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**Learning objects
and instructional
technology 1**

The reward of a commitment to learning objects in higher education is rapid growth in the quality and quantity of learning objects that can be used and reused in a variety of ways.

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Information Technology

Newsletter

Object-Oriented Learning?

Kurtis Scaletta, Digital Media Center, <http://dmc.umn.edu>

Learning object

The term “learning object” is used increasingly in discussions of instructional technology systems. However, there is no single agreed-upon meaning. In the broadest definition, a learning object is just about any element, digital or analog, that is used in teaching and learning. In the most specific definition, a learning object conforms to a set of standards known as SCORM, or Sharable Content Object Reference Module, or some other set of standards that specify how learning objects should be structured and delivered.

The practical use of learning objects depends a great deal on the ability to find and use the learning object.

How learning objects affect instructional technology

For the purposes of this article, I will describe three criteria of learning objects that are present in many definitions. These criteria are not meant as a means to evaluate resources — there are many examples of interactive learning which are compelling and pedagogically sound, but which fail to be “true” learning objects by this definition — but to identify important trends in the growth of learning objects and how they affect instructional technology. Furthermore, offering a definition and noting these trends are based on my interests as an instructional multimedia consultant, multimedia developer, and graduate student in education; other people and units within the Office of Information Technology could have different definitions and criteria for learning objects.

First criterion

The first criterion of learning objects is that they are discrete. In this sense, it would be inappropriate to call a Web course a learning object, or a database of images, or a series of interactions. Rather, a learning object would be a single text, image, or interaction.

Second criterion

The second criterion of learning objects is that they are reusable. Images and text can be pulled into various contexts, while interactions, Web page templates, assessments can be easily reproduced and even customized. Ideally, the learning object would work across platforms, browsers, and within course management systems or learning content management systems; the learning object could be scaled up or down to meet the needs of the learner; and the learning object would be accessible to learners with visual, auditory, or motor disabilities.

Dependent criteria

These first two criteria of learning objects are dependent on each other. The purpose of storing learning content (be it media elements, text, interactions, etc.) as discrete learning objects is to support reusability. In one application, the appropriate learning objects may be delivered dynamically to a user through a learning content manage-

ment system (LCMS), where either the learner selects small learning sessions, the trainer specifies a learning path based on skills and needs, or the LCMS delivers learning based on the learner's performance. In another application, images and interactions are shared among faculty, chosen or customized by faculty to integrate into courses. In this application, learning objects are shared through "repositories," such as MERLOT <<http://www.merlot.org>> or can be shared among peer groups using enterprise course management systems like WebCT Vista.

Third criteria

Whether delivered through an LCMS or stored in a repository, the practical use of these learning objects depends a great deal on the ability to find and use the learning object, which leads to the third criteria of learning objects: the presence of "metadata," or information about the object that is stored in a database. Like the learning objects themselves, this metadata can be proprietary, specific to one LCMS or repository, or align with incipient national specifications.

An example

An example might serve to show both the rewards and potential issues of learning objects. The University of

Figure 1:
an example
from the
University
of Iowa
Website



Iowa departments of Academic Technologies, Spanish and Portuguese, and Speech Pathology and Audiology have collaborated on a Website on Phonetics. The Website (Figure 1) includes beautifully done Flash animations illustrating articulated sounds of English and Spanish. Learners can hear a sound and see how the sound is formed in real time or step-by-step. The complete interface allows learners to associate the sound with the phonetic symbol, linguistic description, and play an accompanying video of a person making the sound.

If the animation is inseparable from its context, not reusable, and not coded with metadata, it is useful only within this Website. It is a very nice learning interaction and serves the needs of the instructors and learners who use the site, but it is not a learning object.

Extensible uses of learning objects

Consider the extensible use of the animation if it were a true learning object.

