

Course
CMP-5081-1
Operating Systems

Computer Science



INTRODUCTION

The goal of the *Operating Systems* course is to help adult learners develop the versatility and autonomy that will enable them to learn about the characteristics of at least two computer operating systems and how they work in general.

In this course, adult learners deal with learning situations that help them acquire practical knowledge about operating systems and critically examine these systems. To interact in learning situations, adult learners choose an operating system suitable to the context and adapt their environment according to ergonomic standards. They use appropriate elements of the interface to carry out their work and check their understanding by validating information or the documentation they consult.

By the end of this course, adult learners will be able to interact with an operating system to perform everyday computer operations. They will also be able to critically examine the operating systems they use as well as the systems' components.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Interacts in a computer environment*
- *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*

Thus, it is by activating and integrating these two subject-specific competencies and by using other resources that adults are able to effectively structure their learning.

During the learning situations, adult learners communicate using a human-machine interface, use the elements of a computer environment and evaluate their efficiency in the computer environment. Throughout the learning process, they adopt ethical behaviours and a critical attitude.

PROCESSES AND STRATEGIES

As they learn about computers, adult learners are called upon to use various processes and strategies. These processes and strategies represent the way in which adults go about solving problems, meeting challenges and, in general, carrying out their learning activities.

For the *Operating Systems* course, the suggested approach is the familiarization process.

Familiarization process	
<ul style="list-style-type: none"> • This process involves becoming familiar with the basics of a computer application. • Adult learners familiarize themselves with the main concepts and develop an overall understanding of the application. • The goal of this process is not to be able to produce documents quickly, efficiently and without errors, but rather to understand as clearly as possible the logic behind the application. 	
Examples of strategies	<ul style="list-style-type: none"> - Determining the necessary resources - Adhering to the plan - Making adjustments to the plan - Determining the improvements to be made and the means of doing so

To meet the requirements of the familiarization process, adult learners take stock of what they already know and try to apply that knowledge to the object or situation they are learning about. Their plan must therefore be flexible and include help resources so that adult learners can make adjustments throughout the process.

CROSS-CURRICULAR COMPETENCIES

The cross-curricular competencies are not developed in a vacuum; they are rooted in learning situations and contribute, to varying degrees, to the development of the subject-specific competencies, and vice versa.

Several cross-curricular competencies can be useful in dealing with the learning situations in the *Operating Systems* course. Three are considered particularly relevant to this course: *Uses information*, *Exercises critical judgment* and *Uses information and communications technologies*.

▪ Intellectual Competencies

As they become familiar with the characteristics and uses of at least two operating systems, adult learners *use information* to meet their computer needs and *exercise critical judgment*. In this way, they learn to make informed decisions based on a given context.

▪ Methodological Competency

By using elements of the graphic interface of at least two operating systems, adult learners become more proficient in *using information and communications technologies*. They learn not to be dependent on a specific version of an operating system and understand that there are several ways of communicating with a computer system.

SUBJECT-SPECIFIC CONTENT

The subject-specific content consists of knowledge and cultural references. The prescribed content for this course is outlined below. However, depending on the context (e.g. if certain tools or functions are not available in a given software program), other equivalent content may be substituted for that outlined below.

KNOWLEDGE

- ***Characteristics of at least two operating systems***
 - Software publishers
 - Platforms
 - Market shares
 - Costs
 - User licences
 - Hardware and software compatibility
 - File system
 - Tree structure
 - Storage principles: FAT, NTFS, inode, MFS
 - Restrictions concerning file names
 - File extensions
 - Rights and privileges of users and administrators
 - Elements of the interface
 - Control panel (system preferences)
- ***Ergonomic characteristics of the work station***
- ***Terminology associated with operating systems***
- ***Configuring settings and basic functions of two operating systems***
 - Customizing display settings
 - Setting time, date and regional options
 - Selecting the keyboard input language
 - Using components and peripherals efficiently
- ***Workplace ergonomics***
 - Positioning oneself properly
 - Adapting the work area
 - Arranging the desktop efficiently

