OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as "developed", "industrialized" and "developing" are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

21338

APPLICATION OF MODERN TECHNOLOGIES AND MANAGEMENT SYSTEMS

SF/BRA/92/001

BRAZIL

Final Report — *Phase II*

Software Technologies in Educational Informatics

Contract No. 93/127

Phase 2 / 5.d

Prepared for the Government of Brazil

by the United Nations Industrial Development Organization

Based on the work of MTA SZTAKI

executed in Software Technologies in Educational Informatics

Backstopping officer: J. P. Moll, Agro-based Industries Branch

United Nations Industrial Development Organization

Vienna

Table of contents

0. Abstract

In full accordance with the aims of the contract signed between UNIDO (Reference SF/BRA/92/001, Contract No. 93/127) and MTA SZTAKI (Reference 209215/93), and the Amendment A to Contract No. 93/127 (March 16, 1994) MTA SZTAKI has fulfilled the contracted tasks and duties stated in *Phase 2 / 5.a)* of the Amendment in compliance with the Terms of Reference (5 July, 1993). The terms and conditions were set in the Appendices of the contract. These duties comprised

- a start-up mission to Rio de Janeiro,

- the preparation of the training contents and the necessary training materials, and

- the delivery of the Software Technologies in Educational Informatics Training Course to the selected trainees of the Brazilian party at the Contractor's home laboratories.

The major objectives such as strengthening the self-reliance and project management capacity of the Brazilian participants in the selected software technology areas (working with hypertext and hypermedia systems, using media management and authoring systems) were achieved by the end of the training period. This advancement was proved by the students through the preparation of high level solutions to the course assessment examples at the end of the training period. The training examples based on the information materials of SENAI, CNI and CETIQT, and the developed hypermedia applications were downloaded into CD-ROM.

1. Introduction

The purpose of this report is to describe the work based on the contract between UNIDO (Reference SF/BRA/92/001, Contract No. 93/127) and MTA SZTAKI (Reference 209215/93). The agreement was signed by UNIDO on behalf of the government of Brazil. The contract targeted significant improvements in the working knowledge of the selected representatives of the Brazilian counterpart (trainees from SENAI-DN and other SENAI institutions) in selected fields of Software Technologies related to Educational Informatics (EI). A number of activities have been carried out in order to transfer the necessary amount of information, including the delivery of training courses, laboratory tuition and provision of consultations to the Brazilian participants.

The report lists the activities carried out in the framework of the above contract with the aim of giving the Reader a general overview. The major outputs of these activities lay in the improved knowledge, the strengthened self-reliance and project management capacity of the trainees. The activities are discussed in the report to such a depth that a global assessment regarding the execution of the agreement (Phase 2, 5.a. of the whole programme) can be fulfilled.

The report presents the details of the work around three main issues:

- the start-up mission,

- preparation of the course contents and training materials and

- the delivery of the training course.

The evaluation of the results and recommendations for the continuation are given at the end of the report. This should ensure further support and improve the utilization of the results during the lifetime of the programme and also in the framework of a possible follow-up co-operation.

2. Contractor's outputs

2.1. Start-up mission

In accordance with the planned schedule of the contract, the start-up mission was accomplished by Dr. Tibor Remzső in the period of 9 - 23 April 1994 during his visit to SENAI-DN in Rio de Janeiro. The goals of the mission were fixed in the negotiations between the representatives of SENAI-DN and MTA SZTAKI during the preparation phase of the contract. The start-up mission aimed at performing the following main tasks:

- Consult all potential partners (SENAI-DN, CETIQT, CNI DEPIN) about their current problems, expectations and future plans.

- Meet and interview the potential trainees, select the participants for the course.

- Work out a mutually acceptable solution regarding all details and aspects of the Software Technologies in Educational Informatics course to be delivered by MTA SZTAKI in Budapest.

- Give seminars on the experience of MTA SZTAKI in the related fields.

The above program was agreed on between SENAI-DN and MTA SZTAKI prior to the arrival of Dr. Remzső for the start-up mission. Thanks to the efforts made by the participating parties both in the preparatory phase and during the visit, the program was successfully completed.

There have been a number of meetings conducted with key managers of SENAI-DN, with some of the responsible representatives of the Computer Departments at SENAI-DN, CETIQT and CNI DEPIN.

