

Vocational Education Program

5780

Networked Office Equipment

Training Sector

9

Electrotechnology

Reach for
your **Dreams**

Québec 

vocational Education Program

5780

Networked Office Equipment

Training Sector

9

Electrotechnology

Formation professionnelle et technique
et formation continue

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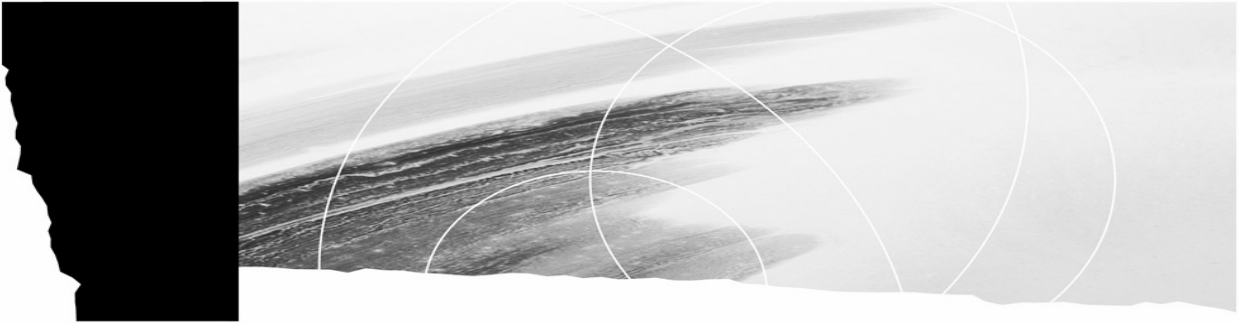
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5780

Networked Office Equipment

Year of approval: 2003

Certification:	Attestation of Vocational Specialization
Total duration:	450 hours
Number of credits:	30
Number of modules:	6

To be admitted to the *Networked Office Equipment* program, students must meet one of the following conditions:

- Hold a Diploma of Vocational Studies in *Business Equipment Technical Service* (5765) or a recognized equivalent.

OR

- Practise a trade or profession related to the program of study.

Introduction to the Program

The vocational training curriculum, from which this program of study derives, is the responsibility of both the Ministère de l'Éducation, which develops the program and its teaching guides, and the educational institutions, which implement the program and the evaluation process. Programs of study include compulsory objectives and suggestions for competency-related knowledge, skills and attitudes.

Programs of study provide teachers with a frame of reference for planning teaching activities. They define the scope of teaching strategies by identifying the broad educational orientations to be favoured and the objectives to be attained. By successfully completing a program, students acquire not only the entry-level competencies required by the workplace in order to practise a trade or occupation, but also a range of knowledge, skills and attitudes that provide students with a certain degree of versatility.

The duration of the program is 450 hours, which includes 135 hours spent on the specific competencies required to practise the trade and 315 hours on general, work-related competencies. The program of study is divided into 6 modules, which vary in length from 45 to 90 hours. The time allocated to the program is to be used not only for teaching but also for evaluation and remedial work.

Title	Code	Module	Hours	Credits
Network Operating Systems Using Current Technology	785 936	1	90	6
New Technologies	785 943	2	45	3
Network Operating Systems Using Emerging Technology	785 956	3	90	6
Diagnosing a Network-Related Malfunction	785 966	4	90	6
After-Sales Service on Networked Office Equipment	785 975	5	75	5
Practicum in the Workplace	785 984	6	60	4

Glossary

Program

A program of study includes compulsory objectives and content, and may also include optional objectives and content that must be enriched and adapted according to the students' needs (*Education Act*, s. 461). In this program, the optional content is expressed in terms of suggestions.

Competency

A competency is the ability to act successfully and evolve in order to adequately perform work-related tasks or activities based on an organized body of knowledge and skills from a variety of fields, perceptions, attitudes, operational expectations, etc.

Objectives

Objectives refer to the operational aspect of a competency. They are expressed in terms of specific requirements and serve as the practical basis for teaching, learning and evaluation. These objectives are either behavioural or situational.

Objectives also provide indicators for learning related to the acquisition of a competency. These indicators are grouped according to elements of the competency (in the case of behavioural objectives), and according to phases of the learning context (in the case of situational objectives). Suggestions for competency-related knowledge, skills, perceptions and attitudes are not prescriptive.

