

Major Principles on the Design of an Educational Network

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Abstract: The modern communication networks, apart from the specialized applications that they offer depending on the nature of their target groups, they support a set of general purpose elementary network services, that provide some essential communication facilities to the end users.

Regarding an educational network, these facilities include collaboration, navigation into the information resources, as well as interpersonal communication, to the members of the Education Society. In the sequel the major principles on providing these elementary network services are presented. On-line/off-line contact over an alternative means of communication among the members of the trans-European Education Society could be an adequate reason for the deployment of an educational communication network. This category of services will offer the members of the Education Society the ability of exchanging opinions on educational and social matters, as well as interpersonal messages, and collaborating. These facilities should be provided by already existing network services, enhanced where necessary by supporting multimedia information exchange (mostly off-line). In the latter case external media players of attachment viewers may be used for the presentation of the multiple media of information.

1. Introduction

The interpersonal communication, which is a major aspect for a communication network, should not be limited to within the borders of the educational network, but can also take place with individuals out of this trans-European network, through its international connections to universal communication networks, such as the Internet.

1.1. Interpersonal Communication

The network services that will be used for interpersonal communication are:

E-mail Service. This service will be provided by a widely accepted E-Mail client that will comply with international recommendations for remote Message Polling, like POP3, and for Multimedia Electronic Mail Exchange, like MIME and X.400.

News/Bulletin Board Service. The News (and/or Bulletin Board) Service will be used to provide electronic fora and discussion lists on educational topics.

On-line talk & IRCs. Such network services will provide the members of the educational network with the ability of having on-line communication with each other.

1.2. Remote access and file transfer utilities

Another crucial category of elementary services for an educational communications network is the remote access to resources of educational information, as well as the ability of file transferring and retrieving archives of educational material. The mostly used services of this category are the following:

File Transfer Service. This is a classical network service that will offer the full spectrum of essential transfer operations required, such as: Uploading one or more objects, Downloading one or more objects, Automatic explosion of compressed objects.

Telnet Service. This service, will mainly be used for access to remote libraries that do not provide a specialized way for accessing them.

1.3. Access to educational/curriculum-related multimedia information

The access to educational multimedia material and curriculum-related information, residing on remote hosts is another crucial elementary facility. For this reason the following services will be provided:

WWW Access Service. The client that will provide this service will be used for accessing the information that will reside in the WWW Servers of the educational network, as well as others selected by the service providers.

Access to curriculum-related information. This service will be accomplished by providing access through the interconnections of the educational network to already existing networks.

2. The Graphical User Interface

The elementary services that will be offered by an educational network, will be implemented by a set of software tools that will abide to the client/server model (a widely accepted architecture). The use of client part of software tools (that will be used at schools), will be provided through a unified, user-friendly Graphical User Interface (GUI).

The User Interface will be implemented with respect to the specialties of the distinct target groups (eg. language), thus giving an added value to the already existing services that will be exploited. It is of great importance for the User Interface to be user friendly by means of flexibility and consistency. It should thus offer the following functions:

- ◆ The operations that comprise the network services should be provided to the end users in a transparent way.
- ◆ The selection of clients corresponding to specific elementary services, should be provided through hierarchically organized menus and buttons.
- ◆ Graceful degradation and recovery from user or service errors should be considered, thus avoiding communication failures and/or general system failures.
- ◆ On-line and context sensitive help should be provided to the users.

3. General Architecture

The environment proposed will provide its users with a uniform Graphical User Interface providing all the basic services, in such a way that it will be described as “friendly” to the user. The demand for a special basic services providing environment results from the need for gradual familiarization of the user to the particular educational network and INTERNET as new ways for communication and collaboration. The user will be gradually presented with ascending options and abilities, passing from simple to more complicated scenarios in use.

This approach ensures:

- ◆ Acquaintance with the basic network services through already known procedures. All services will be learned through drills in fundamental use scenarios.
- ◆ The gradual presentation of the complete set of potentials for every basic service. In this way the student will have time to familiarize himself with all possible scenarios.

The idea of the gradual presentation of each basic service’s potentials includes the following:

- ◆ Grouping of the options of each basic service depending on their functionality and their execution sequence.
- ◆ The grouping of the options generates the assumptions for gradual transition from simple to more complicated scenarios. Every group of options may be gradually enriched according to the pedagogic scenaria under which the basic services will be used.
- ◆ The utilization abilities provided by the educational environment will be presented to the user in restricted, easy to manage parts, which will be based upon the grouping of the options.

Based on the approach above, the environment of the basic services will be divided in four semantic areas:

- ◆ Basic service’s selection area. This will be the main tool-bag of the environment, where additional services forming the integrated educational environment could later be embedded.
- ◆ Tips area. This area will stimulate the student to use new functions, which he hasn’t come across up to that point.
- ◆ Basic service’s functionalities area. The contents of this area are directly related with the chosen basic service and the level of the learning scenario the student has reached up to the point.

