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**Instructional Design and Formative Evaluation
of a Module of
an Introductory-level Guide to the Internet**

Barbara Cree

A Thesis Equivalent

in

The Department

of

Education

Presented in Partial Fulfillment of the Requirements
for the Degree of Master of Arts
(Educational Technology)

at

Concordia University
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ABSTRACT

Instructional Design and Formative Evaluation of a Module of an Introductory-level Guide to the Internet

Barbara Cree

The aim of this thesis-equivalent was to produce the first module of a guide that would introduce Concordia University staff and faculty to the Internet from the context of their working environment. After determining that there was a pressing need for such a guide, it was decided that the target audience would be Macintosh users who are directly connected to the Concordia backbone network.

The development of this module was based on research and theory from the following areas of instructional design and cognitive science: print-based instruction (including use of graphics), instructional design principles, and cognitive strategies. Specific consideration was given to developing the instruction for a very diverse "general" audience, which includes users who are starting at various beginner levels. The content of the guide and its sequence was determined from personal experience, interviews with experts, and electronic communication with trainers in the field.

For the formative evaluation, qualitative data was first collected from two subject matter experts and changes were made according to their suggestions and corrections. Additional qualitative data was then collected from one subject who tested the procedural sections of a draft version of the instruction. Lastly, a small group review included the completion of a short questionnaire and an interview. Response to the module was quite positive. However, field study of the final version over a six month period would be necessary in order to obtain more conclusive results.

With much gratitude, to
my parents, Marc, and Dennis.

Thanks for your support.

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Chapter 1: Introduction

The Internet, or “information superhighway” as it is commonly referred to, is infiltrating work and home environments with an insistence that is impossible to ignore. At universities, in particular, the advantages of using Internet services are becoming apparent in the areas of instruction, research, and administration. Among the many benefits of using Internet services is: the ability to exchange information in the form of e-mail, mailing lists, and newsgroups, to transfer files to colleagues, and to remotely to access libraries and archives containing thousands of documents. An obvious consequence to the rapidly accelerating and expanding presence of the Internet, however, is a huge need to quickly educate people about how they can become part of this “cyberworld” and effectively integrate the many useful network services into their work environment.

1.1 Statement of the problem

At Concordia, as data communication experts carry out the steady installation of cables connecting departments across campus to the Concordia backbone network, members of the University community are increasingly seeking help in getting started using Internet tools and services. This was revealed as the Computing Services consulting resources became more and more taxed, via the Help Line, with calls from beginners wanting to get started “on the nets.” My experience of spending 1 day per week on the Computing Services Help Line revealed the fact that approximately 80 percent of Help Line requests were Internet-related questions. It became very evident that there was a significant need for effective Internet instruction; particularly at the beginner level. Further analysis of the problem would supply the information needed for the development of more focused objectives that addressed institutional and audience needs.

1.2 Analysis of the problem

The following aspects of the main problem were examined before decisions were made regarding the target audience, main objectives, and content of the instruction.

1.2.1 Complex nature of the Internet

Among other reasons, access routes to Internet services vary widely depending on what type of computing platform a user works on and what type of connection the user is making (dial-up or direct), etc. This creates the dilemma of the existence of many different interfaces for accessing the services available. Adding to the complexity is the huge and varied amount of services available on the networks. These factors, accompanied by the difficulties new users experience when trying to transfer files across various types of networks to various types of platforms, make the Internet not especially accommodating for beginners.

It is therefore necessary to introduce a few basic underlying concepts to new users in a simplified way that shows the relationships between the concepts and how they relate to the user's own environment. Although there has been, in the last two years, a dizzying proliferation of introductory-level Internet guides, none were available that could introduce the Concordia community to this complex Internet maze from the context of their own working environment.

Personal discussions, via the Help Line, with individuals trying to get started on the Internet by reading externally produced introductory guides revealed much frustration, since the users were not aware of how much of the instruction and information related to their own networked environment. There was clearly a need for introductory-level Internet instruction presented from a Concordia perspective.

1.2.2 Delivery system considerations

Although it was acknowledged that formal Internet training programs were necessary, funds for a training center were not yet available. It was decided that a comprehensive introductory guide in print form would serve as a useful reference tool for those starting out on the Internet, and would compliment any training courses that would be made available in the future. Also, it was safe to assume that in a user community of such a large size, there would exist some computer users that prefer self-instruction at a learner-controlled pace. Therefore, a print-based guide would suit the needs of these people. Eventually, having the guide *and* training courses would provide people with a choice of avenues for learning about the Internet.

1.2.3. Hardware and software related matters

The major aspect of hardware and software factors that emerged was the problem of varied computing platforms being used on campus (ex. VAX/VMS, UNIX, PC, Macintosh). Accessing Internet services requires the use of varied software packages that are different for each platform. Also, connecting to the backbone could be done in many ways, depending on the hardware and software a particular department was using.

The decision to select the Macintosh platform for this instruction was based on the fact that many departments in the University have recently, or are in the process of, converting to Macintosh platform. Another reason is that the designer of this guide has used Macintosh Internet software for three years, and could be used as a subject matter expert for much of the instruction.

1.2.4 Diverse instructional expectations

The Concordia community consists of a diverse group of computer users, consisting of faculty, staff, and students. This variation of audience type presents a problem when instruction is being planned. For example, the role of the Internet in a faculty member's day could be quite different from that of a student. Since it was impossible to address the needs of all Concordia staff, faculty and students, the target audience had to be narrowed down to particular group. The decision was made to select faculty and staff as the audience for this particular guide.

1.3 Profile of target audience

The results of the above problem analysis led to the decision that the target audience for this guide would consist of faculty and staff who are Macintosh users and who have little or no experience at all using networked communication or any of the other Internet services available.

Since the type of the audience, and the media selected made it impractical to perform pretests for determining entry levels, it was decided that the instruction would start at the most basic level, and therefore would address users who had no experience at all using the Internet. It was inevitable that portions of the material would be redundant for some users, but necessary for others.

A definite prerequisite to using the guide was basic Macintosh literacy. It was essential that users were familiar with using a mouse and navigating the Macintosh menu system. This would be clearly stated as an assumption at the beginning of the guide. As well, this target audience excluded those Macintosh users who were not directly connected to the Internet (in other words, they had to dial-in to use the Internet services). These

users would have to use VAX or UNIX based interfaces to use the Internet services available. Instruction on these services would be addressed in another guide that focused on those particular computing platforms.

1.4 Goals of the instructional design

On the basis of the above problem analysis and target audience profile, it was determined that the delivery system was to be an introductory-level, self-instructional, print-based guide, directed at Concordia faculty and staff Macintosh users. The guide would provide an overview of the Internet; presenting network concepts, principles, and basic procedures in a simplistic way, and would provide references to resources that would bring them to higher level skills in the areas they found most useful to their work.

The three main goals that drove the development of the guide were:

1. that the users would know how to get connected to the Concordia backbone and how to acquire the items necessary for getting started on the Internet
2. that the users would gain a basic understanding of networking, so that they would have a knowledge base on which to build Internet skills
3. that the users would learn how to perform basic Internet-related tasks in the areas of remote login, file transfer, communicating (news, mailing lists, and e-mail), and World Wide Web navigation.

The instructional design presented as this thesis-equivalent project is Module I of this guide.

Chapter 2: Review of the literature

2.1 Review method

This literature review was based on a format suggested by Osguthorpe (1985), which breaks the review down into 3 main areas; an instructional materials review, a content research review, and instructional theory review. The chart below illustrates how these categories apply to the literature review conducted for this particular instructional design.

Category of review	Focus	Main questions asked
Instructional materials review	Characteristics of existing instructional products which have goals similar to those in this instructional design	What Internet guides exist? Does a Introduction to the Internet guide exist at another university that could be used as a model for this design?
Content research review	Research and expert advice on introductory-level Internet instruction	What findings be used in the development process of this instruction?
Instructional theory review	<p>A Analysis of general principles of ID (includes formative evaluation). In this case: Elaboration theory and Keller's Motivational Theory.</p> <p>B Theory and research related to a particular category of learning. In this case: Instructional strategies related to concepts, principles and procedures.</p> <p>C Principles associated with a particular delivery system: In this case: print-based delivery systems.</p>	<p>What parts of what ID theories would best apply to this instructional design?</p> <p>What has proven to be the best way to present, teach concepts? What technical writing principles should be applied?</p> <p>What research findings concerning the use of graphics and text should be applied to this print-based design?</p>

As the above chart indicates, this review ties together research findings and theory from the areas of print-based media research, introductory-level instruction, Internet training, technical writing, the Elaboration Theory and Keller's Motivational Theory. These categories were chosen because they are relevant to the production and evaluation of a guide of this nature. How the information drawn from this literature was used is discussed in Chapter 3, "Development of the Instruction."

2.2. Instructional materials review

The purpose of this review was to gather information about the characteristics of existing instructional products which have goals similar to those of the instructional system being developed. In order to obtain such information, some type of instructional materials search had to be conducted.

Osguthorpe (1985) recommends the "grapevine technique", which consists of telephone interviews with professionals who are involved in the the development of some type of instruction related to your topic. These individuals can share their own experiences, as well as point you to others they know of who are doing similar work. Fortunately today, the existence of electronic communication provides an ideal avenue for finding out what has and hasn't been developed or researched in a particular subject area. The emergence of mailing lists (e-mail based discussion groups) and newsgroups, provides professionals with an inexpensive, quick way to get information from others in their field. For example, by joining the mailing lists called NETTRAIN, one can easily communicate with Internet trainers and educators all over the world.

A thorough search for print-based introductory guides to the Internet, through library searches and contact with professionals via the Internet, did not produce a great deal of

material. The chart below shows the results of the search:

Search target	Results	Value
Introductory level guides to using the Internet	Many available. Mostly commercial. Some free - available on the Internet.	Used some basic information for content. Used as references for further learning. Examined presentation of
Introductory guides re Internet - Macintosh platform	Four - commercial.	As above
Introductory guides to Internet - university specific	Six - different platforms	Examined models and inquired re evaluation methods. No evaluation was conducted.
Introductory guides to Internet - university specific - Macintosh platform	None	

2.3 Content research review

"The chief challenge in conducting a content research review is deciding how broad to take it" (Osguthorpe, 1994, p. 20). The boundaries of this content research review was restricted to the areas of introductory Internet instruction (used for training and for print-based guides). Unfortunately, there was little actual research to be found, due to the relatively recent occurrence of Internet popularity. Therefore, through membership in a mailing list group called NETTRAIN, valuable insight into some of the problems encountered when teaching novices about the Internet provided the largest part of the content research review. Advice from the Internet trainers can be summarized as follows:

- that the trend in Internet instruction was shifting away from presentation of material by service (ex. Telnet, Gopher, FTP etc) and moving towards the presentation of information by use. (ex. communicating, transferring files, etc.)

- that it is essential to provide some information on “netiquette” - the rules of behavior on the Internet. New Internet users, or “newbies” as they are known as, tend to make the same mistakes in their conduct repeatedly when they start out.
- that the use of analogies for topics such as IP addressing has proven to be *very* useful.
- that it is essential to show the *relationships* between the various Internet concepts and services.
- that a balance must be achieved between boring people with too much technical detail, and not providing enough for them to gain the necessary basic understanding of networked services.

2.4 Instructional theory review

2.4.1 General principles of Instructional Design

This review involved the examination of various ID models for the purpose of selecting a model, or elements of a model that could be used to guide the design of this instruction. A belief that theory that is based on views of cognitive functioning would be most appropriate for this type of instruction led to an analysis of the Elaboration Theory of Instruction and Keller’s Motivational Design Theory. Relevant aspects of these theories were highlighted and examined in the belief that they could help provide a learning condition based on contemporary views of cognitive thinking and motivation.