- If it were a **discrete** animation that could be used in other contexts, some educators might upload animations into their own course Websites, while others might integrate the animations into learning content management systems where students could be directed to specific sounds they need to study.
- If the item is independent of the context, it could be **reused** in various educational settings: languages, linguistics, audiology, speech therapy, and so on. If the animations were available as open-source files, developers could more quickly alter copies of the animations to reproduce other sounds, add accessibility features, or integrate the animations into other multimedia projects without starting from scratch.
- If stored in a repository and appropriately coded with **metadata**, the animations could be located and used by other educators and developers in a variety of ways. These adaptations could be stored in the same repository, with full credit to the original authors and co-developer information. In this way, multimedia production would resemble other sorts of academic production, where educators build on one another's work.

A series of events

Instructors and developers can think of learning as a series of events.

- Which events of instruction can be made from existing learning objects?
- Which can be developed as learning objects, with attention to reusability?
- What are standards and specifications that should be met?
- How can the learning objects be shared with others?
- How can people locating resources in a repository determine the quality of the learning object and its impact on learning?

Learning objects in higher education

The concept of learning objects in higher education entails a commitment to understanding the standards and specifications for compatibility and a willingness to share work among a community of practitioners. The reward of participation is rapid growth in both the quality and quantity of learning objects that can be used and reused in a variety of ways.

Following are some of the best resources on the Web for learning more about learning objects.

- A nicely designed site that answers questions about learning objects:
<http://adlcolab.uwsa.edu/lo/index.htm>
- A Website devoted to understanding learning objects and how they affect teaching and learning; it includes an online book by notable authors such as M. David Merrill: <http://www.reusability.org>
- Extensive information on SCORM, a set of proposed standards for learning objects:
<http://www.adlnet.org/>
- The best known repository of learning objects:
<http://www.merlot.org/>
- A few samples of Flash learning objects developed by the author for projects at the University of Minnesota: <http://www.tc.umn.edu/~kurtis/flash>

Showcase: Norwegian Language Course

The Technology Enhanced Learning (TEL) Seminar Series features faculty presentations and seminars focused on educational technology topics. You are invited to attend these events free of charge.

On February 19, Marte Hult, a DMC Faculty Fellow in the Department of Scandinavian, German, and Dutch, showcased her Norwegian language course which is delivered in an online environment.

This TEL seminar is available as a video presentation: <http://dmc.umn.edu/services/series/spring03.shtml#february19>

In the course, Hult provides students with a CD ROM that includes textual content, multimedia files, and interactive exercises. She uses WebCT to create a “live” component where students can explore authentic cultural sites, participate in chat and discussion groups, receive assignments, and take quizzes.

In her presentation, Marte provided looks at the CD ROM and WebCT site and explained the process for developing an online language course.

As this online Norwegian course evolves, Hult is collecting feedback from students for future implemen-

tation. Her principal concerns are that students feel connected to the instructor and to one another, that the online environment is easy to navigate and explore, that the materials are engaging and relevant, and (last but certainly not least) that students learn Norwegian.

Students are enthusiastic

So far students have demonstrated a great deal of enthusiasm, enjoying “anywhere, anytime” availability of the course, and participating regularly in the online live chats and asynchronous discussions. Hult feels strength of stories, rich multimedia, interactive exercises, and connections to real-world resources will continue to motivate students to learn Norwegian.

The “Norte pa Nette” (Norwegian on the Internet) class follows the stories of real people and links to Web resources in Norway.

■ Kurtis Scaletta, Digital Media Center, <http://dmc.umn.edu>

“With the use of the Internet, today’s students of Norwegian learn much more about the modern country, rather than the stereotypical picture.”



Marte Hult recommends

Here are some of the resources Marte Hult recommends to faculty at the University who are interested in developing courseware.

