gopher (and More)/
2. Search all menus on this gopher <?>
3. Resources for Mathematics and Science Education/
4. Education Conferences, Calendars and Announcements/
5. The Regional Alliance/
6. The Guestbook
7. Other Internet Resources

Choosing item 3 (Resources for Mathematics and Science Education) shows the following menu.

1. Education/
2. Gender Issues/
3. Mathematics/
4. Science/
5. Technology/
6. Assessment/
7. Standards/
8. Grants and Funding Information/
9. Resources arranged by Contributing Organization/

Choosing item 3 (Mathematics) again shows the following menu.

1. Math/Science Supervisors Mail (Alliance Virtual Community)/
2. Science/Math MN Project (Minnesota Dept. of Education).
3. Teaching Discrete Mathematics (Rowan College)/
4. Mac Period: A Period Finding Tool (Univ. of Arkansas)/
5. MathMagic.

6. E-database of Student Resesarch: Math (NSRC: Mandeville, Lousiana)/

7. Measuring Up (National Research Council)/

8. CHANCE Project/

9. Encouraging Girls in Math and Science/

10. Statistics Resources/

11. Co-Teaching Collaborations: a K-12/College Reform Model/

12. Other Mathematics Gophers/

From the above menu, some examples of information that can be obtained are as follows. A compiled list of electronic mail discussions regarding mathematics and science education can be read from the Math/Science Supervisors Mail section. The state of Minnesota has a program to improve the participation and achievement of all students in K-12 mathematics and science education. The two year $3,000,000 program will assist in implementing in Minnesota the educational standards developed for mathematics by the National Council of Teachers of Mathematics and for science by the National Research Council. The state of Texas has a telecommunications project for K-12 mathematics called MathMagic. This program intends to motivate students to use computer technology while increasing problem solving strategies and communication skills. The participating schools are paired up with another school to form a team. Mathematics problems are posted electronically to the participating schools and the registered school teams try to solve the problem together by communicating through the computer network. The state of Connecticut has a Co-Teaching Collaboration educational course program aimed at college students who will become high school math teachers. The Co-Teaching program courses are taught together with high school teachers

through course planning and high school class participation to enhance the mathematics instruction experience.

NYSERNet (gopher unix5.nysed.gov) The New York State Education and Research Network is an extensive statewide network that includes about 200 organizations from large research centers and universities to small public libraries and K-12 schools. The purpose of the network is to provide information and computational resources for educational purposes. This gopher provides convenient access to K-12 lesson plans from the Big Sky Telegraph system, a network of bulletin board system.

The root menu of the NYSERNet shows the following items.

NYSERNet Root Menu

1. About This Gopher.

2. Conferences, Calls for Papers/

3. Education News/

4. GovernmentInfo/

5. Higher Education

6. Internet Resources/

7. K-12 Resources/

8. Requests for comment or Collaboration/

....

Choosing menu item 7 (K-12 Resources) shows the following items.

1. Arts & Humanities/

2. Disability Resources & Information

3. English-Language Arts/

4. General/

5. Health, PhysEd & Home Ec/

6. Languages Other than English/

7. Math, Science & Technology/

....

Choosing menu item 7 (Math, Science & Technology) and then choosing item 1 (Math) on the next menu shows the following items.

1. Archives around the world/
2. Database of Student Research in Math/
3. Listservs (mailing lists) in Mathematics (from UCSB).
6. Mathematics Lesson Plans (K-12) from Big Sky Telegraph/

....

Choosing item 6 (Mathematics Lesson Plans ...) gives a list of mathematics lesson plans with the corresponding grade level. Some examples of the lesson plan titles are:

1. Descriptions of the Big Sky Telegraph Math Lesson Plans.
2. "Math Shortcuts"; multiplication & division (4-6)

...

9. Cooking; practical application of math (4-6).
10. Cube Coloring Problem, working with exponents (5-12).

...

18. Geometry; Discovery of Pi (5-7).

...

36. Problem solving via Sherlock Holmes and puzzles (7-12).

...

44. Using M&M cookies to work math problems (4-6).

Each lesson plan contains a detailed description of the purpose and the activities designed to teach the stated mathematical concept.

Going back up to the root menu and choosing item 8 (Requests for Comment or Collaboration) gives a list of messages that are posted to the system requesting assistance from people on the network. For example, a recent message from a mathematics teacher at the Blayney High School in New South Wales, Australia requested that other educators around the world fill out a survey on the high school class that they teach. The result of the survey would be shared by the participant if requested. The survey questionnaire was included in the message and it consisted of 24 general questions about the high school and the students.

U.S. DEPARTMENT OF EDUCATION (gopher inet.ed.gov) The U.S. government maintains well organized gopher servers for most of the government agencies. The latest information related to government activies and variety of reports and data can be found in these government gophers. The root menu of the Department of Education gopher is the following.