• The Elaboration Theory of Instruction

The Elaboration Theory of Instruction was developed “in response to the need for a prescriptive model of instruction that would organize subject matter in a manner consistent with contemporary views of cognitive functioning” (Merrill, Kelety, & Wilson, 1981,

p. 219). The following elements of the main thought behind Elaboration Theory, believed to be the most relevant for this network-related instruction that consisted of highly inter-related procedures, concepts, and principles, were reviewed:

- **Elaboration Theory and the structure of subject matter**

Elaboration Theory is concerned with prescribing the optimal means for structuring and organizing subject matter (Merrill, Kelety, & Wilson, 1981). The model suggests that subject matter can be classified into three major structural components: concepts, principles and procedures, and that this relational nature of schemata contributes to the rationale for this structural model. "In differentiating between concepts, principles and procedures, and prescribing supporting structures to teach each type of subject matter component, the instruction makes explicit the critical inter-relationships that make up a particular topic" (Merrill and Kenety, 1981, p. 229).

Reigeluth (1987), recommends that a single structure be determined which reflects the instruction's primary focus, and that in all courses, one of these three is more important than the other two. The other two, plus facts, should only be introduced "when they are highly relevant to the particular organizing content ideas that are being presented at each point in the course" (Reigeluth & Stein, 1983, p. 344).

- **Elaboration Theory and the top-down approach**

A main element of the Elaboration Theory is the prescription for a top-down approach to instructional design. Merrill & Kelety (1981), stress that the cognitive theory of the concept of schemata finds its parallel in the Elaboration Model's general to specific sequencing format. "By initiating instruction at a relatively high level of generality, a type of schema is established within the learner which facilitates the assimilation of subsequent, more context-specific material" (p. 229).

- **Elaboration Theory and the simple to complex approach**

Reigeluth (1987) recommends proceeding through the identified structure in a simple to complex fashion, with supporting content added within lessons. The simplest version of a procedure is called the *epitome*. Within lesson sequencing, he recommends presenting the easiest, most familiar, organizing concept first, and to present the underlying principle before its associated procedure.

- **Elaboration Theory and synthesis**

Synthesis, a component of the model, refers to conveying to the learner the major relationships between the ideas (i.e. concepts, procedures, or principles). "This is a critical part of the instructional process in that much of learning involves the integration of isolated concepts into a unified message" (Norman, 1976) (cited in Merrill and Kelety, 1981, p. 219). After speaking with many beginner-level Internet users (via the Help line), it became clear that one of their biggest problems was a lack of understanding of how various the various elements of Internet use were related. Questions such as; "Is the World Wide Web something different than the Internet" or "Is Gopher on a different Internet machine than the Web is?" were common. They had, through word of mouth and through the media, acquired isolated pieces of information in the form of concepts, procedures or principles about the Internet and had no idea how the pieces fit together.

To summarize, Elaboration Theory provides a prescription for an overview oriented, top-down approach to instruction that is divided into concepts, principles and procedures. It also prescribes the use of synthesis (relationships between concepts, principles, and procedures and epitomes (tasks that beginner can perform like an expert).

2.4.2 Theory and research related to learning strategies

A review of theory and research related to the cognitive strategies that were most appropriate for the type of structure of the guide, and the nature of its content, was undertaken. This was particularly important, because having such a large, diverse, target audience made it impractical to pretest to assess student learning habits and capabilities. Strategies sought were those that were known not to produce any highly negative results, and those specific to the “knowns” of this design; that the audience consisted of beginner-level adults who all worked at the same institution, and that the subject matter contained many inter-related concepts, principles, and procedures.

• **Relevance**

“Instructional design shows us what instruction should be like in order to be effective and efficient. Motivational design shows us what instruction should be in order to be interesting and appealing” (Salisbury, Richards & Klein, 1985, p. 9). One of the categories included in Keller’s Motivational Design is *relevance*. After a learner has his attention aroused, he will “question the relevancy of a situation before becoming highly motivated” (Keller, 1983)(cited in Salisbury, Richards & Klein, 1985). Strategies suggested for ensuring relevancy are:

- relating the content of practice items to the student interests and past experiences.
- stating explicitly how the practice relates to future activities of the student.
- providing meaningful alternative methods of practice for students to accomplish a goal.

(Keller, 1983)(cited in Salisbury Richards & Klein, 1985)

- **Use of analogies**

The use of analogies is a method of defining newly introduced information using a context that is already familiar to the learner in one or more ways. Recommended in the Elaboration theory, and Keller Motivation Design theory, are the use of analogies for helping the learner interpret new information in the light of prior knowledge. According to learning theorists, new information will also be better remembered if the learner relates it to prior learning. The use of analogical visuals in instruction is well supported in the research literature (Glick & Holyoak, 1983) (Winn, 1982), (Weisenberg & Bain, 1994).

Many of the Internet trainers who take part in the online discussion group (NETTRAIN) recommend the use of analogies for some Internet concepts, and a glance at the Introductory Internet books in any bookstore quickly reveals a consistent use of analogy for introducing basic concepts and terms. Often the main theme of a guide will be one huge analogy. For instance, surfing the net and using Internet services is often presented as a one lengthy cruise, ride, or drive, through the nets. All are analogical representations of navigation through the "information superhighway" (which is itself the most common analogy used for defining the rather hard to define Internet).

Yet does this mean an instructional designer should feel confident with a heavy use of analogies? Perhaps not. Wiesenberg and Baine (1994) warn that developers must be careful not to overuse any learning strategy, "particularly when the audience is a diverse one." The authors drew this conclusion after analyzing the results of an ATI study designed to produce materials that differently affect the learning outcomes of adult learners with varied levels of visual learning skills. Their results seems to indicate that the analogical pictures may serve both a positive role *and* a negative role (perhaps as distracting stimuli for higher ability subjects in knowledge tasks and for lower ability

subjects in comprehension tasks (Cronback & Snow, 1977; Peck, 1987; Winn, 1982)(cited in Weisenberg & Bain, 1994).

Weisenberg & Bain (1994) stress that an instructional designer should make a careful analysis of both the learners preference and ability to process visual information, their individual profiles of verbal and visual abilities, and the level of complexity of the learning task are all important considerations. Since this is impossible when developing instruction for a wide general audience, one should assume that there may be those in the target audience who could be affected negatively by a strategy, and therefore not overuse it.

• Use of frames

According to West, Farmer, & Wolff, (1991) there are many features of content or disciplines which largely determine the appropriateness of a strategy. One strategy commonly recommended that relates to content are the use of frames. Frames, also known as spatial learning strategy, provide a visual display of large amounts of interrelated information and solve the need for a holistic cognitive structure. The concept of frames was introduced into cognitive science by Minsky (1975) and Winograd (1976) developed it further (West, Farmer, & Wolff, 1991).

Alesandrini (1984) refers to frames as "logical pictures, graphs, schematized charts and diagrams that do not look like the things they represent but are related logically or conceptually"(p. 70). Gagne (1981) said that the key to remembering bodies of knowledge appears to be one of having them organized in such a way that they can be readily retrieved. "The more highly organized this previously acquired information, the easier it is for a student to acquire and retain any given new fact that can be related to this organized structure"(p. 84).

“Cognitive psychologists offer several strategies which are particularly suited to providing a big picture so that students can relatively easily grasp this big picture and fit the detail from the text or other materials into that structure, or mold (West, Farmer, & Wolff, 1981). Elaboration theorists refer to this type of strategy as synthesizers. “The purpose of the synthesizer is to relate and integrate the individual ideas of single type of document (ie. concept, principle, or procedure) in order to teach explicitly the interrelationships among these ideas to the learners” (Van Patten, Chao, & Reigeluth, 1980, p. 460).

According to West, Farmer, & Wolff (1991), research and development efforts conducted with students of a variety of age levels and in several knowledge domains, show that frames, type one, can be a very powerful strategy for “declarative and procedural knowledge” (p. 65). Research findings show that the benefits of using frames are as follows (no negative results were found in studies examined):

- frames supply a coherent structure within which detail may be organized
- frames may display a large number of meaningful connections (vanden Broek and Trabasso, 1986) among details and concepts which are integrated into the whole
- frames may provide hints about what is important in instruction

(West, Farmer, & Wolff, 1991, p. 58)

2.4.3. Principles associated with print-based delivery systems

Any instructional design that involves the use of text must consider research proven techniques for presenting print-based information to readers. Research findings related to the following print-based instructional elements were examined for this product and would be used as general guidelines for the presentation of text and graphics.

- **Content presentation principles**

Although content is the crucial element of the written page, the presentation of the content strongly affects motivation to read the page, understanding of material and ease of use (Hackos, 1995). A review of literature for this element of the guide consisted of an examination of research studies related to print-based instruction, desktop publishing, and technical writing principles. In general, this review revealed long established guidelines for the basic presentation of information in a document.

- **Format and writing standards**

One recommendation that appears in the literature repeatedly, and is often ignored, is the use of sufficient white space. "The use of white space is important in graphic design to provide a resting point for the reader's eyes as they move through the text"(Leshin, Pollock, & Reigeluth, 1992, p. 34.) A summary of a few other accepted standards are:

- white space should be used generously
- no more than three types of fonts should be used
- placement of items such as page numbers, heads, subheads etc. should be consistent throughout the document
- small fonts require larger leading

Since the product being developed involved the writing of many procedures, literature related to technical writing was also examined. Consistency of presentation of material was stressed throughout all technical writing literature read. Standards must be applied in the form of naming conventions, spelling and abbreviation conventions, use of special terminology, emphasis techniques, and procedural terms used. Examples of standards provided useful guidelines that represent current best practices recommended by researchers and industry leaders. Valuable information was found in the form of

sample styleguides and multipass checklists designed by industry leaders that could be used as a starting point for ensuring consistency.

- **Use of graphics**

Two questions were asked in relation to the use of graphics in print instruction. Should graphics be used, and if so, how should they be used. With regards to the usefulness of graphics, Levie & Lentz (1982) proposed that pictures serve the following four functions or outcomes:

- *attentional*: attracting a learners attention
- *affective*: influencing emotions and attitudes
- *cognitive*: facilitating learning by improving information acquisition, comprehension and retention
- *compensatory*: accommodating poor readers

Use of pictures is supported by the research and theory on visual memory (Uuille and Marschark, 1983) and the importance of providing examples when teaching concepts (Tennyson & Park, 1980). The results of a major research effort by Dwyer (1978), that involved over 100 studies involving more than 40,000 adult learners showed that pictures facilitate adult learning. "Dwyer concluded that presenting a realistic visual aid can aid learning if the learning outcome involves requiring the learner to draw or otherwise identify location and interrelations among parts, specific patterns or functions, or content relationships" (Alesandrini, 1984, p. 65).

Some studies have shown that graphics can be positive additions to text that can facilitate learning *for some users*. For example, a review of attribute treatment interaction studies that examine the use of graphics in text-based instruction found that "most researchers have concluded that, other things being equal, people having spatial and

abstract abilities relatively stronger than their verbal abilities benefitted more from visual treatments than they did from exclusively verbal treatments" (Cronback & Snow, 1977) (cited in Weisenberg & Bain, 1994, p. 58).

Although it became clear that graphics are an important for learning enhancement, the question of *how* to use them still remained to be addressed. Analysis of research findings and recommendations from experts in the field of instructional design, desktop publishing, and technical writing, produced some valuable guidelines for the use of graphics.