- The OIT University Technology Training Center offers a variety of short courses:
 - <http://training.micro.umn.edu/ShortCourses/>
- The CLA Language Center occasionally offers short workshops on a variety of language learning technology issues:
 - <http://languagecenter.cla.umn.edu>
- The Center for Advanced Research in Language Acquisition (CARLA) is one of the U.S. Department of Education's Title VI National Language Resource Centers. Their website has many resources for developers of courseware:
 - <http://carla.acad.umn.edu>
- Many of the interactive exercises on the CD and WebCT site were developed by using templates at these websites:
 - <http://lang.swarthmore.edu/makers/>
 - <http://trackstar.hprtec.org>



TEL Seminars

Remaining Spring, 2003 Presentations

April 9

- ✓ Wednesday, April 9, 2003
- ✓ Noon to 1:30 p.m.
- ✓ 165 Peik Hall

- Kevin L. Smith; The Health Maintenance Examination: An Interactive Case-Based Design

April 23

- ✓ Wednesday, April 23, 2003
- ✓ Noon to 1:30 p.m.
- ✓ 155 Peters Hall

- Lindsay Shen, James Boyd-Brent, Marilee DesLauriers; Design for Health: A Digital Exploration of the Connections between Design and Well-Being.

May 7

- ✓ Wednesday, May 7, 2003
- ✓ Noon to 1:30 p.m.
- ✓ 6-101 Basic Sciences/Biomedical Engineering

- Kim-Sue R. S. Tudor, Nancy A. Brunzel; Clinical Laboratory Science CD-ROM Tutorial Library: Urine and Body Fluid Tutorial, Immunohematology Tutorial.

- Engin Sungur; Using Instructional Technology for a Reason.

More information

To learn more about the program and to see the series calendar, visit the TEL Seminar Series page on the DMC Website:

<http://dmc.umn.edu/services/seminar-series.shtml>

High 5s from the University Libraries

Nancy Herther, University Libraries, <http://www.lib.umn.edu>

The amount of information being produced every day is astounding. Keeping up-to-date with the information that *you* need to keep ahead in your field can be a daunting task.

The University Libraries offer a wide variety of services and resources of particular interest to doctoral students, faculty, and other researchers here on campus. Here is a quick look at ten that are most critical for you.

Research services

What are the top five research services available for researchers at the University?

1. Workshops, web pages and other options to help you become more independent and self-assured in your research.

The Libraries have experienced bibliographers, subject selectors, and reference specialists working in virtually any area of research you may need. These specialists are responsible for collection development and management, working with students and faculty on secondary research, and teaching in areas related to library resources and secondary research methods.

If you don't know who your specialist is, check out this website for a full listing:
<http://www.lib.umn.edu/about/selector.phtml>

These experts offer many important services in person and over the web. Libraries' staff have created hundreds of helpful web pages, literature guides, research tutorials, and other important aids which are available throughout the various sections of the Libraries' web page. Feel free to contact one of our staff. We will be happy to arrange a personal tour of our resources and services for you at your convenience.

2. Local library services. In a hurry? Maybe the Libraries can help with your research.

Want to check out a book that's in the University Libraries but located on another campus? Need an article that wasn't on the periodical shelf when you last stopped in the library. LUMINA to U provides access to library materials for current University of Minnesota, Twin Cities faculty, staff, and students. LUMINA to U staff will check out books or photocopy articles from the U of M Libraries' collections. Because of the costs involved, there are fees for many of the services. For full details, check out this website:
<https://www.lib.umn.edu/ordering/lumina.phtml>

3. Interlibrary Loans — from across the city or across the world — at your fingertips!

Faculty, staff, and current students of the Twin Cities campus can use our interlibrary loan service for free delivery of materials not held by the Libraries. Books, dissertations, and articles can be requested in many ways:

- Via e-mail to our main ILL (Interlibrary Loans) office in Wilson at: willsill@tc.umn.edu
- Use a web form at: <https://www.lib.umn.edu/ordering/ill.phtml>
- Without leaving the database, use the order/request feature within WorldCat/FirstSearch!
- While in RLIN/Eureka, use their order function, also without leaving the database!
- From the CIC/Big 10 (VEL) catalog, accessible from the Catalogs option from the *BooksAndMore* option of the Libraries' web page:
<http://www.lib.umn.edu/books/>

4. Personalized, specialized reference assistance.

All campus libraries have established, regular reference hours for one-on-one consultation. Subject specialists are also available for individualized consultation on an appointment basis. For a full listing of the subject specialists available for consultation, check out this listing: <http://www.lib.umn.edu/about/selector.phtml>

These experts can help you with your own research or help plan secondary research assignments or even arrange for special lectures, hands-on workshops, or demonstrations for your classes or your colleagues.