- ◆ Basic service's working area. The format of this area depends on the particular basic service as well as the level of the learning scenario the student has reached up to the point.

Each student will have to select the basic service he wants first, then specify the exact functionality required and use the working area to perform it. Of course there may be procedures which will demand more than one functionalities.

4. Design and Implementation issues

According to the basic design principles mentioned in the third part, the user interface of the E-mail, Bulletin Boards and Discussion Lists Services will be presented to the following paragraphs.

4.1. E-mail Service

The main idea of this basic service is to give to its user the feeling that he composes his message on a white sheet of paper and fill in the recipient's personal data on the envelope so that it can arrive safely to its destination. The use of allegories that refer to known operations is a basic characteristic and helps the user not to be disorientated. Furthermore, the gradual learning through the use of the basic service must be ensured.

4.1.1. Message Composition and Submission

The main purpose of this functionality group is to send a new message. Furthermore, the user must acquire indirectly the perception of the purpose, the significance, and the priority of each functionality in reference to the other functionalities of the message composition. So, the elementary figure of the E-mail service for the message composition consists of the following necessary operations:

- ◆ Message Composition. The message will be composed by the user in a special textbox in the E-mail service's working area which will have the shape of a white sheet of paper. On another scenario, the user will be motivated to use a familiar text editor for direct text insertion, so that he will soon be able to realize that the result of this action was the attachment of a text to the message.
- ◆ Attachments in the E-mail Service's functionalities area, will help the user to familiarize with the concept of the attachment. At the final scenario he will have the ability to use images, video and audio attachments.
- ◆ Recipient's-sender's address definition. At the initial scenario the user will be expected to compose his message and fill in the recipient's personal data through a friendly addressing functionality. A White Pages service will collect the data from the filled fields and will define the e-address of the recipient in a transparent way to the user.
- ◆ Message Submission. At this point, apart from the completion of message composition and submission, the necessary control of the messages' data takes place.

4.1.2. Reading of incoming messages and mail handling

This operation group aims at an easy and hierarchical handling of the incoming messages. The main functionalities that the group is consisted of are:

- ◆ Incoming messages Reading. The main purpose is the familiarization of the user with the additional information that are attached to the message and the provided alternating functionalities offered to him. At the initial scenario the user will only be able to read the incoming messages while at the final scenario he will have the ability to see the message's heading, to reply to a message, to forward a message and see any text, video, audio and image attachments.
- ◆ Message Files Creation and Handling. File handling will be represented with a more descriptive way than a common file manager program.

4.2. Bulletin Boards Service

The design approach of the proposed environment for the bulletin boards service will be based to the closest allegory for this services which is the real bulletin boards. Every real bulletin board has a topic and whoever is interested can read the announces and send his own announces. The existing bulletin boards in the Internet, support electronic announces in a simple text format, which is chosen as the most appropriate format to be used for the bulletin boards in the proposed environment. The basic functionalities that are supported by the Bulletin Board service are the following:

- ◆ Searching and Subscription to Bulletin Boards. Already existing Bulletin Boards will be selected and a list will be created. The user will be able to search the list for the Bulletin Boards he is interested in and subscribe to them, so that he can read the exchanging messages and send his own messages.
- ◆ Reading of announces. Each time the user selects the Bulletin Board service, he will be informed of the number of the new announces on each Bulletin Board he is subscribed to. He will be able to read the announces after selecting a specific Bulletin Board from the list.
- ◆ Posting of announces. The user will be able to compose and send his own announces to a Bulletin Board he is subscribed to, using the composition and submission functionalities of the E-mail service.

4.3. Discussion Lists

The Discussion Lists Service provides an effective way of communication among the users that have common interests and offers cooperation capabilities for the implementation of common projects. The closest allegory for the Discussion Lists is the creation of groups with specific common interest (subject of the list) for the realization of a particular purpose.

A Discussion List may be “open”, meaning that every user is able to subscribe to the List whenever he wants, or “close” meaning that the members of the list are controlled from the list’s creator/administrator and not all the users have the right to subscribe. The basic functionalities that are supported by the Discussion List service are the following:

- ◆ Searching of Discussion Lists with specific subject. The searching will be based on techniques similar to those used to the Bulletin Boards service.
- ◆ Subscription to a Discussion List. The user will subscribe to the list via an e-mail that will contain his personal data. The subscription to open Lists will be accomplished by automatic update, while the subscription to close List will be decided by the creator/administrator of list and the user will be informed whether he is accepted or not.
- ◆ Creation of a new Discussion List. Every user will be able to create a new Discussion List, defining the topic, the persons that participate in from the beginning, whether is open or close, and an acceptance mechanism in the case of a close Discussion List.
- ◆ Reading of messages from the Discussion Lists. The user will be able to read the messages only from the Lists he is subscribed to. Each time the user selects the Discussion Lists service, he will be informed of the number of the new messages in each Discussion List he is subscribed to.
- ◆ Message Submission to Discussion Lists. The user can send messages only to Discussion Lists he is subscribed to.

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