- **Managing files and folders**
 - Understanding and using file display modes
 - Handling files and folders
 - Printing a file
 - Creating a file or folder
 - Renaming a file or folder
 - Dragging and dropping
 - Copying, cutting and pasting
 - Deleting

CULTURAL REFERENCES

The following cultural references will help adults understand some of the factors that influenced the development of computer science. These references give a cultural dimension to instruction, expand the adult learners' knowledge and make their learning meaningful. The teacher, with input from adult learners, may choose other references that are more appropriate to the task at hand.

- **Events and chronology**
 - Chronological development of computer systems, peripherals and operating systems
 - Chronological development of computer capacity as it relates to different animation films or special effects
 - History of operating systems of popular electronic devices such as smart phones, cell phones or personal digital assistants (PDAs)
 - Movie-related or literary anecdotes (role of computers in certain science fiction films and novels)
- **Heritage objects**
 - Old computers and peripherals
 - Old type of documentation and help files
 - Price lists and descriptions of old computer systems
- **Regional or national references**
 - Employers, software publishers, creators of smart devices
 - Anecdotes
 - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Operating Systems* course is to help adult learners develop the versatility and autonomy that will enable them to learn about the characteristics of at least two computer operating systems and how they work in general. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment, produce quality computerized documents and adopt ethical behaviours and a critical attitude.

The shaded cells in the table below provide specifics about the contexts in which the prescribed families of learning situations are applied in this course.

Subject-specific competencies	Families of learning situations related to . . .		
	Information	Creation	Critical thinking
Interacts in a computer environment	Interacts by interpreting signals he/she receives and using input and output peripherals	Discovers what computers can do by consulting documentation and by experimenting	Critically examines computerized communication tools by applying evaluation criteria
Produces computerized documents	Communicates by using computerized services	Creates by correctly using the appropriate functions	Evaluates his/her work by setting quality standards
Adopts behaviours that reflect a concern for ethics, safety and critical thinking	Communicates respectfully, using the conventions of a given medium	Acts prudently by adopting safe behaviours	Validates information by using validation criteria

First, adult learners interact by interpreting signals they receive and by using input and output peripherals, in particular to take action. Then, they discover what computers can do by consulting documentation and by experimenting. For example, they may determine what is feasible or choose the right tool to carry out a project.

Subsequently, they critically examine computerized communication tools by applying evaluation criteria to configure their environment appropriately, among other things. They validate information by using criteria to put information in context or distinguish information from propaganda.

BROAD AREAS OF LEARNING

The broad areas of learning deal with major contemporary issues. Ideally, the situations to be studied should be selected in keeping with the educational aims of the broad areas of learning since these areas of learning provide a broader context for the learning situations and thus serve to make learning more meaningful. Two broad areas of learning are considered particularly relevant to this course: Health and Well-Being, and Environmental Awareness and Consumer Rights and Responsibilities.

- **Health and Well-Being**

Helping adult learners understand the importance of healthy living habits is an essential aspect of the Computer Science program. Thus, a learning situation that enables adult learners to adapt an interface to their particular needs and apply ergonomic standards meets the educational aim of the BAL Health and Well-Being.

- **Environmental Awareness and Consumer Rights and Responsibilities**

Learning how to develop an active relationship with his or her surroundings while maintaining a critical attitude toward consumption and the exploitation of the environment is an essential part of an adult's education. A learning situation that enables adult learners to evaluate the costs related to computer use as well as the possibilities of recycling equipment meets the educational aim of the BAL Environmental Awareness and Consumer Rights and Responsibilities.

EXAMPLE OF A LEARNING SITUATION

All learning situations, no matter what broad area of learning is targeted, place adult learners at the heart of the action. Learning situations promote the development of subject-specific and cross-curricular competencies, the acquisition of computer knowledge and skills and the mobilization of various resources that are useful in carrying out the tasks at hand.