The following seminars have been presented during the visit to the invited participants at the premises of SENAI-DN in Rio de Janeiro:

- MTA SZTAKI - A Short Introduction
- Hypertext, Hypermedia Systems
- The Informatics Training Centre

- Hypermedia Authoring Systems
- CD-ROM Technology and CD-ROM Applications

There were a few meetings held with the major aim of preparing the execution of the activities listed in the Terms of Reference as part of Phase 2. The first of these talks was conducted with Mr. Roberto Boclin and Ms. Leila Miranda of DN. There were some further meetings with members of a team at CETIQT working on the preparation of the pilot project in the field of Educational Informatics (Colorimetry). This project would be under the guidance of Dr. Robert Hirschler acting as a general advisor to the subject.

2.2. Preparation of the course and the training materials

The contents of the Software Technologies in EI Training Course have been selected in a relatively long procedure, after a number of iterative sessions. The first proposal was made after a series of talks carried out by an expert of UNIDO visiting SENAI-DN. This proposal was verified at various SENAI departments. The Invitee's Proposal made by MTA SZTAKI reflected the opinions of all contributing parties. The final version of the course contents was agreed on with the representatives of all SENAI departments interested in the programme and their affiliated institutions during the start-up mission of Dr. Remzső.

The contents and timing data of the course schedule as proposed by MTA SZTAKI were based on the experience obtained from running similar, publicly announced, programmed courses in MTA SZTAKI and in the ELTE University of Budapest and the Technical University of Budapest. In order to meet the particular demands of the Brazilian party, a new course concept has been worked out and also the contents of the course has been revised for the purposes of the SENAI training session.

The final details of the concept were worked out by a team of professionals in software technologies in educational informatics and training under the supervision of **Dr. Tibor Remzső**, Senior Analyst and Project Manager.

The members of the team were:

- **Dr. Miklós Biró**, Senior Analyst (Database),
- **Dr. László Keviczky**, Senior Scientist in hypertext and hypermedia Systems (also Secretary General of the Hungarian Academy of Sciences),

- **Dr. János Demetrovics**, Senior Scientist in database software technologies (also Member of the Hungarian Academy of Sciences),

- **Mr. Tibor Szép**, Research Associate and

- **Ms. Ágota Bausz**, Research Associate.

The training materials were prepared in a form and quality required by MTA SZTAKI's standard training methodology, immediately following the conceptual settlement of the course contents. These documents contained detailed descriptions, transparencies and texts for reading. The training materials were copied for every participant in the form of 11 volumes, totalling to about 800 pages per trainee.

2.3. Delivery of the training course

The EI training course was delivered between the 24th of May and the 24th of June 1994 in the Informatics Training Centre of MTA SZTAKI. The Participants of the course were:

Fernanda Massena Mello   CNI

Janis Ivars Ritins   SENAI DN

Marco Aurélio Medeiros   SENAI Regional Department Santa Catarina

Nilton Carlos Lessa Vieira Junior   SENAI DN

Richard Beckerig Maciel   SENAI DN

Robert Luiz Ribeiro Knowles SENAI DN

Wladimir Bezerra Luz   CETIQT

Carlos Trein   SENAI Regional Department Ric Grande do Sul

The Informatics Training Centre was equipped for this course with the following computer configuration:

- 6 user workstations (386 AT PC's with 4 MB RAM, 80 MB HDD, Ethernet controller, keyboard and mouse; DOS, Windows for Workgroups, X Terminal emulation and PC/TCP networking software) *for networking tasks*

- 5 student workstations (486 PC's with 8 MB RAM, 400 MB HDD, Ethernet Controller, Sound Blaster

    sound system, keyboard. mouse) *for authoring tasks*

- 1 student workstation (486 PC's with 8 MB RAM, 400 MB HDD, Ethernet Controller, CD-ROM, Sound Blaster sound system, keyboard, mouse, Movie Machine Video System) *for authoring tasks*

- 1 student workstation (486 PC's with 8 MB RAM, 400 MB HDD, Ethernet Controller, CD-ROM, Sound Blaster sound system, keyboard, mouse, Screen Machine Video System) *for authoring tasks*

- 1 student workstation (486 PC's with 8 MB RAM, 400 MB+1.6 GB HDD, Ethernet Controller, Sound Blaster sound system, keyboard, mouse, Recognita OCR System) *for authoring tasks*