1. Behavioural Objective

A behavioural objective is a relatively closed objective that describes the actions and results expected of the student. Behavioural objectives consist of the following four components:

- The *statement of the competency*, which is the result of the job analysis, the general goals of the program and other determinants.
- The *elements of the competency*, which describe in terms of specific behaviours the essential aspects that are necessary in order to understand the competency. They specify the major steps involved in performing a task or the main components of the competency.
- The *achievement context*, which corresponds to the situation in which the competency is exercised at entry-level on the job market. The achievement context does not specify the context for learning or evaluation.
- The *performance criteria*, which define the requirements by which to judge the attainment of each element of the competency and, consequently, of the competency itself. They are based on the requirements for performing a task or activity and indicate the expected level of performance or the overall quality of a product or service. They relate to the competency as a whole or to several elements of the competency.

Evaluation is based on expected results.

2. Situational Objective

A situational objective is a relatively open-ended objective that outlines the major phases of a learning situation. It allows for output and results to vary from one student to another. Situational objectives consist of the following five components:

- The *statement of the competency*, which is the result of the job analysis, the general goals of the program and other determinants.
- The *elements of the competency*, which outline the essential aspects of the competency and ensure a better understanding of the expected outcome.
- The *learning context*, which provides an outline of the learning situation designed to help the students develop the required competencies. It is normally divided into three phases of learning:
 - information
 - participation
 - evaluation
- The *instructional guidelines*, which provide suggested ways and means of teaching the course to ensure that learning takes place and that the same conditions apply wherever and whenever the course is taught. These guidelines may include general principles or specific procedures.
- The *participation criteria*, which describe the requirements the students must fulfill in each phase of the learning context. They focus on how the students take part in the activities rather than on the results obtained. Participation criteria are normally provided for each phase of the learning context.

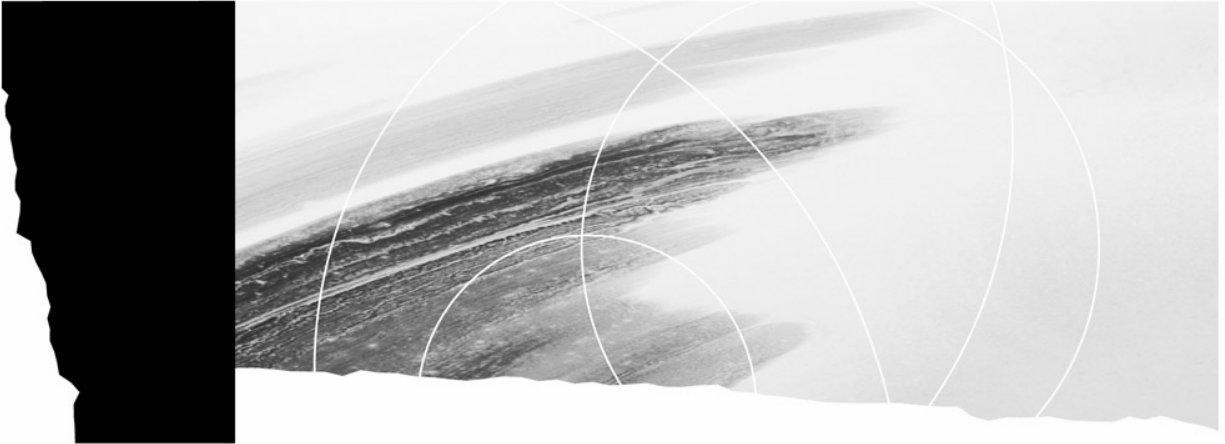
Evaluation is based on the student's participation in the activities of the learning context.

Module

A module is a component of a program of study comprising a prescriptive objective and suggestions for competency-related knowledge, skills, perceptions and attitudes.

Credit

A credit is a unit used for expressing quantitatively the value of the modules in a program of study. One credit corresponds to 15 hours of training. Students must accumulate a set number of credits to graduate from a program.



Part I

Program Goals

Educational Aims

**Program Competencies and
Grid of Competencies**

Harmonization

Program Goals

The *Networked Office Equipment* program prepares students to practise the occupation of Office Equipment Technician Specialized in Network Support.