• Effective use of graphics

A model designed by Goldsmith (1993) provides an effective guideline for the use of graphic illustration. This model consists of twelve elements formed by the interaction of four visual factors (based on learning theory) and three communication factors (based on communication theory). Goldsmith's model was developed as a result of a thorough review of the research literature in the fields of education and psychology (Weisenberg & Baine, 1994). Four elements relevant to this design are:

1. *Semantic unity*: Each image is given enough distinctive features to allow learners to recognize it.
 2. *Syntactic location*: Learners are assisted in perceiving depth by using texture gradients, figural elevation and overlap, converging lines and shading.
 3. *Syntactic text parallels* (refers to the spatial and temporal relationship between text and image): If the picture contains the same information as text, the picture is presented first.
 4. *Semantic text parallels*; relates to the matching of text and image by textual labels where appropriate; use exactly the same words in both the text and the images.
- (Goldsmith, 1993) (cited in Weisenberg & Baine, 1994)

Although Goldsmith recommends that each image is given enough distinctive features to allow learners to recognize it, excessive detail and realism in graphics is generally not recommended. Research studies have shown that these types of graphics are not only more difficult to process and learn, but can distract the learner from what is important to know (Leshin, Pollock, & Reigeluth, 1992, p. 282).

Also, the same consistency demanded for the elements of text on a page must be applied to use of graphics. Hackos (1995) stresses that an illustration style must be established when producing a user guide. Line drawings should not contain different line weights, lettering, perspective, treatment of shading etc. She suggests that a style be established that is appropriate for the publications type and meets the audience needs.

- **Principles of technical communication**

In order to measure the quality of a user guide, Hackos (1995) recommends that you must first consider how your audience identifies quality. Based on many studies of audience needs for information, technical communicators have identified user quality requirements as follows:

- Technical accuracy (factually correct information).
- Information boundaries. "Endlessly complete explanations of nice-to-know details interfere with their ability to do the simplest steps."
- Easily accessible information. Ex. well-organized table of contents.
- Easily understood information that is written appropriately for their levels of previous knowledge and experience.
- Well illustrated; useful illustrations that help learn.
- Contains relevant examples, typical examples of procedures, decisions and concepts that learners can relate to their own experiences.
- New terminology explained.

(p. 530)

2.4.4 Formative evaluation

Formative evaluation appraises the appeal and instructional effectiveness of curriculum materials during their development, production, and early implementation phases. A review of relevant research in the field of evaluation was conducted in order to determine what type of formative evaluation use for this product. West, Farmer, & Wolff (1991) state that the following decisions be made: formality of the evaluation, purpose of the evaluation and type of evaluation. "If important decisions involving considerable amounts of money, sizable numbers of people, or considerable risks are to be made about the value or worth of the instruction, then some type of formal systematic) evaluation may be warranted. Otherwise informal evaluation or even no evaluation may suffice (p. 258).

Thragarajan (1978) suggests that the concern with evaluation should be addressed by using cost-benefit models "which take into account the nature of the instructional product, the complexity of its content, potential for damage resulting from its weaknesses, and the size of the target population."(p. 135).

• Evaluation of design elements

The next question was what elements of the product should be tested. Hackos suggests that a heuristic evaluation be part of the formative evaluation of a user guide. This involves the use of a checklist, that ensures that elements of the styleguide that was established in the development phase is used consistently throughout the product (Hackos, 1995).

Hackos suggests that a "usability assessment" also be implemented to assess the effectiveness of instructions, introductory text, conceptual information, reference topics, tables and diagrams and the combination of illustration and text (p. 438).

Chapter 3: Development of the Instruction

The development process of this guide was driven by the results of the literature review as follows:

3.1 Selection of design model

Relevant principles of the Elaboration Theory of Instruction were considered excellent ID guidelines for a subject such as networking—which consists of many interrelated concepts, principles, and procedures. The development of the guide would be based on these subject matter components. Also, since it was the intention of the developer of this guide to later “zoom” in on the various units and provide more detailed instruction in the form of additional units for advanced users, this top-down approach was appropriate.

For example, the guide was designed to get users started on the Internet, provide a general overview of Internet services, and direct users to more detailed or higher level material. Also, the presentation of concepts, a key area of this design, would best be approached in this general to specific manner.

The fact that the instruction was print-based also influenced all decisions in the design. As Leshin, Farmer, & Wolff (1992) stated,

Media selection and utilization are an excellent example of the inter-dependency among parts of the ISD process. Rather than being a step that comes after instructional strategy selection in a linear process, it is a design decision that influences all of the aspects of the systemic design process. (p. 5)

3.2 Content analysis

It was decided that there would not be an analysis of learner entry level skills to determine what Internet knowledge the users already had. Results of many conversations with users via the Help Line led to the assumption that there would be those in the target audience who had no experience using the Internet at all and therefore content decisions were influenced by this information. The content analysis was done by following the steps below, which was recommended in the ISD model (Leshin, Pollock, & Reigeluth, 1992).

1. A listing of all content was made. The guide was divided into two modules. Module one would include information and instructions on "getting connected, an overview of the Internet and a few of the most important networking concepts, and basic steps for accessing and navigating the World Wide Web. Module two would specifically address the various Internet services, such as Telnet, FTP, etc. The formative evaluation would be conducted on the first module, and the results would later be applied to the second module. Module one was then broken down into the four content areas; procedures, concepts, principles, and supporting content.

2. The main procedural tasks contained in module one were identified and sequenced. This consisted of identifying and sequencing the steps. Supporting content and facts that would accompany the tasks were listed.

The following considerations were made during the categorization of content:

- **Procedures**

The types of procedures a beginner needs to be able to do in order to proceed to more complex tasks were determined. The Elaboration Theory's holistic approach was used,

which recommends beginning the instruction with a very simple, yet representative kind of case until the learner thinks and behaves like an expert for that one type of case (Leshin, Pollock, & Reigeluth, 1992, p. 81).

- **Concepts and principles**

The relevant concepts needed to understand the reasons underlying the procedures were listed. Without the combination of skills *and* conceptual understanding, the learners would lack a common foundation for advanced Internet skills, an important instructional goal. Yet, remembering that a common user complaint is being presented with too much information, the decision was made to include *only* those concepts and principles highly related the basic introductory-level activities. For example, the concept of network protocol is an integral component of every Internet service and was therefore included in the scope of concept coverage.

Other concepts chosen included: client/server, protocol, and IP addressing, essential concepts for students to understand in order to become self-reliant users of the Internet. Every effort was made to show the interrelationships between the various concepts.

The Elaboration Theory also stresses the importance of presenting complex information on a macrostructural level. This is described by Elaboration theorists as *synthesis*, referring to outlining to the student the major relationships between the ideas (concepts, procedures or principles) expressed in a given topic. Synthesis was used in unit 2, which provided a macrostructural look at the Internet and how Concordia relates to it, and in the form of a frame that compared the various Internet services.

- **Supporting content**

Supporting content included prerequisites—information which must be learned, items that must be acquired, or steps that must be taken before a given piece of the major content can be learned. For example, learners cannot use Concordia Internet services without having an account on a Concordia multi-user machine. Therefore, it was necessary to provide information about how to acquire an account. Supporting content also included other content which is meant to reinforce learning or is helpful. For example, mention of concepts would be integrated into the procedures in a way that ties the elements together. For example, the terms *client* and *server* were used frequently.

In order to reflect the top-down approach recommended by the Elaboration Theory, the section which included an explanation of what the Internet is and how users at Concordia link to it was presented in this manner. Starting with a description of the Internet as a whole, the instruction “zoomed in” on the relevant sub-networks until it reached a more detailed, specific, treatment of the subject matter, that focused on the technical requirements the user must have in order to connect to the Internet.

3.3 Analysis of procedures

The simplifying conditions method (SCM), used in the Elaboration theory, involves working to identify a very simple kind of case that is as representative as possible of the task as a whole. The ways in which the simple version of the task differs from the most complex versions were identified with the help of task experts and are listed as the “simplifying conditions”—real world conditions that distinguish the epitome version from more complex version of the task. The simplifying conditions were then relaxed, one at a time, in the order that introduces the most important and most representative remaining version of the task first (Reigeluth & Kim, 1991) (cited in Leshin, Pollock, & Reigeluth, 1992).

For example, after applying this method to the procedure of accessing a World Wide Web site, it was determined that the most representative case would be to simply have the user open a connection to a site and briefly navigate the system. Therefore, the learner is able to perform the task of accessing a Web site like an expert from the start. An example of a more complex version of accessing a Web site would be to access a site by using a "search engine."

By providing the simplified instruction for all the main Internet services (module 2), the learner would acquire a "holistic vision" of what he can do on the Internet even though it is simplified and limited. "This is a simple yet powerful sequencing strategy that enhances motivation, as well as understanding, transfer and retention". (Leshin, Pollock & Reigeluth, 1992, p. 4)

The simplifying conditions method was applied to all the main categories of module one. The more complex versions would be determined and used in a more advanced guide.

The correct sequence of steps was determined by working backwards from the desired learning objectives. For example, if the procedure was to send a simple e-mail message, the questions asked were a) how was this particular stage of e-mail use reached and b) what specific steps must be taken to reach it?

Steps were checked, and then paths were arranged in order of complexity, starting with the simplest path (complexity was determined by the number of steps in the path and degree of difficulty for a learner to master).

3.4 Content Sequencing

Once the content was identified and procedures were analyzed, it was necessary to design a final sequence for presenting the module on a macro level. In accordance with the ETI theory, the instruction as a whole, and each unit, should begin with an initial, highly inclusive treatment of the subject matter topic. General introduction was included to provide a "big picture" of what was included in the guide—informing the learner of why the information presented is important and how will he use it. Directions for working with the instructional material and use of conventions was included as well.

An overview of the Internet and Concordia's links to it were covered in unit two of the module. Unit three introduced more detailed basic concepts such as client/server by incorporating the information into basic steps for using one of the most popular services available on the Internet, the World Wide Web search and retrieval system. The Web was chosen for its motivational appeal, and because of its powerful hypertext capabilities—which would offer the user quick access to additional reference material.

3.5 Application of strategies

Due to the impracticality of pre-accessing attitude, motivational characteristics, and ability, it was essential to carefully select the learning strategies to be used.

The nature of what was to be learned, the common characteristics of the learners (ex. they are all adults), and general research findings related to strategy use was taken into consideration before selecting and sequencing cognitive strategies.

Also, the type of disciplines involved in the instruction were considered an important factor in the selection of strategies. West, Farmer & Wolff (1991) say that there are

many stable factors related to disciplines which largely determine the appropriateness of a strategy. West's decision matrix for selecting instructional strategies according to content characteristics was used. Recommendations and additional strategies from the Elaboration Theory and Keller's Motivational Design Theory were applied.

The strategies that appeared to be the most suited for this instruction were analogies, frames (tables), and relevance. The decision was made to use them in various areas of the instruction and test their effectiveness in the formative evaluation, as well as later on in the field testing.

- **Generalities**

Included in the Elaboration Theory is a recommendation for the use of "generalities" when teaching application of skills. A generality is a definition of a concept, directions for a procedure, and the statement of a principle. When the learner is shown how a generality applies to a specific case it is called an example (or demonstration.) When the learner has to do it herself, it is called practice (or exercises)." Usually the best strategy is to present the generality simultaneously with an example, and gradually fade the generality from each subsequent example." (Leshin, Pollock, & Keigeluth, 1992). This technique was applied to the instruction.

- **Frames (synthesis)**

One of the challenges in teaching about the Internet is presenting the vast amount of information in a way that helps retention. The use of frames was used to present certain critical information in this instruction, such as what types of servers exist on the Internet, what their roles are, and how they relate to each other and to the learner. The servers are simply different types of servers using different protocols to communicate

with the “clients” (Internet software) the learner is using. This information is often presented to the learner without showing relationships between the concepts, procedures and principles involved, creating confusion. According to West, Farmer, & Wolff, 1991) “without awareness of the text structure and/or big picture in the form of main ideas, learning is rote and piecemeal at best; and if there is piecemeal planning it will probably be forgotten quickly (p. 59).