- 2 Sun Workstations (1 Sun SPARCstation 1+ and 1 SPARCstation 10) *acting as file servers and also as a printer server.*

- 2 Apple Macintosh (Quadra AV) (16 Mbyte RAM, 400mbyte HDD, 1.2 Gbyte optical disk, CD/ROM, keyboard, mouse input microphone, color scanner, color InkJet printer, loudspeaker systems, video camera systems, audio and video tape recorder systems) *for authoring tasks and demonstrations.*

The software packages presented were listed in the **Interim Report.**

Additionally to the equipment set up in the training cabinet access was ensured to the following server computers through the Ethernet type 10 Mbit/sec local network of MTA SZTAKI:

- Sun SPARCcenter 2000

- DEC Alpha

- HP 9000

- ICL DRS 6000.

The SW EI training course combined the benefits of the traditional tuition type training with the efficiency of Computer Based Training. After the morning lectures the participants had practices with the above mentioned equipments and software tools. The continuous presence of tutors resulted in excellent personal contacts between the lecturers and the trainees. The Brazilian participants easily got acquainted with these methods and equipments and successfully used it during the whole training period. This technique made it possible that, despite the prevailing differences in the level of knowledge and skill of the

trainees, all of them could proceed with their own pace and made the maximum profit of the time spent in Budapest.

Soon after the first days of the training it became clear that the participants also differed in their level of interest for certain subjects. Even more so, there emerged a definite demand on behalf of the Brazilian trainees to shift the stresses between some of the prepared course themes. They mostly requested to increase the relative weight of practicing with authoring tools on the SENAI information materials.

Although the time was very limited and the preparation of the necessary new training documents and example materials required extra efforts and the involvement of additional trainers, the experts of MTA SZTAKI managed to slightly rework the training schedule. Less time was used with the unpopular themes to allow more time for the required themes (CD-ROM applications, Microsoft Multimedia Viewer, Optical Character Recognition, Image Processing Methods, Sound Management, Frame and Video Grabbing).

This work was executed in the original spirit and framework of the contract with no changes in the basic guidelines and knowledge body. The final, executed version of the course schedule, the list of the training materials are attached to this report as Appendices.

4 lecturers gave proper guidance throughout the different themes and the training sessions. The complete Training Course was partly supervised, partly delivered by the lecturers as follows:

No	Topic	Lecturer
1	Hypertext and Hypermedia Systems Introduction	Tibor Remzső
2	Hypertext and Hypermedia Systems General Informations	Tibor Remzső
3	Authoring Systems Multimedia ToolBook	Tibor Remzső
4	Authoring Systems Multimedia ToolBook Introducing ToolBook Tutorial	Tibor Remzső
5	Authoring Systems Multimedia ToolBook ToolBook OpenScript	Ágota Bausz
6	Authoring Systems GUIDE 3.1	Ágota Bausz
7	Authoring Systems AuthorWare Professional for Windows	Tibor Remzső
8	Authoring Systems Microsoft Help	Tibor Remzső
9	Authoring Systems Microsoft Multimedia Viewer	Tibor Remzső

10	Managing Media Sound	Tibor Szép
11	Managing Media Text	Tibor Remzső
12	Managing Media Graphics	Tibor Remzső
13	Managing Media Video	Tibor Szép
14	Multimedia in the Apple Macintosh Environment	László Keviczky
15	Multimedia literature	Tibor Remzső

2.4. Introduction to Industrial Colorimetry (Multimedia sample application)

This practical course was developed in cooperation with the Applied Colorimetry Laboratory of the SENAI-CETIQT (Rio de Janeiro, Brazil).

2.4.1. The first part of the program

The first part of the program teaches the reader the Munsell color system. The Munsell color system is perhaps the best known of all color-order systems. Based on the guiding principle of equal visual perception of small color differences, the Munsell system is both a collection of samples painted to represent equal intervals of visual perception of color difference between adjacent samples, and a system for describing all possible colors in terms of its three attributes.

The three attributes of the Munsell system are the Hue, Value, and Chroma. These attributes correspond to three variables commonly used to describe color. Hue is that quality of color which we describe by the words red, yellow, green, blue, etc. Value is that quality by which a color can be classified as equivalent in lightness to some member of a series of gray samples ranging from white to black. Chroma is the quality which describes the degree of difference between a color and a gray of the same value or lightness.