Office equipment technicians specialized in network support are employed in maintenance and service companies, or wholesale and retail distributors.

They provide after-sales service (i.e. installation, repair, maintenance or updating) of photocopiers, microcomputers, fax machines, sales registration equipment, or any other network-connected equipment. They must be able to determine if the cause of a problem is related to the network or to the equipment itself (e.g. electronic, optical or mechanical malfunction).

Technicians perform their tasks alone, either in a workshop or at the customer's place of business. They must be able to respond to service calls, and communicate properly with colleagues, network administrators and network users.

Concern for establishing good customer relations, the ability to represent their employer and a desire to stay up to date are essential qualities for these workers.

The program goals of *Networked Office Equipment* are based on the general goals of vocational training. These goals are:

To help students develop effectiveness in the practice of a trade or occupation:

- To teach students to perform tasks and activities correctly and at an acceptable level of competence for entry into the job market.
- To prepare students to progress satisfactorily on the job.

To help students integrate into the work force:

- To familiarize students with the specialization they have chosen.

To help students develop and acquire occupational knowledge, skills, perceptions and attitudes:

- To help students:
 - develop autonomy and the desire to learn, and acquire effective work methods
 - understand the principles underlying the techniques and the technology used in the trade or occupation
 - develop self-expression, initiative and an analytical mind
 - acquire the attitudes required to successfully practise the trade or occupation, a sense of responsibility and a concern for excellence

To ensure job mobility:

- To help students develop positive attitudes toward change.

The program meets two requirements of vocational training, i.e. versatility and proficiency in tasks related to the trade or occupation. Versatility is ensured through several general competencies that enable students to acquire the knowledge and skills required by the trade. Proficiency in networking tasks is ensured through the acquisition of specific competencies. Both types of competencies cover all areas of employment and ensure job mobility.

Educational Aims

Educational aims are based on important values and concerns and serve as guidelines for interactions with students. As a general rule, educational aims focus on important aspects of the students' professional and personal development, such as attitudes, work habits and intellectual skills that have not been explicitly formulated in the program goals and objectives.

Educational aims encourage teachers to follow a certain direction in their interactions with students. Promoted on an ongoing basis, educational aims are specifically designed to help students develop habits, attitudes and other attributes that are beyond the scope of the program objectives.

The *Networked Office Equipment* program encourages students to develop their:

- autonomy and sense of responsibility
- communication skills
- perseverance and resourcefulness

Program Competencies and Grid of Competencies

Program Competencies

- To service network operating systems that use current technology.
- To adapt to new technologies.
- To service network operating systems that use emerging technology.
- To diagnose a network-related malfunction.
- To provide after-sales service on networked office equipment.
- To enter the work force.

Grid of Competencies

The grid of learning focuses lists general, work-related competencies and specific competencies required to practise the occupation, as well as the major steps in the work process.

The grid of learning focuses shows the relationship between the general competencies on the horizontal axis and the specific competencies on the vertical axis. The symbol (\triangle) indicates a correlation between a specific competency and a step in the work process. The symbol (\bigcirc) indicates a correlation between a general and a specific competency. Shaded symbols indicate that these relationships have been taken into account in the formulation of objectives intended to develop specific competencies related to the trade or occupation.

The logic used in constructing the grid influences the course sequence. Generally speaking, this sequence follows a logical progression in terms of the complexity of the learning involved and the development of the students' autonomy. The vertical axis presents the specific competencies in the order in which they should be taught. The modules including the general competencies on the horizontal axis should be taught in relation to those on the vertical axis. This means that some modules are prerequisite to others, while other modules are taught concurrently.