Our reference services include such innovations as e-mail, Chat, and other types of reference assistance. For more information on these services, check out this website: <http://infopoint.lib.umn.edu/>

5. Workshops on a variety of important topics.

- *Need to set up an AutoAlert service with Current Contents?*
- *Planning to do research with the citation indexes?*
- *Looking for ways to improve your web searching or use of MNCAT?*

The Libraries sponsor a wide variety of free workshops and special programs throughout the calendar year to help you better use key resources or better manage your research tools. For a complete listing of workshops available, bookmark this site and check it out often: <http://www.lib.umn.edu/research/index.phtml#workshops>

Academic resources

What are the five most essential databases for researchers and academics?

1. Lexis Nexis Academic and its companion databases — *Lexis Nexis Statistical*, and *Lexis Nexis Congressional* — are essential databases providing huge stores of information and data.

Information overload is very costly

“Over the last few years, Internet, Intranet and similar developments have brought an unmanageable amount of information to the average employee. Gartner estimates that companies will invest more than \$30 billion on Information Management systems, including collaboration, business intelligence and document management, in 2002.”

Source

“Gartner Says 90 Percent of Businesses Suffer from Information Overload,” May 3, 2002

http://www.dataquest.com/press_gartner/quickstats/techTrends.html

Lexis Nexis Academic provides access to the full-text of many key worldwide newspapers, wire service reports from around the world, news transcripts from major Western news outlets, as well as access to the *Chronicle of Higher Education* and key full-text access to many core legal publications. Trends on research funding and information on what’s happening here or elsewhere in the world of academe are readily available.

Lexis Nexis Congressional provides indexes to congressional information going back to 1789, when Congress held its first sessions.

Lexis Nexis Statistical not only allows for very sophisticated searching, but the records generally include the actual statistical charts themselves, many downloadable in Excel formats. What more could you ask for?

2. Digital Dissertations

With over 1.6 million entries, the *Digital Dissertations* database is the one central, authoritative source for information about doctoral dissertations

and master's theses. The database provides information on dissertations and master's theses from the United States, Canada, and the Pacific Rim.

Digital Dissertations provides citations only for dissertations and theses accepted from 1861 to 1980. Citations for dissertations published from 1980 forward also include 350-word abstracts written by the author. Citations for master's theses from 1988 forward include 150-word abstracts.

The database includes free twenty-four page previews (in pdf-format) of dissertations and theses submitted from 1997 forward. Dissertations from the University of Minnesota since 1997 are sometimes included full-text in the database.

If you want a good summary of the current state-of-the-art for some topic or issue, a dissertation may be a good starting point.

3. Citation Indexes

This is the stuff of true academic research! If you have never done a citation search of your own research or of some key research papers in your field, this is the database you need. (Tenure is an excellent time to get into this database.)

The three citation indexes — *Arts & Humanities Citation Index*, *Social Science Citation Index* and *Science Citation Index Expanded* — are essential tools to look at how ideas evolve, develop, and spread out in the literature. These amazing indexes allow you to search through the references and footnotes of articles to find out who is citing who and how new research and ideas are integrated into existing literature and theory.

4. Current Contents

Good for general searching, this database is best used as a time-saving way to keep up in your field; it lets you browse journal tables of contents from your office or home. The database features sophisticated software that lets you set up automatic searches to be run on a scheduled basis with results sent to your e-mail account.

For information on how to set up a search for automatic updates, see this website: <http://www.biomed.lib.umn.edu/inst/lclasshandout.html>

5. ERIC and Education FullText

The *ERIC* database, along with *Education Abstracts/Education Full Text*, form the core of online databases covering the field in education. Distance education, web integration, teaching skills, and educational administration are all covered in these indexes.