The use of frames greatly assisted in organizing some of the complex information included. One of the content areas of this instructional design is comparative descriptions of types of services (ex. Gopher, Telnet, WWW) that exist on the Internet. A frame was seen as an effective way of presenting a comparative overview, or “synthesis” of Internet services and how they relate to each other and to the wider system (the Internet).

- **Analogies**

After reviewing the literature on analogy use and discovering that some negative results for certain types of users has occurred in some research studies (Cronback & Snow, 1977; Peck, 1987; Winn, 1982) (cited in Weisenberg & Bain, 1994) it was decided to use analogies sparingly and in one of the biggest trouble spots; the subject of IP addressing. The components of a user’s e-mail address were compared to that of a postal address, enabling the learners to get a clearer picture of the domain structure in electronic addressing.

Other features used were characteristic of systematically designed instruction. These include graphic representation of on-screen information and advance organizers (recommended in Keller’s Motivational Theory).

- **Relevance**

Keller's Motivational Design Theory recommends the use of relevance as a highly motivating element in instruction. Therefore, every effort was made to present as much of the content of the guide as possible from the context of Concordia University.

Concepts were described as much as possible in reference to the learner's environment.

Also, the application of learner control (Keller's Motivational Theory) is reflected in the instruction by the use of learner management of the pace of their instruction.

3.6 Content Presentation

Content presentation refers to the general formatting of the documents and the use of the graphics, which, according to the findings from the literature review, have proven to be positive additions to text. Design principles and principles regarding the presentation of procedures were drawn from the literature review and formed into a set of writing and formatting standards. (This proved to be one of the most time consuming aspects of the guide production). The following elements were addressed:

- **Manual structure**

Standard components of user guides suggested by a professional styleguide and other technical documents were modified and applied.

- **Consistency**

Consistency was applied to document elements such as typefaces, type sizes, heading sizes, margin size, space between headings and body, placement of graphics, etc. A styleguide was included as part of the established standards. This consisted of an alphabetical list of terms used for spelling and correct use of abbreviations, naming conventions, procedure, emphasis techniques etc.

- **Use of white space**

Wide left margins were used which push reader's attention into the center of the page. White space was used consistently throughout the guide to add contrast. The addition of extra space between paragraphs to was also applied to enhance readability.

- **Organization**

In order to keep the learners informed as to where they are in the guide, a one or two word chapter identifier was placed at the top of each page. Also, shaded boxes were used for the basic steps presented in each chapter — to allow for quick recognition. The table of contents was made detailed enough so learners could quickly find the information they needed.

- **Attention focusing devices**

Italicization, which is "highly recommended" by Leshin, Pollock, & Reigeluth (1991), was used to provide emphasis to keywords and titles. White type against a black or a gray background for emphasis was also applied to the material in consistent places. Graphic indicators (often referred to as *structural cues*) in the form of bullets, filled boxes, etc., were also used.

- **Use of graphics**

Graphics used in the guide take the form of diagrams, maps, graphic representations and screenshots. Information drawn from the literature review was listed and the following suggestions by Hackos (1995) were incorporated into the format standards established for the guide:

- Excessive detail and realism was not used.
- Each image was given enough distinctive features to allow learners to recognize it.
- The integrity of each image was clearly defined.
- Learners were assisted in perceiving depth by using texture gradients, figural elevation and overlap, converging lines and shading.
- If the picture contained the same information as text, the picture was presented first.

Weisenberg and Bain recommend that pictures should be drawn by someone with good graphic design skills to minimize learner confusion that can result from poor images. As this was not possible due to budget considerations, high quality clip art was used whenever possible.

3.7 Product description

The final product was a 24 page, 8 1/2 x 11" black and white guide that contained greyscale images and screens. A questionnaire was included to be used for field testing.

Chapter 4: Formative Evaluation

Leshin, Pollock, & Reigeluth (1992) define formative evaluation as a "checking" process during the development of instructional materials. The focus of this formative evaluation was on diagnosing weaknesses and generating improvements to the product. It can be described as relatively formal (using standard instruments) but informal in the sense that it is not systematic. No pretests and preassessments would be used to provide evidence of the level of the learner's attainment of what is to be taught.

Determining the effectiveness of a guide of this nature is a somewhat complex process. Chinien and Boutin (1994) say that "effectiveness is an elusive concept which is often narrowly operationalized as student performance on post-tests". Performance testing was deemed not applicable to this product after an analysis showed that mistakes in the instruction would not seriously affect the learner for the following reasons:

- the guide was a learner-controlled instructional system. In other words the learner can spend as much time as necessary to achieve the objectives.
- the learners would never be tested on the material.
- copies of the guide would be produced on a printer in the department as they were needed. Therefore, any major errors found would not involve the expense of having to throw away many copies.

Expert judgment, checklists, and learner feedback were used as the revision criteria. The evaluation was not confined to the stated goals of the instruction but rather sought to assess and evaluate outcomes of any sort. Student attitudes incidentally established

by the guide were revealed by answers to open-ended questions. Unanticipated effects, good or bad, had an effect on decisions about revision or refinement of the instruction. Also sought were reactions to the use of strategies (analogies, frames, etc) and the presentation of the material. The aim of this evaluation method was not only to identify weaknesses, but also to generate ideas for improvements.

4.1 Evaluation method

The evaluation was divided into 3 stages: expert review, procedures review, and group testing. Field testing would take place over the course of the next six months in the form of a questionnaire placed in the back of the guide. The field testing is not a part of this report.

4.2 Stage 1: Expert review

During the expert review, interviews were held with two subject matter experts to solicit expert opinion and to verify technical accuracy. The SMEs were Data Communications experts from the Computing Services Department at Concordia University. One of the SME's was considered an expert in Macintosh computers as well as networks. They were selected based on their knowledge and experience with the content and task and for their understanding of the target population, who they work with on a day to day basis.

The subject matter experts were asked to review and correct the instructional content for:

- accuracy of content
- proper sequence regarding prerequisites
- current information on the subject
- accuracy and effectiveness of visuals

The interviews took approximately two hours each. The questions the SMEs were asked included the following:

- Is there information presented in this guide that does not appear technically accurate?
- Is the content up to date?
- What additional information do you think should be provided, based on your experience showing users in the community how to use various network related tasks?

At first, each expert had some difficulty with the macro level explanation of networking concepts. For example, network protocols were presented in a very simplified way as three basic layers. The SME's, each having a wealth of knowledge about all of the seven protocol layers that exist, had difficulty digesting the simplification of this material. They had a tendency to suggest more detail—but in the process of doing so realized that adding what they thought of as one small item of information could confuse the learner a great deal if explanation was not applied to it. They soon realized that would expand the instruction beyond the boundaries of introductory level material.

The experts' advice was invaluable when trying to choose the technically correct words to summarize levels at these macrostructural levels. The changes made were often simply one word, but when attempting to summarize material as complex as networking, a one word change can make an enormous difference in technical accuracy.

Technical changes were made from their suggestions, particularly in the area of concepts and principles. In one instance, a procedure that had been presented as the simplest path achieve a stated objective was changed to one that was more accurately the simplest route to achieve the objective.

4.3 Stage 2: Procedures review

After the module was edited using a standards checklist, a procedures review was conducted by having a staff member of the University test all the procedures presented in a draft version of the module over a one week period. Her comments, suggestions, and reports of problems, including unclear procedures, were collected. Changes were made to the instruction accordingly. This provided a considerable amount of information about logistic problems that users might have. This review was done to prevent basic procedural problems from distracting the three subjects who would be next evaluating the guide. The problems encountered were recorded and changes were made accordingly.

4.4 Stage 3: Small group review

When a draft of the module was completed and technically and procedurally reviewed, three representatives of the target population having little, if any, familiarity with Internet, were given the module to use. Three subjects (staff members) were then given a questionnaire that had been designed using some basic recommendations by Jackson (1988). It was kept short, a consistent, attractive format was used, and questions were grouped by type. A rating scale was used to evaluate format and organization. Regarding the use of strategies, simple "yes or no" type questions were asked, each of which was "tagged" with a question probing for specific examples in the case of a negative response (See appendix B: *Evaluation Questionnaire*). The subjects were also interviewed.

4.5 Results of the formative evaluation

The response to the module was quite positive (see Appendix B: Table of results). The subjects found the content very useful, and particularly liked the following:

- the use of a frame for the presentation of material
- the presentation of material from a relevant context
- the clarity of information and consistency of page elements
- the top-down approach to the basic Internet overview (unit two)
- the graphic illustration of concepts

One user found the inclusion of explanation of MacTCP “boring” but later stated that it helped to know this information when this system software stopped working properly on her machine. Some ambiguities were pointed out and revisions were made.

Although it was beyond the scope of this project, field study of the final version over a six-month period would be necessary in order to obtain more generalizable and conclusive results.

4.6 Conclusions and recommendations

Successful use of this guide with a number of people over the course of six months (measured by a questionnaire included in the guide) will provide further evaluation on the usefulness of the guide. However much was learned from the production and evaluation of this module that would mold the production of Module II of the guide.

One solid conclusion was that the rapidly accelerating speed of technological change makes it virtually impossible to keep a print version of an Internet-related guide up to date. New versions of software, with sometimes radically changed interfaces, appeared constantly during the production of this module. Carefully chosen screenshots became frustratingly obsolete in what seemed like minutes after they were placed in the text.

Although it would not be possible to have module I available online only (users need this

on the World Wide Web. This would allow for regular revisions of the material at no cost.

Revisions were made to module I to reflect this decision. For example, references to the online version of "Part II" were added, and the instructions on accessing a Web site (in unit 3 of module 1) were adjusted to lead the user to the Web page containing Part II.

This decision meant that some additional research, in the area of online documentation and the use of hypertext, would have to be undertaken. However, much of the research pertaining to print is clearly relevant to the setting of electronic text. As well, all of the data collected from the evaluation of module I could be applied to module II.

The recommendations for continued use of this guide were:

- Due to the rapidly changing nature of the Internet, the guide must be updated on a regular basis. Online versions are obviously easier to maintain.
- The procedural paths should be examined and decision steps that differentiate one path from another be used to write more advanced instruction for these topics.
- That a questionnaire must be included in the guide for at least six months in order to gather feedback from a sufficient representative sample of the target population. This would be used with unsolicited comments about the documentation by users, usually offered in the course of seeking technical support.
- That module I be used as a "template" for Internet introductory guides that address other platforms being used at the University.

Summary

The decision to produce Module I of an introductory guide to the Internet entitled *Getting Started on the Internet* resulted from an established need to inform and instruct the University community about the Internet and its services. The instruction was designed, developed, and formatively evaluated after careful analysis of related literature and expert review. The production of this module also resulted in the development of highly useable user guide format, and procedures writing standards. Results of the formative evaluation showed a very positive response to the module. As well, the production of module one instilled in its designer an acute awareness of the difficulties involved in producing print versions of Internet-related instruction, due to the dizzying rate of change inherent in technology today.

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Evaluation form for:

Introduction to the Internet Part 1: Getting Started

Your feedback is an essential factor in molding this document into one that serves the Concordia community best. Thank you for taking the time to answer these questions.

Please indicate which category of Concordia employee you belong in:

Faculty Staff

PART I:

Please place a **check mark** or an **x** in the grey box beside the word you feel most appropriately rates each aspect of the guide indicated. If you wish to cite specific examples, or make additional comments, please write them in the lines provided below each rating.