GRID OF COMPETENCIES															
Networked Office Equipment	Competency number	Objective	Duration (in hours)	WORK PROCESS						GENERAL COMPETENCIES				Number of competencies	Duration (in hours)
				To receive a request for service.	To plan the work to be done.	To carry out the work.	To clean and tidy up.	To communicate with customers.	To write a report.	To service network operating systems that use current technology.	To adapt to new technologies.	To service network operating systems that use emerging technologies.	To diagnose a network-related malfunction.		
SPECIFIC COMPETENCIES															
Competency number	N									1	2	3	4		
Objective		O								B	B	B	B	4	
Duration (in hours)			D							90	45	90	90		315
To provide after-sales service on networked office equipment.	5	B	75	▲	▲	▲	▲	▲	▲	●	●	●	●		
To enter the work force.	6	S	60	▲	▲	▲	▲	▲	▲	●	●	●	●		
Number of competencies		2												6	
Duration			135												450

N: Competency number O: Type of objective: B: Behavioural S: Situational D: Duration (in hours)

Correlation to be taught and evaluated: Between a step and a specific competency (▲) Between a general and a specific competency (●)

Harmonization

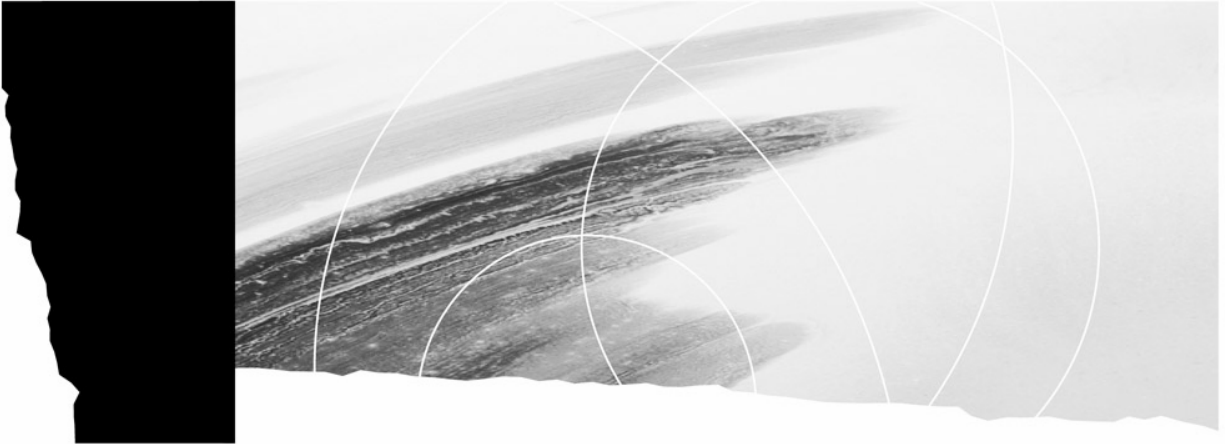
The Ministère de l'Éducation harmonizes its vocational and technical programs by establishing similarities and continuity between secondary- and college-level programs within a particular sector or between sectors in order to avoid overlap in program offerings, to recognize prior learning and optimize the students' progress.

Harmonization establishes consistency between training programs and is especially important in ensuring that the tasks of a trade or occupation are clearly identified and described. Harmonization makes it possible to identify tasks requiring competencies that are common to more than one program. Even if there are no common competencies, training programs are still harmonized.

Harmonization is said to be “inter-level” when it focuses on training programs at different levels, “intra-level” when it focuses on programs within the same educational level, and “inter-sector” when carried out between programs in various sectors.

An important aspect of harmonization is that it allows the common features of competencies to be identified and updated as needed. Common competencies are competencies that are shared by more than one program; once acquired in one program, they can be recognized as having been acquired in another. Competencies with exactly the same statement and elements are said to be identical. Common competencies that are not identical but have enough similarities to be of equal value are said to be equivalent.

Harmonization of the *Networked Office Equipment* program has resulted in identifying competencies that are shared with other programs. Detailed information on the harmonization of this program and its results are presented in the document entitled *Tableaux d'harmonisation, Liaison en réseau d'équipement bureautique*.



Part II

Objectives

Behavioural Objective**Statement of the Competency**

To service network operating systems that use current technology.

Achievement Context

- Given technical reference materials in English or French
- Working with:
 - a computer workstation connected to a local network
 - a network operating system using current technology

Elements of the Competency**Performance Criteria**

1. Manage the disk.

- Appropriate partitioning of disk
- Suitable choice of file system
- Appropriate interventions on tree structure
- Appropriate interventions on files:
 - moving
 - saving and restoring
 - copying
 - deleting
 - compressing and decompressing
 - modifying rights and restrictions
 - editing
- Correct modification of file attributes

2. Customize the computer environment.

- Correct adaptation of the Graphic User Interface (GUI) to the user's requirement:
 - start-up
 - menu
 - shortcut
 - taskbar
 - display style
 - screen saver
 - password, etc.
- Correct adaptation of the Graphic User Interface (GUI) on multi-user workstation.