If you want to keep up with trends in higher education, innovative uses of the web or new teaching techniques, you will want to start here.

Don't forget the key databases in your field

The Libraries have over 200 databases available for free searching by current students, staff, and faculty of the University of Minnesota, Twin Cities campus. Among those you will find databases that are essential to your field and others that might be worth an occasional look because they tangentially cover trends related to your research. Invest the time to get to know these databases; it will be one of the best investments you can make.



Most of all, the Libraries are people

The University Libraries have many key resources available through our web pages and in our libraries. Perhaps most importantly, we also have a staff of experts in every key area that you need to know. We have online searchers with as much as 30 years of searching experience; experienced subject specialists, some with doctorates in their fields and all with a good background in their subject fields; award-winning researchers and writers; talented instructors; and more. This is, perhaps, the finest and most essential tool the Libraries offers you: our staff.

Check out our website. Call us. We are happy to talk with you anytime and help in any way that we can.

■ Communications about this column should be addressed to: Nancy K. Herther, Social Sciences Bibliographer, 170b Wilson Library, West Bank; n-hert@umn.edu; 612-624-2020.

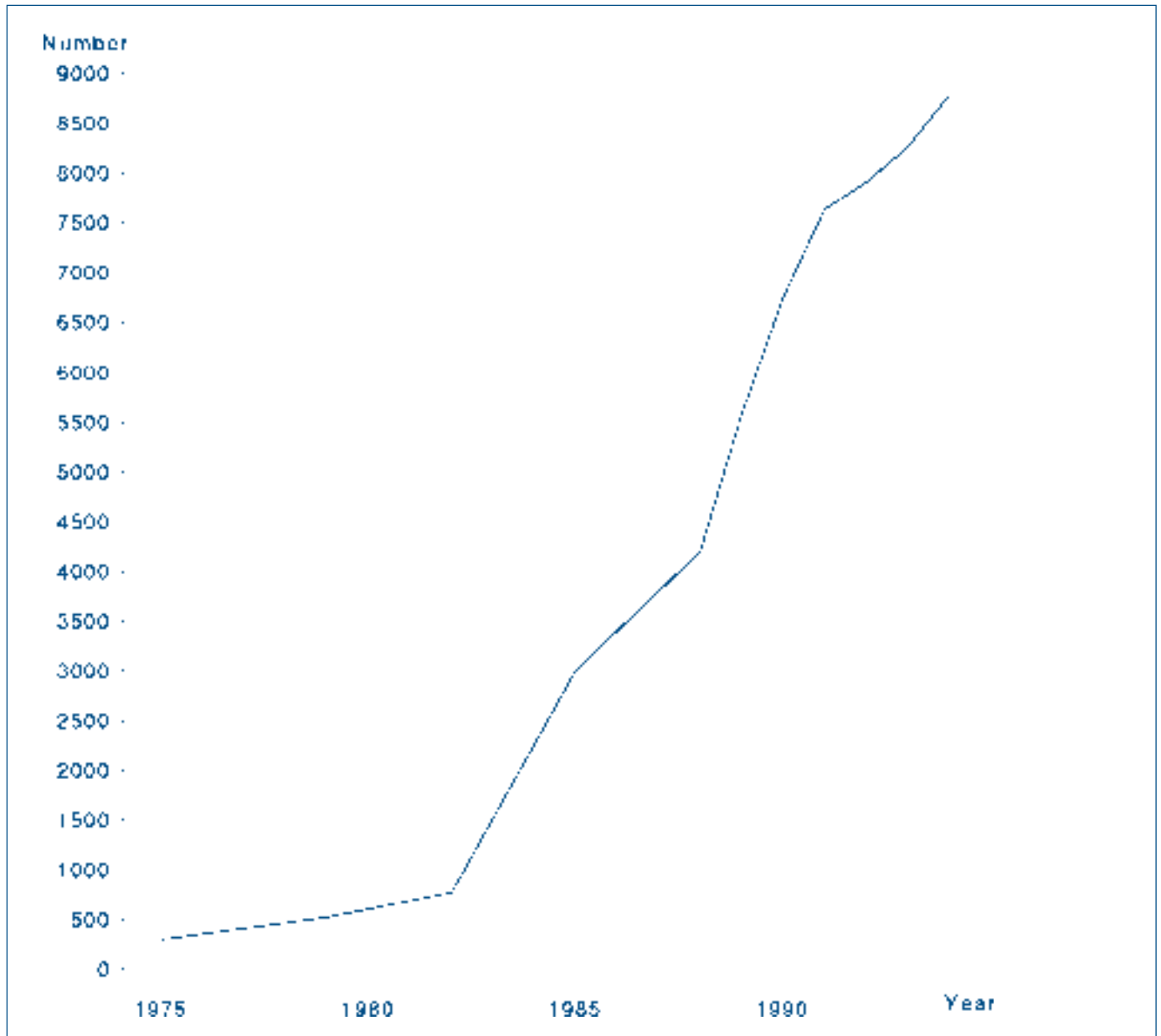
How Much Information Is There?