The Munsell system consists of a lot of color samples named chips. These chips are arranged in pages of constant hue. On each page, samples are arranged by Value in the vertical direction and by Chroma in the horizontal direction.

The Main page of the first part in the program is a small animation. The user can read on this page the title of the part. On the background you can see the Munsell-tree. From this page the program automatically jumps to the

Color attribute page. This page explains the three attributes of color in the Munsell system.

The first attribute in the Munsell system is the hue. The Munsell system contains five basic hues (R=Red, Y=Yellow, G=Green, B=Blue, P=Purple), and the five adjacent pairs of these (YR=Yellow-Red, GY=Green-Yellow, BG, PB, RP). Munsell Hue is expressed by a number and letter combination such as 5Y or 2GY, where the letters are taken from the ten color names and the numbers run from 1 to 10.

The first animation sequence begins with the empty Munsell circle of the ten colors, and you can see the 10 colorchips in the right corner of the screen. The program first puts the five main colors to their right place on the circle, then the five complement chips.

The second attribute in the Munsell system is the Value. The second animation sequence explains this attribute of color. The program first draws the neutral color transition from white to black. Then shows the transitions of the five main hue, from the lightest to the darkest color.

The third attribute is the Chroma. The third animation sequence first draws the red Munsell page row by row, and shows the transition of the red color from the grayest red to the most saturated red. After it you can see the other four base color page, and the chips are drawed column by column.

2.4.2. The second part of the program

The second part of the program would like to teach the user the behaviour of white beam of light and the prism. On the screen can be seen a prism with white beam of light. The light breaks on the prism, and behind the prism in the right upper part of the screen you can see the spectrum. The visible spectrum keeps from 400 to 700 nanometer.

This is a practice page. The user can drag up to three filters from the bottom of the page, and put them into the white beam of light. The only interactive parts of the Spectrum page are the filters. You can place the filters into the three slots. The spectrum window (on the upper right corner of the screen) will reflect the change immediately. In this spectrum window you can see the relative energy function of the light. This is the spectral energy distribution.

The colorimetry practising program was written with ToolBook. In the development we was working together with two experts from the Applied Colorimetry Laboratory of the SENAI-CETIQT. We delivered the 2.0 version of the training

material to SENAI and CETIQT together with the Market Study collection.

2.5. Preparation of the Market Survey Report

The contents of the Multimedia Authoring Market Survey Report was the following:

Executive Summary

Multimedia Computing
Multimedia Basic Concepts
Multimedia Technology
Multimedia Platforms
VIDEO CD

Multimedia Networks

Networ˙ Access to Multimedia Information
Networked Multimedia

Multimedia Market

Authoring Software Market
Multimedia Marketing Opportunities
Choosing Multimedia Products

Multimedia Authoring Software

GUIDE
ToolBook
AuthorWare Professional for Windows
Multimedia Viewer 2.0
Introduction to Industrial Colorimetry (Multimedia sample application)

2.6. Follow-up Mission in Brazil

The aims of this follow-up mission were:

- to evaluate the results of the EI educational and pilot project,

- consulting in the topic of hypertext and hypermedia authoring,

- on-the job training on EI,

- preparation of the 3rd phase.

The follow-up mission was accomplished by Dr. András Siegler in the period of in the period of 14 - 25 August 1995 and by Dr Tibor Remzsō in the period of 21 Aug - 3 Sept 1995 during their's visit to SENAI-DN in Rio de Janeiro.

Thanks to the efforts made by the participating parties both in the preparatory phase and during the visit, the program was successfully completed.

Institutions visited were:

SENAI DN   Alexander Figueira, Wladimir B. Luz
CNI   Marcos Felix Monte Rabstein, Fernanda Massena Mello
CIET   Paolo Roberto Krahe, Lorenzo Francesco Giovanni Gino
               Maria Ridolfi
CETIQT   Prof. Lucio, Prof. Robert Hirschler
CTAI   (Santa Catarina) Catarina (Marco Aurelio Medeiros

The following seminars have been presented during the visit to the invited participants at the premises of SENAI-DN and CNI in Rio de Janeiro:

- MTA SZTAKI - A Short Introduction

- Workgroup Systems

- Groupware Applications.

There were a few meetings held with the major aim of preparing the execution of the activities listed in the Terms of Reference as part of Phase 3.