3. Run programs and commands in text mode.

- Appropriate choice of commands
- Observance of syntax
- Accurate location of command or program
- Correct interpretation of results
- Correct use of potential of commands and programs

- 4. Install drivers.
 - Appropriate choice of drivers
 - Compliance with installation procedure
 - Accurate interpretation of messages
 - Correct verification of installation
 - Appropriate configuration of network parameters

 - 5. Manage services in a client-server environment.
 - Addition or removal of services such as:
 - printing
 - DHCP
 - DNS
 - FTP
 - POP
 - SMTP
 - other
 - Observance of syntax during configuration
 - Correct configuration of remote access
- For the competency as a whole:*
- Concern for rules of ergonomics
 - Correct use of microcomputer
 - Optimal interventions

Suggestions for Competency-Related Knowledge, Skills, Perceptions and Attitudes

To acquire the competency, students should master knowledge, skills, perceptions and attitudes, such as:

- Use backup utility software.
- Be familiar with different file systems.
- Be familiar with procedures for attributing rights and permissions.
- Take into consideration equipment features.
- Ensure data integrity.
- Show concern for respecting users' needs.
- Be familiar with remote access protocols.
- Be familiar with network configuration parameters.
- Be familiar with procedures for adding and removing services.

Situational Objective

Statement of the Competency

To adapt to new technologies.

Elements of the Competency

- Gather information on new technologies used in servicing networked office equipment.
- Recognize the need to adapt to technological change in the field of electrotechnology.
- Become aware of their reactions to technological change.
- Modify their behaviours and attitudes.

Learning Context

Information phase

- Gathering information on new technologies used in servicing networked office equipment such as business machines, transmission media, network equipment, operating systems and communications protocols.
- Analyzing the information.
- Recognizing the similarities and differences between well-known technologies and new ones.
- Summarizing the information gathered.
- Presenting the results of their research to other participants.

Participation phase

- Learning about the personal qualities needed to adapt to change, such as autonomy, intellectual curiosity, a desire to learn and an interest in new developments.
- Establishing a relationship between their attitudes to change in general and to technological advances.
- Discussing how technological advances affect the practice of the trade.
- Listing ways that make it easier to keep up to date.
- Putting into practice ways that make it easier to accept change.

Evaluation phase

- Producing a report in which they:
 - present the results of their research on new technologies
 - summarize their views on the importance of adapting to new technologies

Instructional Guidelines

The teacher should:

- Encourage all students to engage in discussions and express their opinions.
- Motivate the students to participate in the proposed activities.
- Provide the students with pertinent reference materials.
- Organize visits to leading-edge companies, conferences, exhibitions, etc.

Participation Criteria

Information phase

- Gather information on new technologies.
- Present the results of their research to other participants.

Participation phase

- Agree to reflect on their ability to adapt to change.
- Express their views clearly during group discussions.
- Participate in the proposed activities.

Evaluation phase

- Write a report that includes:
 - a summary of the results of their research
 - a summary of their views on the importance of adapting to new technologies
 - a list of ways that make it easier to keep up to date

Suggestions for Competency-Related Knowledge, Skills, Perceptions and Attitudes

To acquire the competency, students should master knowledge, skills, perceptions and attitudes, such as:

- Demonstrate a desire to learn.
- Identify sources of information such as technical manuals, CD-ROMs and the Internet.
- Interpret terminology related to new technologies.
- Distinguish main ideas from secondary ones.
- Use an efficient research method.
- Question their opinions with respect to change.
- Respect the opinion of others.
- Apply rules governing group discussions.
- Be receptive to feedback.
- Use word-processing software.

Behavioural Objective**Statement of the Competency**

To service network operating systems that use emerging technology.