“The world produces between 1 and 2 exabytes of unique information per year, which is roughly 250 megabytes for every man, woman, and child on earth. An exabyte is a billion gigabytes, or 10^{18} bytes.

Printed documents of all kinds comprise only .003% of the total. Magnetic storage is by far the largest medium for storing information and is the most rapidly growing, with shipped hard drive capacity doubling every year. Magnetic storage is rapidly becoming the universal medium for information storage.”

From the “How Much Information?” School of Information Management & Systems, University of California, Berkeley. Report available online at: <http://www.sims.berkeley.edu/research/projects/how-much-info/summary.html>

Figure 1: available electronic databases



Source of graph in Figure 1: “The Seven Ages of Information Retrieval,” by Michael Lesk on the Web at: <http://lesk.com/mlesk/ages/ages.html>



Mirror, mirror on the wall, who can help me most of all?

Every day we are asked by various people in our lives to do things for them. It may be our boss, our co-worker, a friend, or family member. At times it can seem like our lives are spent just dealing with the demands of others.

As we go along we tend to develop habits as to how we will deal with these demands. It may become our habit to just do whatever we are asked; or we may choose to only do those things we like to do, or we may just do whatever we feel we can do. Our habits become the driving force in our lives while we are in the passenger seat.

Once we have this kind of habit, if something goes wrong, such as discovering we're lost or going down the wrong street, who do we blame? Not ourselves; we blame the driver! We become passive while we blame those around us for our problems. We need to reverse this and discover how we can put ourselves back in the driver seat.

We need to be like the wicked queen in the children's fairy tale who asks the mirror for help. Only our question should be: "mirror, mirror on the wall, who can help me most of all?" The mirror will definitely tell you that *you* are the one who can help *you* the most!

We all need to look in the mirror to evaluate ourselves and to see if we really are who we think we are. Other people only see what we

present to them. If we don't look in the mirror, we may forget who we really are. We may not realize that what others are seeing is not what we think. Looking in the mirror and evaluating ourselves is the key. It's the key to helping ourselves; and it's the key to putting us back in the driver seat.

Those people who accomplish the most in life are the ones who evaluate themselves. They don't wait for others to tell them what they need or what they are missing. They evaluate themselves and then work on improving themselves.

If you haven't looked in the mirror for awhile, maybe its time for a check up. Especially if you feel that others haven't recognized your talent, rewarded you, or given you the opportunities you feel you deserve. Maybe they're not seeing in you what you think they should be seeing.

Look in the mirror and be honest with yourself. Are you really who you think you are?

If you want others to help you, you must be willing to help yourself first. It won't work if you're just waiting for others to help you; its time to get in the drivers seat again. Look in the mirror and see who you are; it's the short cut to helping yourself.