The first of these talks was conducted with Mr. Wladimir Luz, chief in NuI of SENAI. There were two further meeting with Dr Paolo Cray and Mr. Fernando XXX of the CSEIETER on the contents of the Phase 3 of the project.

We gave to SENAI-DN a new collection of market report materials (the contents are listed in App4).

Finally we agreed in the contents of the Phase 3

Phase 3 will incorporate three main topics in IT: *Managing Internet, Groupware and Electronic Data Interchange.*

These main topics will be presented in the same series of seminars and laboratory practices so that the structure and amount of inputs by SZTAKI set in the Terms of Reference (5 July 1993) related to the Contract remain unchanged. Accordingly, Phase 3 will be accomplished as follows:

Start-up: 2 week visit of SZTAKI's Project Manager of Phase 3 to SENAI - assessment of immediate needs, consultancy, seminar.

1st step: 2 weeks laboratory practice and advanced workshop at SZTAKI for a small number of SENAI's network administrators and system managers (3 - 5 participants to be nominated by SENAI). The purpose of the 2nd step is to make Brazilian experts acquainted with the experience and daily practice of the SZTAKI in managing large networks, information systems and workgroups.

2nd step: 2 weeks course in Rio de Janeiro consisting of seminars on Groupware and EDI for a large audience (30 - 50 people) followed by laboratory demonstrations using hardware facilities provided by SENAI (to be delivered by two experts of the SZTAKI).

The proposed contents of the Phase 3 are listed in the App5.

3. Evaluation

As it can be seen from the above description of the activities, MTA SZTAKI managed to successfully carry out all of its contracted duties and solved all problems arising during the execution of the Phase 2.

The Brazilian participants achieved the targeted results by the end of the training. In addition, the materials of the course were hard-copied on a professionally-made CD-ROM for demonstrating the achieved results. This was proved primarily through the excellent solutions made by the trainees to the course assessment tasks. The questions asked at the final examination addressed mainly the problem solving skills of the trainees, and not so much the lexical knowledge. The answers and solutions were all acceptable.

The trainees proved to be very capable to act as real trainers after the return to their home office and can be expected to effectively disseminate the knowledge obtained during the training. They are excepted to efficiently use the course materials in their works. Their involvement in all phases at the continuation of the project would be advisable and useful.

In Brazil formed new multimedia development centers in some states around our trainees. Examples are in SENAI DN Rio de Janeiro (Wladimir Bezerra Luz, Nilton Carlos Lessa Vieira Junior, Robert Luiz Ribeiro Knowles, Richard Beckerig Maciel) and in CTAI Santa Catarina (Marco Aurélio Medeiros). These groups are working on multimedia projects.

MTA SZTAKI and its specialists were available beyond the usual expectations to support the personal requests of the trainees in course of the training. The training program was managed to cope with these requests up to the end of the possibilities in the spirit of the contract.

There have been some joint programs, social events and excursions organized, and help was available in many kinds of needs (personal questions, obtaining tickets, reservations, etc.).

After the training session we fulfilled the following tasks:

- preparation of the colorimetry courseware material,
- preparation of the market study

- preparation of the extensions to the market study

- preparation of the follow-up mission

- preparation of the Phase 3 contents.

4. Recommendations

There are some issues to be considered in order to make the results of our co-operation even more attractive:

- The trainees should now become trainers and do everything to disseminate the knowledge obtained during the EI course in Budapest. If they need any help in doing this, they can consult MTA SZTAKI at any time. This refers to both conceptual and practical aspects of teaching and hypermedia authoring.

- SZTAKI can assist in preparing system designs, providing consultations and presenting results of its experience in the field of EI applications.

5. Appendix A1 Contents of the Market Study Extension

General State of the Art of Multimedia Courseware in Education (30 pages)

Tools for Multimedia Courseware Development and Delivery (100 pages)

Hardware Specification for Multimedia Development and Delivery (15 pages)

Royalty and Copyright: Pronciples and Practice for Courseware Production (12 pages)

6. Appendix-A2 Proposed Contents of the Phase 3

PART 1: INTERNET AND RELATED SERVICES

The course - to be accomplished as a seminar and a field practice in Hungary - will give an in-depth understanding what are the business opportunities of the Internet, how to use the Internet utilities and how to organize and manage large Internet sites.