Achievement Context

- Given technical reference materials in English or French
- Working with:
 - a computer workstation connected to a local network
 - a network operating system using emergent technology

Elements of the Competency**Performance Criteria**

1. Manage the disk.

- Appropriate partitioning of disk
- Suitable choice of file system
- Appropriate interventions on tree structure
- Appropriate interventions on files:
 - moving
 - saving and restoring
 - copying
 - deleting
 - compressing and decompressing
 - modifying rights and restrictions
 - editing
- Correct modification of file attributes

2. Customize the computer environment.

- Correct adaptation of the Graphic User Interface (GUI) to the user's requirement:
 - start-up
 - menu
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 - display style
 - screen saver
 - password, etc.
- Correct adaptation of the Graphic User Interface (GUI) on multi-user workstation

3. Run programs and commands in text mode.

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- Accurate location of command or program
- Correct interpretation of results
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4. Install drivers.
- Appropriate choice of drivers
 - Compliance with installation procedure
 - Accurate interpretation of messages
 - Correct verification of installation
 - Appropriate configuration of network parameters
5. Manage services in a client-server environment.
- Addition or removal of services such as:
 - printing
 - DHCP
 - DNS
 - FTP
 - POP
 - SMTP
 - other
 - Observance of syntax during configuration
 - Correct configuration of remote access
- For the competency as a whole:*
- Concern for rules of ergonomics
 - Correct use of microcomputer
 - Optimal interventions

Suggestions for Competency-Related Knowledge, Skills, Perceptions and Attitudes

To acquire the competency, students should master knowledge, skills, perceptions and attitudes such as:

- Use backup utility software.
- Be familiar with different file systems.
- Be familiar with procedures for attributing rights and permissions.
- Take into consideration equipment features.
- Ensure data integrity.
- Show concern for respecting users' needs.
- Be familiar with remote access protocols.
- Be familiar with network configuration parameters.
- Be familiar with procedures for adding and removing services.

Behavioural Objective

Statement of the Competency

To diagnose a network-related malfunction.

Achievement Context

- Given technical reference materials in English or French
- Using:
 - network plans and diagrams
 - tools and measuring instruments
- Working with networked office equipment

Elements of the Competency**Performance Criteria**

1. Become familiar with the network-related malfunction.
2. Prepare the steps to be taken.
3. Study the network plans.
4. Verify the network equipment and operating system.
5. Process the information gathered.
6. Identify the cause or causes of the malfunction.

- Gathering of all the information
- Relevance of information gathered
- Clear questions to the network administrator
- Appropriate choice of:
 - reference manuals
 - tools
 - instruments
- Accurate interpretation of network structure and architecture
- Correct verification of reliability of transmission media
- Correct verification of equipment compatibility
- Correct verification of equipment configuration
- Correct verification of network capacity
- Thorough analysis of data
- Formulation of plausible hypotheses
- Accurate identification of cause(s) of malfunction

For the competency as a whole:

- Observance of occupational health and safety regulations
- Compliance with instructions
- Proper use of problem-solving methods
- Accurate diagnosis

Suggestions for Competency-Related Knowledge, Skills, Perceptions and Attitudes

To acquire the competency, the students should master knowledge, skills, perceptions and attitudes, such as:

- Be familiar with different network structures and architectures.
- Be familiar with reference models.
- Be familiar with communications protocols.
- Carry out research.
- Communicate clearly with the network administrator.
- Be familiar with network verification tools.
- Be familiar with network verification software.
- Be familiar with the symbols representing different network components.
- Recognize network segments.
- Be familiar with the different categories of cables and connectors.
- Be familiar with standards related to copper and optical fibre links.
- Be familiar with the parameters that affect network links.
- Interpret test results.
- Be familiar with operating systems.
- Be familiar with network components and their functions.

Behavioural Objective**Statement of the Competency**

To provide after-sales service on networked office equipment.