1. The general organization of the guide

POOR FAIR ADEQUATE GOOD VERY GOOD

2. The general organization of the individual chapters

POOR FAIR ADEQUATE GOOD VERY GOOD

3. The format and layout of the guide

POOR FAIR ADEQUATE GOOD VERY GOOD

4. The clarity of the procedures

POOR FAIR ADEQUATE GOOD VERY GOOD

5. The clarity of the illustrations

☐ POOR ☐ FAIR ☐ ADEQUATE ☐ GOOD ☐ VERY GOOD

6. The choice of examples given

☐ POOR ☐ FAIR ☐ ADEQUATE ☐ GOOD ☐ VERY GOOD

7. The explanations of the basic networking concepts

☐ POOR ☐ FAIR ☐ ADEQUATE ☐ GOOD ☐ VERY GOOD

PART 2

For the following questions, please place a **check mark** or an **x** in the grey box beside yes or no, and write additional comments, if necessary, in the lines provided.

8. Did you find the illustrations generally helpful?

☐ YES ☐ NO If no, please state why you don't find them helpful

9. Did you find the use of analogy (postal address illustrating IP addressing) helpful?

☐ YES ☐ NO If no, please state why you don't find it helpful

10. Did you find the Internet services chart helpful?

☐ YES ☐ NO If no, please state why you don't find it helpful

11. Do you feel that you now have a better understanding of basic network concepts?

☐ YES ☐ NO If not, please explain why.

12. Did the guide succeed in helping you get connected to the Internet?

YES NO If no, please specify why.

PART 3

Please answer the following question in the space provided.

13. What recommendations would you make for improving the guide?

Appendix B: Table of Results (summary of small group review):

Introduction to the Internet Part 1: Getting Started

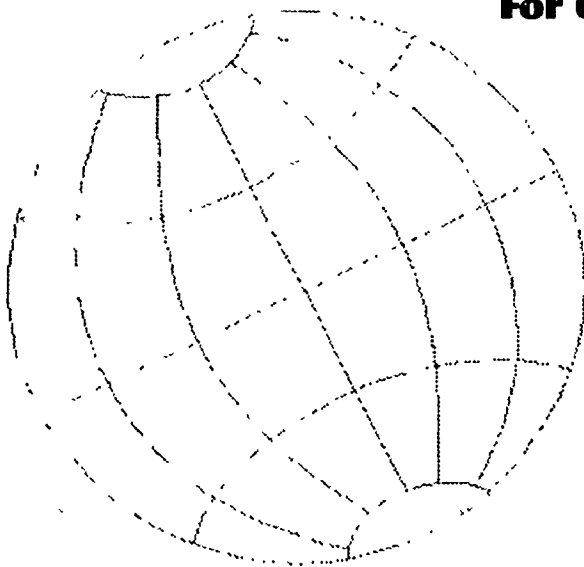
	POOR	FAIR	ADEQUATE	GOOD	VERY GOOD	COMMENTS
1. The general organization of the guide					3	• Logical sequencing
2. The general organization of the individual chapters				1	2	• Good intros • Well sequenced
3. The format and layout of the guide					3	• Very attractive format • Motivating appearance
4. The clarity of the procedures					3	• Consistent
5. The clarity of the illustrations					3	• Attractive graphics
6. The choice of examples given				1	2	• More examples needed
7. The explanations of the basic networking concepts					3	• Well simplified
				YES	NO	
8. Did you find the illustrations generally helpful?				3		
9. Did you find the use of analogy (postal address illustrating IP addressing) helpful?				3		• Use more
10. Did you find the Internet services chart helpful?				3		• Very useful reference
11. Do you feel that you now have a better understanding of basic network concepts?				3		
12. Did the guide succeed in helping you get connected to the Internet?				3		
13. What recommendations would you make for improving the guide?	<ul style="list-style-type: none"> • Add more examples • Explain more about navigating Web 			<ul style="list-style-type: none"> • Add info about filetypes • Perhaps info about AppleShare 		

Introduction to the Internet for Macintosh Users

Part I: Getting Started

For Concordia Faculty & Staff

**Barbara Cree
March, 1996**





Introduction to the Internet for Macintosh Users

Part I: Getting Started

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Please note!

This guide was written with the following assumptions

- **That you have a direct connection to the Concordia backbone network**
Most of this instruction and information applies to those Macintosh users who have a direct connection to the Concordia backbone network, and therefore can use the Macintosh applications described (such as NSCA Telnet and Netscape Navigator). If you will be dialing in, you will require a SLIP/PPP connection to use these applications. This type of connection is not available at Concordia.
- **That you have System 7.0 or later**
In order to run Netscape Navigator, the application used for Chapter 3 "Path to the Web", your Mac must have a 68020 processor or better and must be running System 7.0 or later.
- **That you have a working knowledge of the Macintosh computer**
To use the software described in this guide, it is necessary for you to have a working knowledge of the Macintosh and its operating conventions. You should know how to use the mouse, and standard Macintosh menus and commands. If you need to learn these techniques, please consult the manuals and disks that came with your Macintosh, or attend the Introduction to the Macintosh workshops offered by Computing Services. Contact Carmelita Swan (3668) at the Training and Development Department to register for a workshop.



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Introduction

In 1969, approximately 10,000 people had access to the Internet. In the past two years there has been an EXPLOSIVE growth of Internet use in society, a growth that was driven by the introduction of software that provides the most interesting and user friendly interface to access to the greatest amount of information. There is an estimated twenty and twenty-five million users with direct access to the Internet today, and that number is expected to exceed 100 million by the year 2,000.

The use of networks for communication and information retrieval is changing the nature of research, instruction and administration in every academic community around the world. Concordia faculty and staff are fortunate to be part of a university that does not charge for using the Internet!

Why get to know the Internet?

The benefits of learning to use networked communication and Internet services are plenty. Among them:

Communication

- you can take advantage of the convenience of e-mail to communicate with colleagues within the University and at other universities around the world
- you can share knowledge and experience with people who participate in special topic newsgroups and mailing lists (Concordia has a number of newsgroups that keep the community informed about current events, computing solutions etc. A mailing list service is also available.)

Information/Research

- you can access hundreds of libraries (including CLUES), as well as document and software archives, and subscribe to the growing number of free electronic newsletters and journals.

Teaching

- if you are a faculty member, you can join the rapidly growing number of academics around the world who are using the Internet for instructional and research purposes.

Although it is clear that electronic communication has become vital for productive work in administration and academia, it has approached us with such magnitude and at such an alarmingly fast pace that members of a university community can easily feel they are being left behind. There is suddenly a great deal to learn. Is there a way to quickly become a knowledgeable and efficient user of the online world known as Cyberspace?

Fortunately, applications such as Eudora and Netscape Navigator allow new users to integrate network use into their working environment very quickly. But there are still no quick answers to becoming an efficient net user. Search engines allow for easy access to much information, but there is no one central directory to point one to the information needed. Successfully finding resources on the Internet, moving files around, and feeling comfortable as part of the distinct culture that is the Internet, takes some acquired knowledge and experience.

About this guide

Although it is not necessary to know technical details about networks and communication systems in order to use them, it does help to have a basic understanding of some of the major concepts and principles involved. This guide, *Introduction to the Internet for Macintosh Users Part I: Getting Started* threads an introduction to these basic network concepts and principles through instructions on getting set up and performing basic tasks such as configuring a communications application and accessing a World Wide Web site.

Chapter 1 provides a brief overview of what the Internet is, and, using a top-down approach, zooms in on each of the links that ultimately connects your computer to the Internet backbone.

Chapter 2 lists the requirements you need to connect to the Internet and tells how to acquire them.

Chapter 3 threads a basic introduction to fundamental network concepts through instructions on how to configure Netscape navigator Navigator, the most popular browser for accessing the World Wide Web. You will be also learn how to access a Web site and navigate the system. At this point you will be ready to start the second part of this guide: *An Introduction to the Internet Part II: Using Internet Services*, which is presented online using the Web's powerful document linking system known as *hypertext*.

Conventions used in this guide

- If you see a word, or a word group in **bold**, it indicates the name of a Macintosh menu item, command, or dialogue box.
- The instruction to "click" an item indicates a *single* click of the mouse. For the occurrences where double clicks are required, the term "double-click" is clearly stated.
- New concepts or terms are in *italics* when they first occur in the text.



The Internet and our links to it

An idea sparked by the Cold War

The Internet has its roots in a 1960's Cold War "Internetting" project that aimed at protecting the U.S. Department of Defense network, called ARPAnet, from a nuclear attack. The 1964 RAND proposal outlined the development of a war-invulnerable network that had no central authority (and therefore no central target point). This eventually led to the emergence of the Internet.

The Internet (with a capital I) has come to be known as the world-wide collection of WANS (Wide Area Networks) and LANS (Local Area Networks), or internets (with a small i) that connect through routers and gateways to the NSFnet (National Science Foundation network). This collection of networks all operate according to the standards of the Transmission Control Protocol and Internet Protocol (TCP/IP) system that governs all exchanges of information. The US NSFnet is the major provider of Internet backbone service. (A backbone is that part of a network which provides high-speed links between the WANS and LANS).

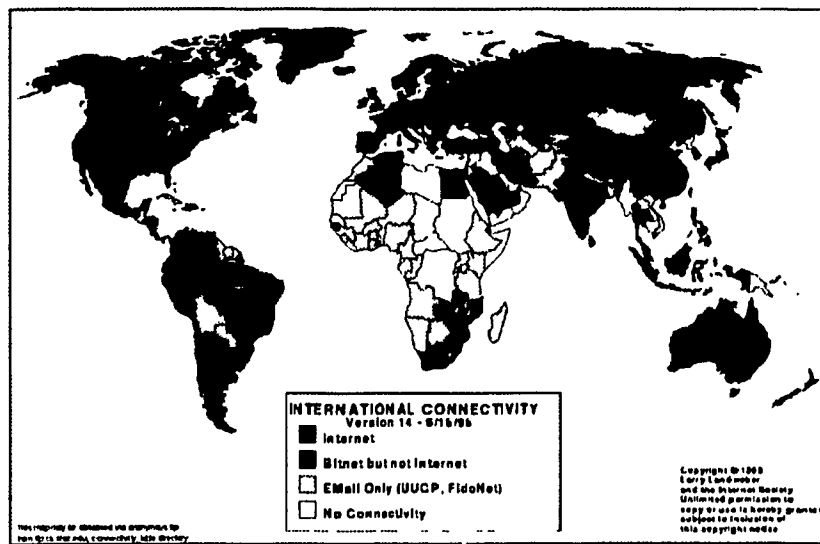


Figure 1-1 International Connectivity

Other large networks, such as BITNET (Because It's Time Network), operate according to a different communication system, and are not considered part of the Internet, although we can communicate with people on these networks through gateways.

Canada's link to the Internet backbone: CA*Net

The national backbone network, the CA*net, links the provincial networks and connects through a router to the NSF backbone

This network was launched by the National Research Council in 1990, in order to provide global networking capabilities to Canada's education and research communities. CANARIE (Canadian Network for the Advancement of Research, Industry and Government), is a project, largely funded by the federal government, that aims at developing Canada's information infrastructure

Quebec's link to the CA*Net: RISQ:

The provincial backbone network, RISQ (Réseau Interordinateurs Scientifique Québécois), links networks in the province and connects through a router to the CA*net backbone

RISQ provides communication services and computer-based resources, and is monitored by McGill University, which acts as RISQ's Network Operations Centre

Concordia's link to RISQ: The Concordia backbone network

Our University backbone network links departmental LANS and connects through a router to the RISQ network. The Concordia backbone provides Ethernet speeds of 10 megabits/second. A high speed cable connects the two campuses at speeds of 100 megabits/second. Computing Services' staff work behind the scenes to keep all aspects of this network running smoothly. The Concordia community is one of the few university communities that has free access to the Internet.