The course is designed for information and communication technology professionals and managers of SENAI. The course is also a foundation for the field practice which deals with other issues of Internet (publishing information on Internet servers, administration of the Internet servers and company-wide Internet networks).

The course will be combined with a workshop, where students will use workstations connected to the Internet. During the practical hand-on sessions in Hungary in Brazil students use several popular Internet packages (public domain MS-Windows based utilities; commercial MS-Windows/Windows 95 packages from Microsoft, Novell and FTP, OS/2 Warp Internet applications; X Windows based UNIX applications on Solaris.

SENAI will also receive a CD-ROM with a comprehensive collection of public-domain and shareware Internet applications, technical guides and documentation.

Internet Course Outline

- General Overview

- Connecting to the Internet

- E-mail

- Electronic bulletin boards (list servers and the News)

- Using the remote computer (Telnet)

- File Transfer (FTP, Anonymous FTP)

- Integrated Internet Exploration Tools (Gopher, WWW)

- Interactive discussion through the Internet (talk, IRC)

- Searching and navigation on the Internet

- Security Risks and strategies using Internet

- Internet Business Opportunities

PART 2: GROUPWARE AND WORKGROUPS

INTRODUCTION

Groupware refers to technology which enables people to tackle documents and projects in teams, more commonly known as workgroups (another term used liberally in IT marketing literature). Whether the members of workgroups enjoy a common location or represent multiple enterprises on an international scale, groupware is the glue that ensures that all members can input and access the same information and exchange documents. Although the technology has been applications-led so far, the groupware concept extends to the operating environment.

Groupware is a logical evolution of local area networks (LANs) and has been existing as a concept for more than five years, but it is only now taking shape in terms of products. If the term has created confusion in the minds of so many, it is often because vendors are inconsistent in their definition of what constitutes groupware. The goal of groupware is to take the personal out of personal computing, forcing technology to mirror (and optimize) real working practices. The time is right to review the products and technologies that have grown out of the concept.

THE CONTENT OF THE COURSE on Groupware and Workgroup Systems

- Workgroup&Groupware Technology Analysis

- Technology Basics

- Groupware Components

- Applications Software

- Operating Systems

- Enabling Technologies

- The Notes Phenomenon

- Market Analysis

- Market Highlights

- Market Leaders: Lotus, Microsoft, Apple, WordPerfect, Borland, ICL, Digital Equipment

- Selection Guidelines

- Future Directions

- Intelligent Office Systems&Intelligent Document Management

- Optical Storage Technologies

- Networking, Internet, WWW

- Database Management in the Office (LAN, Remote Database Access)

- Full-Content Retrieval (Library Management)

- Imaging Systems (OCR, Document Management)

- Form Management (JetForm)

- Graphical User Interfaces

- Multimedia Objects in the Office

- Collaborative Work and Workflow Management in Intelligent Offices

PART 3: ELECTRONIC DATA INTERCHANGE (EDI)

INTRODUCTION

Electronic Data Interchange (EDI) is the exchange of business information in a digital, computer-readable format. The currently used EDI applications range from business inquiries and purchasing goods and services to health care claims. EDI has become highly regarded as a vital part of daily business operations in the large industries where it began (automotive, transportation and pharmaceutical) and in many others. Businesses in these industries realize substantial cost savings compared to the cost of a manual paper transaction. EDI also increases data accuracy and productivity. It enables immediate response to orders and order inquiries, same-day shipment, inventory reduction, and reallocation of data entry resources.

THE CONTENT OF THE COURSE on Electronic Data Interchange

- What is EDI?

- EDI transactions

- How does EDI work?

- Benefits of EDI

- Deeper understanding of EDI

- Information Flow

- The EDI Document

- EDI Technology

- EDI Standards

- ASC X12 and UN/EDIFACT

- Retail Industry Standards

- The UCS Standard

- UCS Communications

- Direct Store Delivery

- WINS (Warehouse Information Network Standard)

- The VICS (Voluntary Industry Communications Standard) Guideline

- Implementation

- Key to Success

- The Five Pieces of an EDI System

- telecommunications capacity

- telecommunications software

- EDI translator

- interface

- translation or reformatting of information

- Implementation Phases

- Choosing a VAN (Value-Added Network)

- EDI Network Vendors

- Translation Software

- The Interface File/Mapping