Achievement Context

- In response to a service call
- In a workshop or at the customer's place of business
- Given technical reference materials in English or French
- Using tools and measuring instruments
- Working with networked office equipment

Elements of the Competency**Performance Criteria**

1. Receive a service request.

- Accurate interpretation of service request

2. Plan the work.

- Correct prioritization of calls
- Proper work sequence
- Correct estimate of material required to perform the work

3. Gather information on the network.

- Relevant questions to the network administrator
- Accurate recording of main ideas
- Accurate interpretation of network or subnetwork plan
- Active listening
- Courtesy

4. Install the equipment and connect it to the network.

- Observance of procedures for installing:
 - photocopiers
 - microcomputers and microcomputer peripherals
 - sales registers
- Accuracy of subnetwork addresses and masks
- Correct configuration of the communications protocols
- Correct installation of specialized office automation software
- Clear verbal communication when demonstrating how to operate the piece of equipment
- Proper testing of the networked equipment

5. Repair the networked equipment.

- Gathering of all the information on the malfunction
- Accurate diagnosis of malfunction in:
 - the equipment
 - the network
- Problem solving for equipment such as:
 - photocopiers, microcomputers, peripherals, and sales registers
 - interfaces
 - cables and connectors
- Problem solving for specialized software
- Problem solving for versions of operating systems and communications protocols
- Proper testing of networked equipment
- Clear verbal communication when discussing problem with network administrator

6. Service networked equipment.

- Clear explanations given to users during equipment shutdown procedures
- Concern for not creating problems in the network
- Observance of maintenance procedures

7. Write a service report.

- Use of appropriate terminology
- Accuracy of recorded information
- Quality of written language
- Legibility of recorded data

For the competency as a whole:

- Observance of occupational health and safety regulations
- Observance of professional ethics
- Customer satisfaction
- Optimal functioning of networked equipment
- Appropriate use of tools and instruments
- Effective stress management
- Clean, orderly work area

Suggestions for Competency-Related Knowledge, Skills, Perceptions and Attitudes

To acquire the competency, students should master knowledge, skills, perceptions and attitudes, such as:

- Possess good organizational skills.
- Demonstrate autonomy.
- Be familiar with the different network architectures.
- Distinguish among the different network material.
- Distinguish among the different features of transmission media.
- Be familiar with network protocols.
- Verify the power supply, telephone line and network link.
- Show concern for meeting customers' needs.
- Observe occupational health and safety regulations.
- Show concern for not making the malfunction worse.

Situational Objective

Statement of the Competency

To enter the work force.

Elements of the Competency

- Become familiar with certain working conditions related to servicing networked office equipment.
- Carry out various trade-related activities.
- Observe company policies.
- Observe professional ethics.
- Communicate with superiors, company personnel and customers.

Learning Context

Information phase

- Learning about the terms and conditions of the practicum.
- Preparing a list of companies likely to accept trainees.
- Learning about company policies.
- Writing a résumé and a cover letter.
- Communicating with practicum supervisors in host companies.

Participation phase

- Observing the work context: the socioeconomic environment (e.g. products and market), professional associations, organizational structure, equipment, technological advances, working conditions, professional relationships, health and safety, etc.
- Performing or participating in various occupational tasks.
- Recording their observations in a practicum log.

Evaluation phase

- Producing a brief report of their observations, the tasks carried out, and the similarities and differences between the classroom and the workplace.
- Discussing the accuracy of their perception of the trade.
- Participating in the evaluation of their practicum with the teaching personnel and the practicum supervisor in the host company.
- Participating in the evaluation of practicums with other trainees.

Instructional Guidelines

The teacher should:

- Provide the students with the means to choose an appropriate practicum position.
- Maintain close ties between the school and the host company.
- Promote the observation and performance of a variety of work-related tasks.
- Make sure that a qualified employee of the company supervises the trainees at all times.
- Ensure support and supervision of the students as needed.
- Intervene if difficulties or problems arise.
- Encourage the students to engage in discussions and to express their opinions, especially when choosing their practicum positions, and when comparing their perceptions before and after their experience in the workplace.

Participation Criteria

Information phase

- Prepare a list of companies.
- Learn about company policies.
- Meet with a company representative with a view to obtaining a practicum position.

Participation phase

- Follow the company's instructions regarding activities, work schedules, etc.
- Gather information about the workplace.