■ Shih-Pau Yen, Academic and Distributed Computing Services and Networking and Telecommunications Services

*The views expressed in this column are the personal opinion of the author
and not the official view of the Office of Information Technology.*



Need to Purchase Software?

University Computer Services (UCS) now provides onsite software sales for University of Minnesota students, faculty, staff, and departments at UCS's East Bank campus location.

UCS continues the software service formerly provided by the Computer Bookstore retail operation.

More information

- ✓ see the UCS Website at <http://www.umn.edu/ucs/>
- ✓ call UCS at 612-624-4800

More campus options

As well as the UCS location, there are other software purchase options available for University of Minnesota students, faculty, staff, and departments. All of the software options are also listed on the UCS website: <http://www.umn.edu/ucs/>.

- UCS (University Computer Services)*
- Techmart*
- Software License Agreements*
- Microsoft Academic Student Select*
- Microsoft Software Program (for departments)*

- ✓ Techmart software sales: <http://techmart.umn.edu/>
- ✓ U of M software license agreements: <http://www.umn.edu/adcs/site/>

See UCS website for details: <http://www.umn.edu/ucs/>

- ✓ Student option: Microsoft Academic Student Select software for students
- ✓ Department option: Microsoft Software Programs for U of M departments

■ Renee Rivers, University Computer Services, <http://www.umn.edu/ucs/>

▼ Help

Phone: Area Code = 612

Computer Misuse or Abuse (also see Procedure 2.8.1.1)

- Emergency Network Help Line 625-0006
- Non-emergency, e.g., spamming: abuse@umn.edu

1-HELP •24/7 unless otherwise noted 612-301-4357

Dial 1-HELP. Listen to the voice menu list of options.

Press the number of your desired option.

- Technology Help: <http://www.umn.edu/adcs/help>

■ Passwords: new and forgotten ones

■ CCO Central systems, PeopleSoft

- by e-mail: x-help@umn.edu

■ Internet, Email, Microcomputers

- call-in Monday–Thursday • 8 am–11 pm
- call-in Friday • 8 am–5 pm
- call-in Saturday • noon–5 pm
- call-in Sunday • 5 pm–11 pm

• walk-in 8 am–5 pm, M–F:

152 Shepherd Labs; 93 Blegen Hall; 50 Coffey Hall

- by e-mail: help@umn.edu

■ Networking and Telecommunications Services: NTS

- by e-mail: help@umn.edu

▼ Dial-in Computer Access

Internet/PPP: up to 53kps if v.90 612-627-4250
(56k K-flex, Flex56, X.2 protocols are unsupported)

▼ Quick Guide

Modem Usage (current activity on your account)

<http://www.nts.umn.edu/services/modemusage.html>

Internet/Email account management

<http://www.umn.edu/validate>

MNCAT/LUMINA (Library) – <http://www.lib.umn.edu>

Office of Information Technology

<http://www.umn.edu/oit>

One Stop Services – <http://onestop.umn.edu>

Techmart – <http://www.techmart.umn.edu>

Technology Training Center

<http://www.umn.edu/adcs/info/training.html>

UM News Servers – news.tc.umn.edu, news.umn.edu

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Threats, UM Police Department 911 on campus

- off campus 624-3550

Computer Accommodation Program – voice/tty... 626-0365

U Computer Services/Computer Repair Serv 624-4800

Statistical Software Support:

- including SAS and SPSS 624-3330

Associate Vice President and

Chief Information Officer, Steve Cawley 612-625-8855

Newsletter subscription information and archives at <http://www.umn.edu/oit/newsletter>

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Rec# label trivia for Twin Cities campus addresses: 1st # is Rec#, 2nd # is the Campus Mail delivery code, <http://umn.edu/lookup>

Apr. 2003 [pantone295,1205]

Add

Delete/Cancel *

Change Name *

Change Address *

Change Other *

* If you cancel or change a campus address, please tell us the Rec#. Tear off the end page and send the entire mailing label to us. Or send email to: oitns1tr@umn.edu

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