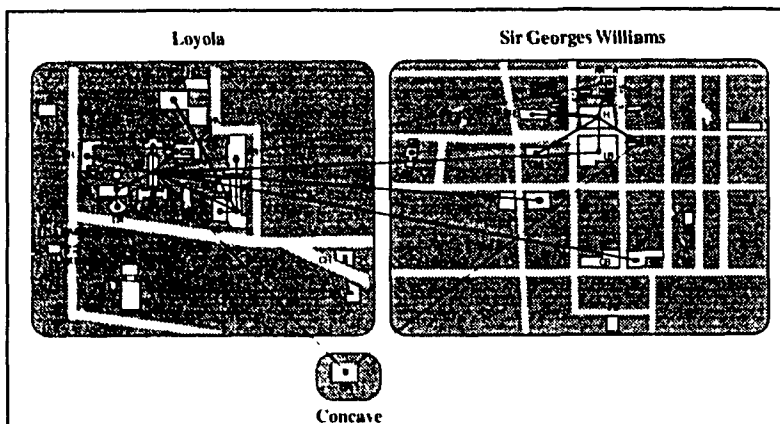


Figure 1.2 An illustrated "snapshot" of Concordia's backbone network December 1995
Compliments of the Data Communications Group, Computing Services

Departmental links to the Concordia backbone: LANS

The Departmental LANS link the computers (of many different platforms) in Concordia departments together and connect through routers to the Concordia backbone network.

Your Macintosh is part of an Appletalk LAN, which has a system of its own based on the AppleTalk communication system. This system, however, is designed to work smoothly with TCP/IP, the Internet communication system.

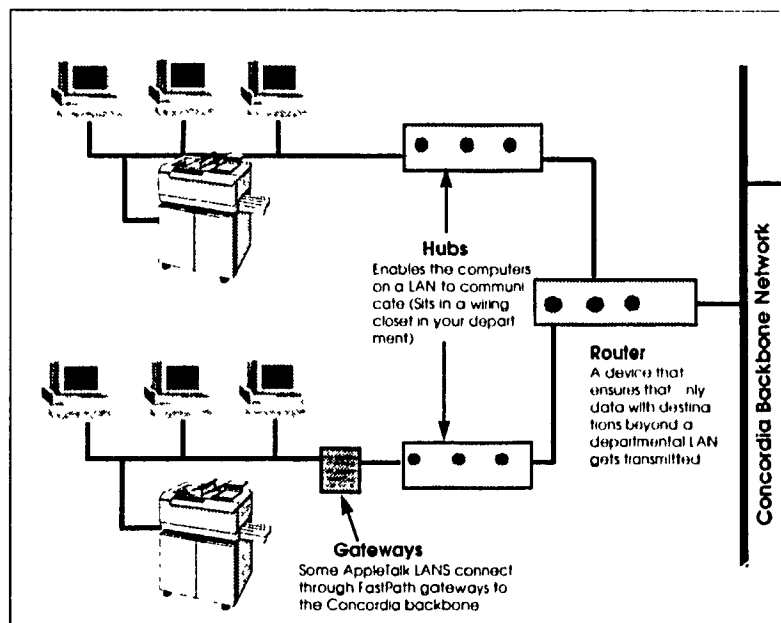


Figure 1-3 Departmental LAN connections to the Concordia backbone

Getting your Macintosh connected

To put it in a very simplified way, network operations are based on various layers of functionality. The physical network is divided into a hierarchy of layers, and above this the various layers of a communication system govern the exchange of information among computers and other devices. Getting your personal computer connected to the Internet involves acquiring the necessary items related to these basic network layers. The next chapter will tell you what items are required, and where to get them.

CHAPTER 2

Connection Requirements

Above the underlying mass of cables and wires that interconnects computers and devices (*nodes*) on the Internet, is a communication system based on the *TCP/IP protocol suite*. These protocols govern the exchange of information between the many different platforms and operating systems. An *addressing* system identifies the nodes and provides direction for the transmission of resources. Lastly, commercial vendors of the various computing platforms provide users with interfaces to the services offered by the network.

In order to connect to the Internet and use the services available, you require items related to the above essential communication system components.

Internet connection requirements

To connect to the Internet and use Internet services from your office at Concordia, you need

1. A direct connection to the Concordia Ethernet backbone network
2. System software that enables your Mac communication system (based on AppleTalk protocols) to provide access to TCP/IP protocol based network services. This software is either MacTCP or Open Transport
3. An e-mail address (acquired by getting a computer account)
4. Macintosh communication software (which provides an interface for mail, Netnews, etc.)

1. A direct connection to the Concordia backbone network

•Are you connected?

Many Concordia departments have Ethernet connections onto the campus network. One way to tell if you have a direct connection is to look in your Chooser (under the Apple in the top left corner of your Mac). If you see AppleTalk zones, this indicates that there is a *router* (a device that connects your LAN to the backbone) in your department.

•What if you're not?

If your Macintosh is a fairly recent model (ex. Quadra 650, Power Mac) it has built-in Ethernet capability. However, you need to purchase an adapter to suit the type of Ethernet cable installed. This can be purchased for approximately \$80.00 from an Apple dealer.

Earlier models without built-in Ethernet can be either be fitted with an Ethernet adapter (approx. \$250.00), with a LocalTalk and an Ethernet transceiver (approx. \$150.00) or a Phone Net connector (approx. \$35.00). What is needed depends on the model of your Macintosh and whether or not you are connected to a LocalTalk network and will be connecting to the backbone through a gateway (FastPath).



To inquire about the possibility of being connected to the backbone, or to find out if there are any plans to do this for your department, please contact the technician in charge of your department. If you don't have a technician, call the Computing Services Help Line at 848-7613.

2. TCP driver (MacTCP or Open Transport)

On Macintosh computers, a Control Panel device known as MacTCP was developed to allow Macs to communicate with other hosts on the Internet using the TCP/IP protocol, which in turn allows for communication among diverse systems. Recently a much more sophisticated device called Open Transport has begun to replace MacTCP. Although by the end of this year Open Transport will replace MacTCP for most types of Macs, it presently only runs on Power Mac 7100's or higher.

If you have an earlier model Macintosh than a Power Mac 7100, refer to section A below. If you have a Power Mac 7100 or higher, refer to item B on the following page.



A) MacTCP

•Where to get MacTCP

If you have one of the more recent Macintoshes that comes with system 7.5, then MacTCP is part of your system software. If you are running system 7.1 or earlier, you need to purchase MacTCP, which costs approximately \$60.00 and can be purchased from your local Apple dealer.

•Do you need an IP address?

To run MacTCP, you may need to obtain IP addresses. This depends whether your Macintosh's connection is in the form of 1) a connection to your departmental LocalTalk network (which in turn is connected through a gateway to your department's Ethernet cable or 2) a direct connection to your department's Ethernet cable.

Please call your department's computer technician, if you have one, or the Computing Services Help Line at 848-7613, to determine whether or not you need these addresses and if so, to obtain the addresses.

•Installing and configuring MacTCP

To install MacTCP, drag it into your Control Panel folder. Instructions for configuring MacTCP are available in the form of an *Info note*, which can be obtained from the Hall Bldg. and Loyola service areas (H-925), the Computing Services reception area at LB-800, and from the Computing Services OFFICE SERVER in the Software Archive/Mac Info notes folder. See Appendix A *Accessing the Computing Services Macintosh Software Archive* for instructions on how to access the server.



B) Open Transport ("If you have a Power Mac 7100 or higher)

•Where to get Open Transport

Open Transport can be obtained from the Computing Services Office Server in the Software Archives/Communications folder. See Appendix A for instructions on accessing the server.

•Do you need an IP address?

To run Open Transport, you may need to obtain IP addresses. This depends whether your Macintosh's connection is in the form of : 1) a connection to your departmental LocalTalk network (which in turn is connected through a gateway to your department's Ethernet or 2) a direct connection to your department's Ethernet cable.

Please call your department's computer technician, if you have one, or the Computing Services Help Line at 848-7613, to determine whether or not you need these addresses and if so, to obtain the addresses.

•Installing and configuring Open Transport

Instructions for configuring Open Transport are available in the form of an *Info note*, which can be obtained from the Hall Bldg and Loyola service areas (H-925), the Computing Services reception area at LB-800, and from the Computing Services OFFICE SERVER in the Software Archives/Mac Info notes folder. See Appendix A: *Accessing the Computing Services Macintosh Software Archives* for instructions on accessing the server

3) An e-mail address

Each machine on the Internet consists of a **unique address**. Canadian network addresses are obtained by CA*Net's Domain Name Registry, which has been allocated a set of numbers by InterNIC, for use within Canada. Internet Protocol (IP) number 132.205 has been assigned to Concordia University

Domain names are given to the IP numbers because they are easier to remember.

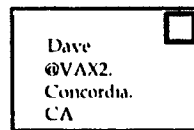
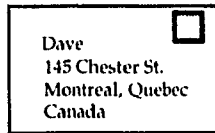
The domain name ends with an extension indicating the type of organization the system belongs to or the country the machine resides in. For example, **.com** represents "commercial" and **.gov** represents the U.S. government. Canadian IP numbers are identified by their **.ca** extension.

A standard e-mail address consists of a person's username, the name and location of the computer they have an account on, and the domain extension. The information goes from specific to general, as with our postal addresses.



Ch.2: Requirements

For ex: At Concordia, the address for the multi-user machine VAX2 is **vax2.concordia.ca**. If your username is Dave, and your account is on VAX2, then your e-mail address would be **dave@vax2.concordia.ca**. Your username would relate to our postal system something like the following



You get this address by having authorized access, or an account on a Concordia machine, such as VAX2 (a VAX/VMS machine) or Alcor (a UNIX machine), which supports e-mail and is connected to the Campus network

•Getting an account on a multi-user system

The staff and faculty at Concordia may apply for a computer account on most University Computing Services managed computers by completing an account application form. This form must be signed by your departmental signing authority

There are application forms available for computer accounts offered by Computing Services. Forms are available at the Hall Building Service Area, Rm 11-925, and the Loyola Service Area, CC-207. You will be requested to show your ID card when you pick up your access card, which contains your username (the name you choose to be known by on the network) and password. Accounts are ready within 4 working days following the receipt of your completed application

4. Macintosh communication software

The development of various applications that provide graphic user interfaces for Internet services spurred the rapid growth of public use of these services. Macintosh TCP/IP based applications, such as Eudora and Netscape provide Macintosh users with familiar interfaces for mail, file transfer, etc. These applications are available as shareware (a minimal charge) or freeware.

The relatively recent addition of a particular Internet application has been a catalyst in attracting people by the masses into that networked world known as Cyberspace. The graphic desktop versions of an application known as a "browser" offers users a fascinating interface to the powerful Internet search and retrieval system known as the World Wide Web. The next chapter will lead you to the Web using the most popular browser, Netscape Navigator.

Follow the instructions in Appendix A: *Accessing the Computing Services' Software*



Ch. 2: Requirements

Archive and download the following items from the "Supported Software" folder:

1. Netscape Navigator 2.0
2. Stuffit Expander 3.5
3. JPEGView 3.0
4. Telnet 2.7b4

The only application that will be addressed in the next chapter is Netscape. However, you will need to have the other items on your machine when you begin Part II of this guide, so downloading them now will save you time later.

Once you have everything you need, move on to Chapter 3 for instructions on entering the World Wide Web, and Part II of this guide.