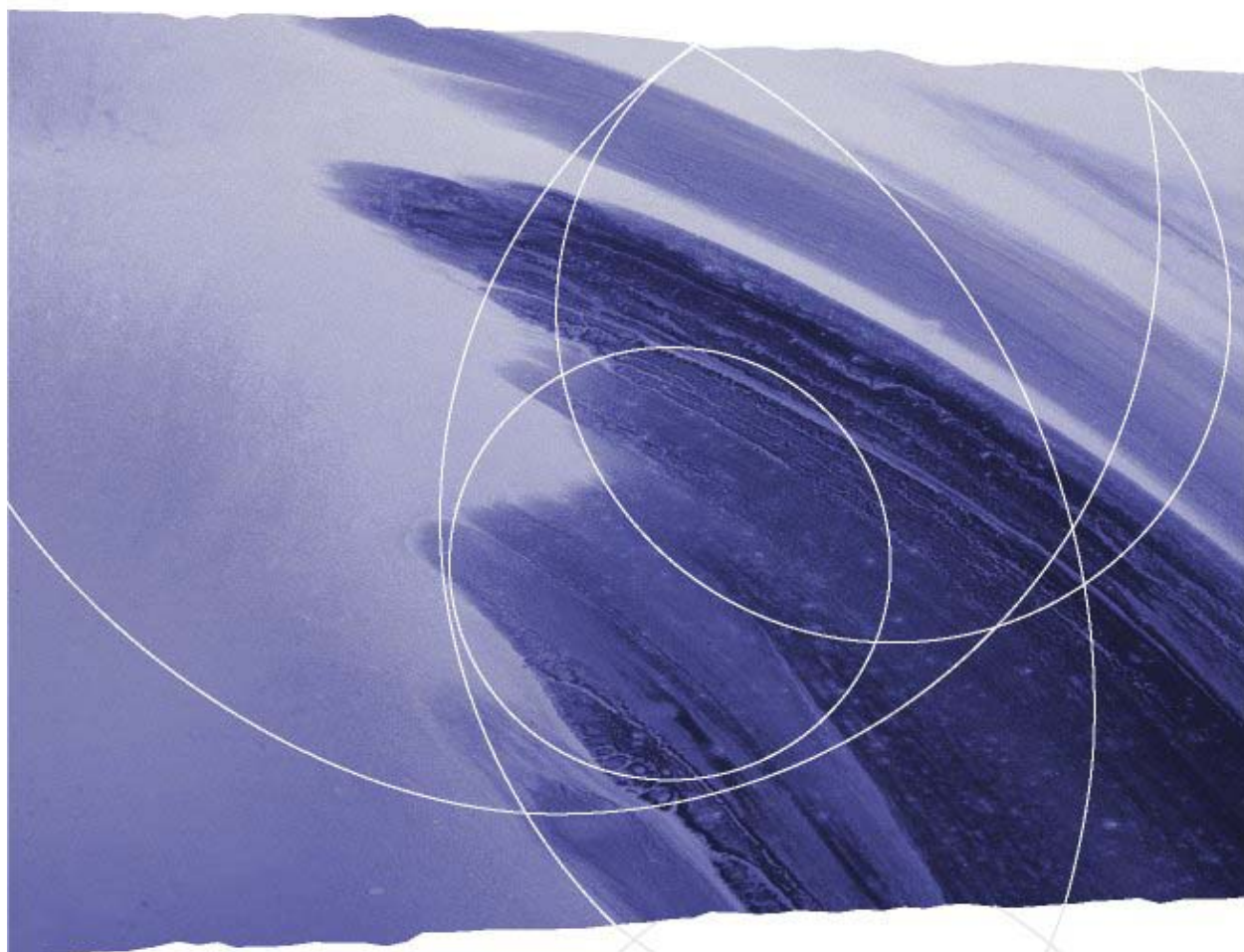
Evaluation phase

- Produce a brief report.
- Share with other students their experiences in the workplace.

Suggestions for Competency-Related Knowledge, Skills, Perceptions and Attitudes

To acquire the competency, students should master knowledge, skills, perceptions and attitudes, such as:

- Describe the steps involved in looking for a practicum position.
- List the attitudes required when actively looking for a practicum position.
- Show interest in doing a practicum.
- Describe the elements to be recorded during a practicum.
- Describe behaviours to be adopted in the workplace.
- Understand the importance of observing company policies.
- Show concern for observing health and safety regulations.
- Show concern for adopting positive attitudes.
- List their aptitudes, interests and preferences related to the specialization.
- Describe the requirements of the workplace.
- Be receptive to feedback.



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