U.S. Department of Education Root Menu

1. About This Gopher/
2. What's New in This Gopher/
3. Search this Gopher by Key Words (Jughead)/
4. U.S. Department of Education Programs-General Information/
5. Department-wide Initiatives (Goals 2000...)/
6. Educational Research, Improvement, and Statistics (OERI & NCES)/
7. Elementary and Secondary Education (OESE), and Early Childhood/
8. School-to-Work, Vocational and Adult Education (OVAE)
9. Announcements, Bulletins, and Press Releases/
10. U.S. Department of Education Phone Directory <CSO>
12. Educational Software/
13. Other Education Gophers and VERONICA

Searches/

Instead of going through all the menu items in search of information on math education, the Department of Education gopher can be searched using the Jughead program listed as item 3 on the root menu. The Jughead program searches only the local gopher instead of searching all the gophers worldwide. Entering "math education" as the key words, the following items are located on the Department of Education gopher.

1. Ideas for Math and Science.
2. Principles for Teaching Math.
3. 94/08/04: States Get $251 Million for Math-Science Instruction.
4. 94/05/06: Math-Science Guide Book.
5. Eisenhower Regional Consortia for Math and Science.
6. Math and Science Education.
7. First In the World in Science & Math.
...
12. Improving Math & Science Teaching Report.
...
16. Curriculum Reform in Science, Math, & Higher Order Thinking.
...
20. (Alabama - Grade 8) NAEP 1992 Math Assessment (zip). <PC Bin>
21. (Arkansas - Grade 4) NAEP 1992 Math Assessment (zip).. <PC Bin>

....

The first 19 items on the menu are various information regarding math education. Items 20 through 208 are math assessment database for 1992 and 1993 broken down by states and grades 4 and 8. The national math assessment database for grade 12 is also listed on the menu. The files are in compressed format

which has to be downloaded to the users computer and decompressed for use.

Starting again from the root menu, menu items 6 and 7, National Center for Education Statistics (NCES) and Educational Resources Information Center (ERIC), are useful sources for information on education. A small example of the type information that can be found in the NCES section are shown below.

1. National Household Education Survey
2 Survey of Earned Doctorates Awarded in U.S.
3. Recent College Graduate Study
4. International Education Statistics
5. National Assessment of Educational Progress
6. National Longitudinal Studies

...

ERIC is a national information system that can provide access to education related literature. The ERIC databae contains over 750,000 abstracts of documents and journal articles on education research and practice. The ERIC database also contains retrieval articles on education. Within ERIC, AskERIC (Educational Resources Information Center) is a good resource for accessing information about education. The ERIC database can be searched online through the gopher server.

III. World Wide Web Resources

Although the gopher server system has made searching the Internet easier than ever before, even more significant improvement has been achieved with the World Wide Web (WWW) protocol. The information is made even more easier to search by using the hypertext key words embedded in the text. The information can be accessed by pointing

at the words in the text using a pointing device such as a mouse and clicking instead of going through a menu system. Also, the Mosaic program running on a graphic system such as the Windows system allows the retrieval and simultaneous viewing of text and images. The added capability to view text and images simulataneously has made the Internet even more useful as a source of information. The use of WWW protocol will increase rapidly as more WWW servers become available. Some WWW servers related to mathematics education that are currently available are as follows.

1. US Educational Resources Information Center
2. University of Kansas Explorer project
3. Australian National University Hypermedia Educational Resources
4. Scholastic Internet Center
5. Educational Technology
6. Educational Online Source

These servers can be found under the heading of educational resources.

SUMMARY

This study has shown that Internet is a valuable resource for mathematics education for information and communication. Internet contains wide range of information related to teaching mathematics at all grade levels including college. Currently, almost all of the information regarding mathematics education is from the U.S. but information from outside the U.S. is expected to grow as number of Internet users outside the U.S. grows. The potential to communicate with mathematics

educators around the world and with students around the world also makes Internet a powerful tool for mathematics education and mathematics education research.

Here are some ways that Internet can be used in assisting mathematics education.

1. Library – information resource
2. News Room – keep up to date on the latest news and discussion regarding math education
3. Meeting Room – forum for questions and discussions
4. Mail Room – direct communication with educators, researchers, administrators, teachers and students around the world
5. Laboratory – with students and teachers and researchers who can fill out surveys, take tests and etc.
6. Publishing Room – a quick and easy way to release information to the rest of the world and get immediate feedbacks

REFERENCES

Harris, J. (1993). Networked information location tools: gophers, veronica, archie, an dJughead. The Computing Teacher, (Aug/Sept),. 16.

Randall, N. (1994). Teach yourself the internet: around the world in 21 days. SAMS Publishing.

Schatz, B. R. and Hardin, J. B. (1994). NCSA mosaic and the world wide web: global hypermedia protocols for the internet. Science, 265, 895.

Williams, M. E. (1994). The Internet: Implications for the information industry and database providers. Online & CDROM Review, 18(3), 149.