CHAPTER 3

The path to the World Wide Web

This chapter will lead you to the huge system of interlinked data known as the World Wide Web. The introductory overview of the Internet remains threaded through the following instruction, where you will be shown how to configure a Macintosh application called Netscape Navigator, and how to access a Web site. The Concordia Web site you will reach contains Part II of this introductory guide, which presents an online introduction to the Internet services such as Netnews, e-mail, and file transfer, and to the popular Macintosh software available for using these services.



Netscape Navigator: A Web browser for the Macintosh

Netscape Navigator (commonly referred to as Netscape) is a World Wide Web *browser*, an application designed to “browse” through and retrieve the data from the World Wide Web. The Web is a hypertext-based search and retrieval system that is designed to interlink the rapidly growing amount of information on the Internet. Institutions, corporations, and individuals linked to the Internet, that are considered to be part of the Web are those that have data, coded in HTML (Hypertext Markup Language), available for browsing and retrieving from servers running http (HyperText Transfer Protocol) software.

Concordia has been very active in developing a presence on the World Wide Web. There is a growing depository of information related to many aspects of administrative and academic elements of Concordia available on Web servers at Computing Services and other departments in the University. You can access this information using Netscape, your Web *client*.

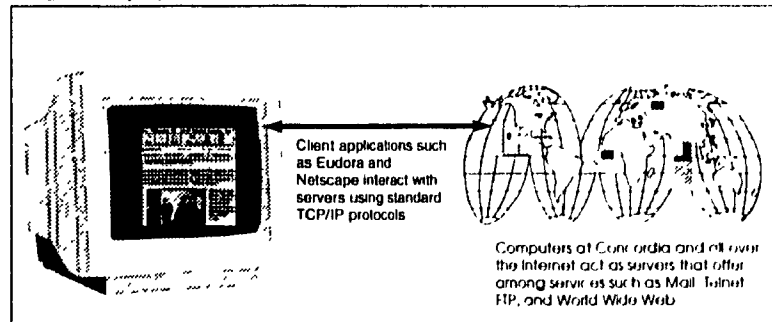


Figure 3.1 Client/Server systems

Netscape and the other applications you will become familiar with, act as *clients* that accesses information on *servers*, computers of various types running software which processes information based on standards defined for the *http* (Hypertext Transfer Protocol) protocol, one of the TCP/IP protocol family members. All of the major services that you will become familiar with as you become experienced on the Internets, are based on protocols from the TCP/IP family, and use a client/server system.

The appearance of the client to the user is dependant on the vendor of the application. For example, Netscape is an Web client application that provides a graphic, Macintosh or PC interface for browsing and retrieving the information on Web servers. Other Web browsers provide different interfaces.

For example, the screenshot on the left of Figure 3.2 shows the Web browser Netscape running on a desktop computer. Figure 2b shows a Web browser called Lynx running on a mainframe (such as VAX2 or Alcor). In this case the mainframe you are logged onto runs the client and communicates with the Web servers. Figure 3.2 below shows views of the same Time Magazine Web page using both graphic and command line browsers.

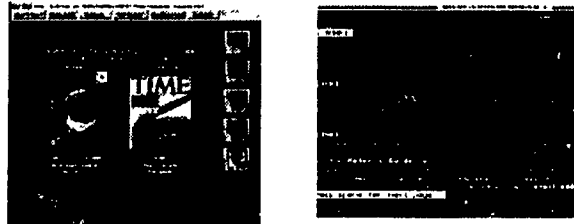


Figure 3.2 A look at the same Time Magazine Web page viewed using Netscape, a desktop graphic browser, and using Lynx, a browser designed for VAX or UNIX based systems

One of the attractive features of a Web browser is that they can also communicate with servers running software related to other IP services such as FTP, Gopher, and Telnet. This results in access to an incredible amount of information using only one client application. Users can simply click on or select underlined text to contact someone by e-mail or access an FTP site.

The developers of Netscape have added features to the applications that allow it to accept incoming mail and act as a newsreader (an applications that provides an interface for newsgroup discussions), bringing it close to the application that answers all desktop Internet needs.

Installing Netscape Navigator 2.0 for the Macintosh

 Netscape 2.0 Installer

NB: To use Netscape your computer must be running System 7.0, have 3 MB of hard disk space and 3 MB of RAM available.

To install Netscape, double-click the Netscape installer found in the Netscape folder you downloaded from the OFFICE SERVER. Click the **Install** button when the installer dialogue box appears and a correct version of Netscape for your type of Macintosh will be installed (refer to the Read Me document in the Netscape folder for additional information about the installation).

Configuring Netscape Navigator

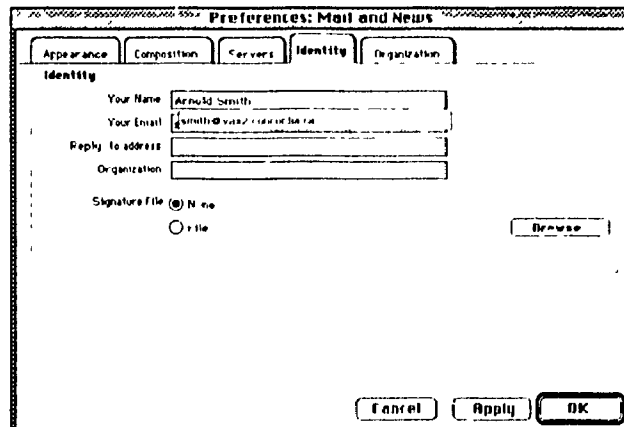
Most desktop Internet applications require some configuration in order for the various client/server exchanges to take place. Once you configure one Internet application with a basic understanding of the information you are entering and why you are doing so, why you are doing what, you can configure the similar aspects of other Internet applications with no problem. You are also better able to fix problems related to configuration when they occur.

Configuring addresses

In order to use an application to send mail, read newsgroups, and access FTP archives, you must identify yourself as well as the mail and news servers in your local environment. Follow the instructions below to configure Netscape with personal and Concordia specific addresses.

Configuring addresses: How to identify yourself & local servers

1. Choose **Preferences: Mail and News ...** from the **Options** menu. The Mail and News preferences dialog box appears.
2. Click the **Identity** preferences option found in the row of preference categories at the top of the dialog box. The Identity preference options are displayed.



3. Type your full e-mail address in the text box beside **Your Email**:
4. If you wish your full name to be appended to your e-mail address when you send mail, type your full name in the text box beside **Your name**:

5. Click the **Servers** preferences option found in the row of preference categories at the top of the dialog box. The Servers preference options are displayed.

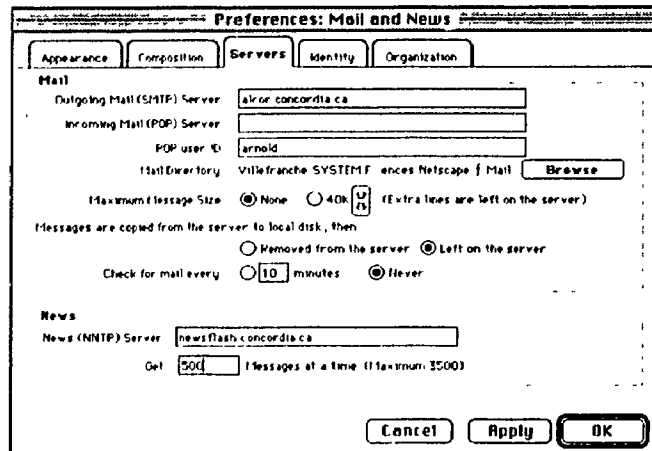


Figure 3-4 Netscape Servers preference options

6. Type the address of the Concordia multi-user system you have an account on (ex: `vax2.concordia.ca` or `alcor.concordia.ca`) in the text box beside **Outgoing Mail (SMTP) server**:

Netscape uses the Simple Mail Transfer Protocol (SMTP) to send mail and the Post Office Protocol (POP) to receive it. If the POP account text box is left blank, Netscape will use the same machine address for have indicated for SMTP. Therefore, since the commonly used mainframes at Concordia support both protocols, you don't need to fill in the Incoming mail POP server information.

7. Type your username in the text box beside **POP user ID**:

Netscape will attempt to log in to the mainframe you have your e-mail account on when you make a request for the application to check your incoming mail. To do this, it requires your username.

8. Type `newsflash.concordia.ca` in the text box beside **News (NNTP) Server**:

If you want Netscape to act as a *newsreader*, (software that accesses the information on news servers), you must give it the address of your local news server. At Concordia, Newsflash is the name of the machine, located in the Computing Services' machine room, that provides news (discussion groups) services (known as Netnews) to the Concordia community and to other universities in the province.



Addressing on the Web

Now that you have configured Netscape, you are ready to access a World Wide Web site. Of course, navigating the World Wide Web involves that fundamental Internet element—addressing. To connect to a remote server you must provide its IP address, and when you make your way from Web page to Web page you are continuously requesting access to local or remote machines. On the Web, addresses are in the form of URIs (Uniform Resource Locators).

Concordia's URL is

<http://www.concordia.ca>



Concordia's Home Page
(a document coded in
the HyperText Markup
language) sits on a
Macintosh at LB 800

The section preceding the two slashes tells the browser what IP protocol to use to reach the server. The two slashes after the colon indicate a machine address will follow. This contains the main Home Page, the document containing hypertext links that serves, as a springboard to reach all other documents or pages, of that site.

Accessing a main Home Page and linking from there to sub-directories or documents is one way to get to where you want to go. If you wish to go directly to a sub Home Page or a particular document on one of the pages, you simply add slashes and addresses in the correct hierarchical order. For example, the URI of the Computing Services Home Page is

http://www.concordia.ca/computing_services/

This will take you directly to the Computing Services section of the Concordia web site. From here you can navigate, using hypertext, around the Computing Services Web pages. Or if you know the particular document you wish to reach you can access it directly. For example to access Part 2 of this guide, the address is

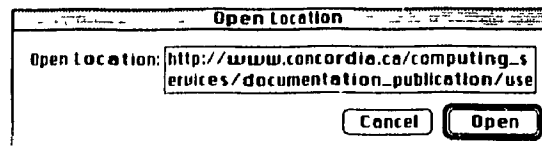
http://www.concordia.ca/computing_services/documentation_publication/user_guide/macinternet_intro.html

Some URLs may seem ridiculously long to someone who is just starting out on the Internet. However, references to URIs usually reach us electronically (via e-mail or newsgroups, for example). Therefore, the common practice is to highlight the URI, copy it, and paste it into the appropriate place in Web browser. If the page turns out to be useful, a *bookmark* can be saved that one can simply click to reach the address again at any time in the future.

How to access a Web site and navigate the system

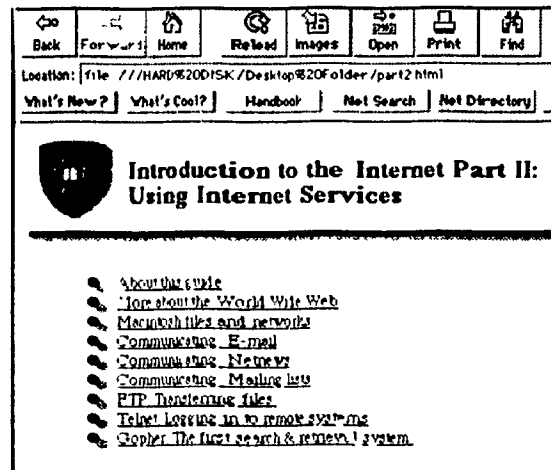
Follow the instructions below to access the Web page containing Part II of this guide

1. If Netscape is not running, double-click the Netscape icon to start the program. A connection is made to the Netscape Home Page.
2. Choose **Open Location...** from the File menu. The Open Location dialog box appears.



3. Type the URL (in this case, type `http://www.concordia.ca/computing_services/documentation_publication/user_guide/macintro.html`) in the text box, and then click **Open**.

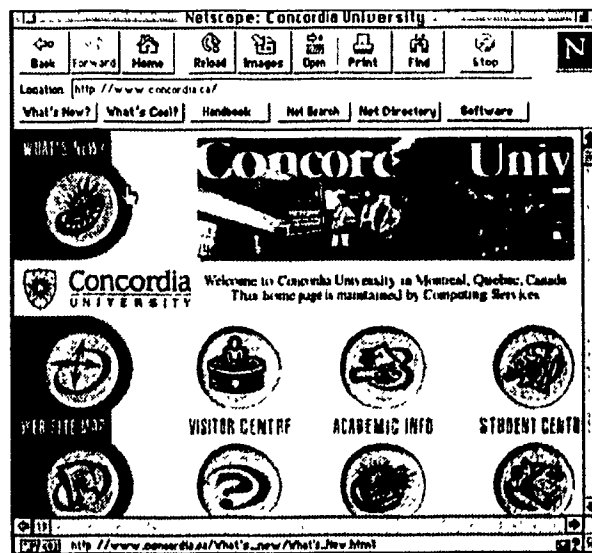
The Netscape icon at the top right corner of the Netscape window indicates (looks like shooting stars) that a connection is being attempted. If the connection is successful, the page displaying Part II appears.



Note You may get an error message indicating that the server is too busy to accept connections. In this case try again in a few minutes.

Ch 3: Path to the Web

4. Move your cursor over the blue underlined text on the screen without clicking it. This is hypertext, links to documents on the same server, or on remote servers. As you move your cursor over a hyperlink you will see the address of the link appear in the bottom left corner of the browser.
5. Click item 1, **About this Guide** in the Index. The Netscape browser (client) will make a connection to the document *about.html*, which is located on the same server.
6. Click the **Back** button, located at the top left corner of the browser. You will return to the index. (The Back button will always return to the previous page visited).
7. Click **Go to Concordia Home Page**, located at the bottom of the index page. The Concordia Home Page will appear.



The Concordia Home Page is in the form of an *image map*, a graphic that contains sections that are links (referred to as *hot spots*). If you click on one of the buttons it activates a link to the destination indicated on the button.

At this point, you can move about the Concordia pages, start Part II of the Internet Guide (where there is more information about using Netscape), or expand your Web explorations to other parts of the world.

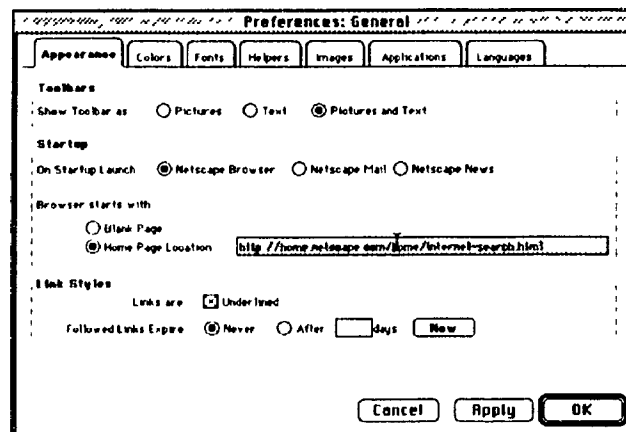
8. Choose **Quit** from the **File** menu to quit.

Additional Netscape Information



Setting your Home Page location

Netscape is pre-configured to connect to the Netscape Home Page each time the application is opened. If you want Netscape to connect to another site upon start up, and each time you click the Home button on the top level of the menu bar, choose **Preferences: General** from the **Options** menu and enter the preferred URL in the text box beside Home Page Location.



Images off or on?

If you want to zip around the Web much faster, deselect **Auto Load Images**, which is found under the **Options** menu. Images will not automatically be downloaded but will be represented by the standard image icon. If you want to see the image, simply click on the icon to download it. Or click the **Images** button in top level of the Netscape menu bar to download all of the images on the particular page you are connected to.



Allocate more RAM

Netscape requires a minimum of 2 MB RAM to run. However it's a good idea to allocate more RAM to it. To do this highlight (click once) the Netscape icon when the application is not running and choose **Get Info** from the **File** menu. Change the minimum RAM figure to as much as you can spare.



Learning more about Netscape Navigator

- Netscape training for staff and faculty is provided free of charge by Computing Services. Contact Carmelita Swan at the Training and Development Department (3668) to register for a workshop.
- Part II of this guide contains more detailed instruction on Netscape and the World Wide Web in general.
- The Netscape handbook can be accessed by clicking the **Handbook** button on the bottom portion of the Netscape menu bar.

About Part II of this guide

Part II of this guide, "Using Internet Services" is an introduction to the various Internet services such as file transfer and e-mail. This section of the guide uses Netscape to take advantage of the powerful, interactive multimedia environment of the Web. The use of hypertext allows for immediate linking to references and additional resources available on the Internet. This allows those who wish to further increase their Internet skills, in the areas that interest them most, do so very easily. It also provides the perfect medium for showing examples of how the Web is being used in Higher Education.



Accessing the Computing Services' Software Archive

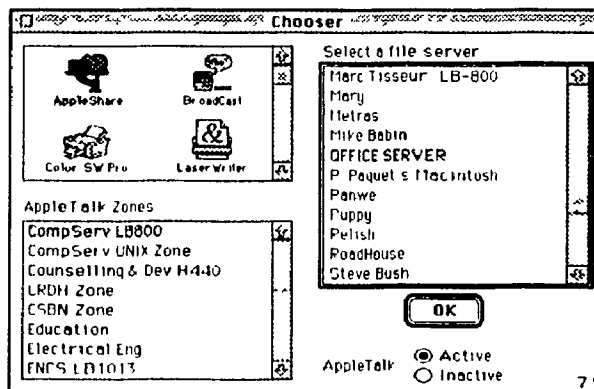
The Computing Services' Software Archive contains a selection of Macintosh software (shareware and freeware) that has been downloaded from various archive sites on the Internet. This software is available to Concordia staff and faculty via AppleShare.

Included in the Software Archive are communication applications, virus detectors, graphics utilities, etc. Info notes related to the Macintosh computing platform are also available in the archive as Portable Document Format (PDF) files.

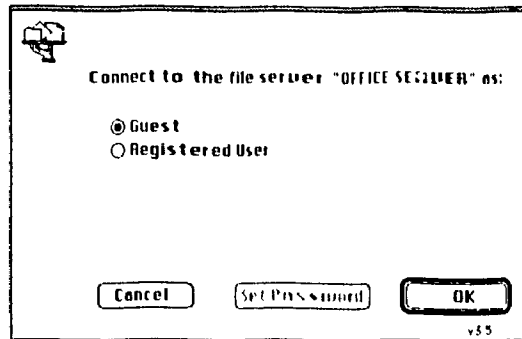
The Archive is located on the Computing Services' Office Server, located at LB-800. Follow the steps below to access the server and download software to your Macintosh.

How to access the Software Archive and download a file

1. Choose **Chooser** from the **Apple** menu. The Chooser window appears.

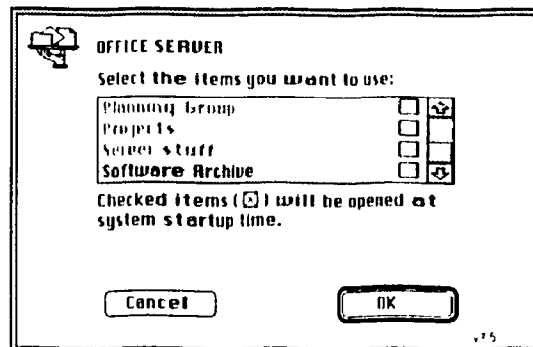


2. Click **AppleShare** (top left corner) to select it.
3. Scroll through the list of **AppleTalk Zones** (bottom left side of window) and click the **CompServ LB800** zone. A list of file servers available in that zone appears on the right side of the Chooser window.
4. Scroll through the list of file servers and click **OFFICE SERVER**.
5. Click **OK**. The file server connection dialog box appears.



6. Click the radio button beside the **Guest** option, and then click **OK**.

A directory dialog box displaying a list of the folders (known as volumes) available on the server appears.

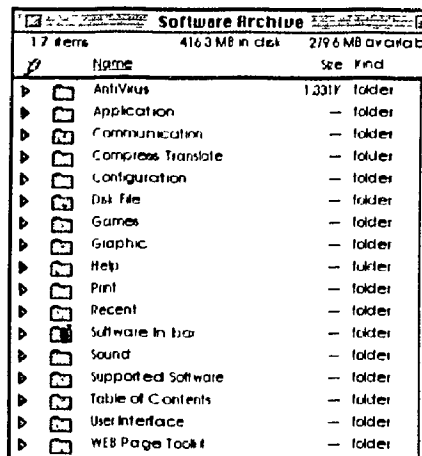


7. Scroll through the list of server items and click **Software Archive** and then click **OK**. The server volume you selected appears on your desktop.

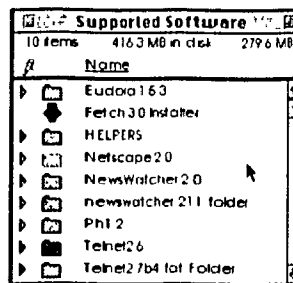


NOTE: DO NOT click the box at the right side of **Software Archive**. Checked items will appear on your desktop each time you start your Macintosh. This means that a connection is opened to the server, and you may be unnecessarily preventing other people from accessing it. Click **OK**.

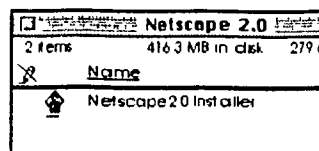
8. Double-click the server icon to open the volume. A window displaying the contents of the Software Archive folder appears.



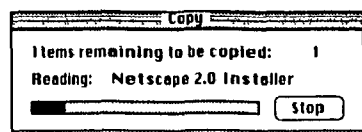
9. Double-click the folder icon that contains the software you wish to copy. (In this case, double-click the "Supported Software" folder to locate the items listed in Chapter 2.) A window displaying the contents of the folder appears.



10. Double-click the folder icon of the software you wish to copy. The contents are displayed.



- 10.** Drag the item you wish to retrieve to your desktop or a chosen location on your hard drive in order to download a copy of it. The Copy window appears with a monitor bar that informs you of the progress of the download.



- 11.** When you have finished downloading all the items you require, drag the Software Archive server volume icon to the trash. This disconnects you from the Computing Services OFFICE SERVER.

Notes about the software

Freeware is free, shareware is not

The software found in the Software Archives is a collection of *freeware* and *shareware*. Freeware is just that—free. Shareware usually costs approximately \$10 to \$30. This is a great deal, because the authors of some great applications spend many hours developing and upgrading them. The cost of the software and address to send the money to is usually indicated in the Readme file or user guide that accompanies the software, or appears as a message when you start up the application.

Some of the most popular Macintosh Internet applications, such as Eudora Light and Netscape Navigator, are free to anyone affiliated with an educational institution.

Software versions

When the developers of Internet software work on an upgrade, they usually release *beta* copies. These versions are recognized by a *b* at the end of the version number (ex: Netscape 2.0b2). However, these are not officially released versions of the software, and are only made available so users will try them out and report bugs. Usually, the lower the beta number, the more bugs the software has. These versions are not supported by the developers.

In the supported software folder all of the items are officially released versions except NCSA Telnet 2.7b4. This version of Telnet is the last upgrade released and has been tested and OK'd by the Computing Services Macintosh network consultant.