The table below shows the elements that need to be considered when developing a learning situation and highlights those selected for the learning activity described on the following page.

ELEMENTS REQUIRED IN LEARNING SITUATIONS	
Broad area of learning (targeted) - Contextualizes learning to make learning more meaningful	<ul style="list-style-type: none"> • Environmental Awareness and Consumer Rights and Responsibilities
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	<ul style="list-style-type: none"> • Interacts in a computer environment • Adopts behaviours that reflect a concern for ethics, safety and critical thinking
Family of learning situations (prescribed) - Group together situations appropriate to the course, based on issues drawn from reality - Promote the acquisition of computer knowledge and skills	<ul style="list-style-type: none"> • Information <ul style="list-style-type: none"> ○ Interacts by interpreting signals he/she receives and using input and output peripherals • Creation <ul style="list-style-type: none"> ○ Discovers what computers can do by consulting documentation and by experimenting • Critical thinking <ul style="list-style-type: none"> ○ Critically examines computerized communication tools by applying evaluation criteria ○ Validates information by using validation criteria
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	<ul style="list-style-type: none"> • Uses information • Exercises critical judgement • Uses information and communications technologies
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	<ul style="list-style-type: none"> • Terminology associated with operating systems • Configuring settings and basic functions of two operating systems • Choosing an operating system based on the context and comparing its characteristics with those of another operating system

This section provides an example of a learning activity. It includes a context that serves as a common thread throughout the activity; however, it is not formally spelled out. Although they may not be explicit, the learning situation includes the elements identified in the table above: the broad area of learning, the subject-specific competencies, the families of learning situations, the cross-curricular competencies and the prescribed knowledge. To promote learning, these elements must be structured in a coherent and meaningful way.

Teachers can target any element as a focus of learning, be it actions related to the subject-specific or the cross-curricular competencies or the prescribed knowledge that adults must acquire.

EXAMPLE OF A LEARNING SITUATION

Purchase order for new computer equipment

Task: Present a proposal to the principal of the adult education centre for the purchase of new computer equipment (hardware and software, costs, operating system and compatibility) for the student newspaper.

To start off the activity, the teacher describes the type of computer equipment needed to produce a student newspaper. He or she then presents a list of the materials currently used by the student newspaper team (computers, peripherals, software and operating systems) and asks the adult learners to prepare a proposal to update this equipment.

To carry out the activity, adult learners determine what hardware and software could be kept. They look for new equipment or appropriate updates on the Internet, in stores or in advertising flyers. They use the documentation or descriptions provided to compare or sort the results of their search based on the compatibility with the hardware and software materials that will be kept. When they are satisfied with their choices, they submit their purchase order detailing all of the computer equipment and items they recommend, along with an explanation backing up their recommendations.

At the end of the activity, the teacher asks the adult learners about their purchase order to validate their knowledge about operating systems and the logic behind their choices, taking into account the fact that adult learners are still familiarizing themselves with the systems.

END-OF-COURSE OUTCOMES

To deal with situations related to operating systems, adult learners identify and use the features of at least two operating systems. To do this, they use the following subject-specific competencies: *Interacts in a computer environment* and *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*.

When adult learners *interact*, they accurately interpret the signals transmitted by the operating system and respond using elements of the graphic interface. If necessary, they use various material resources efficiently, adapt the interface to their needs and work ergonomically.

When adult learners *discover what computers can do* or *critically examine computerized communication tools*, they consult the documentation provided and experiment with the tools in a responsible manner, taking into account user agreements, codes of ethics, copyright and conditions for use. They apply evaluation criteria by examining their results and recognizing obstacles to effective interaction, and determine ways of overcoming these obstacles.

When adult learners *validate information* or documentation on operating systems, they check its compatibility with the operating system used and make sure the source is credible.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they identify the characteristics of at least two operating systems; configure the settings and basic functions of two operating systems; adapt the interface; and manage files and directories. Thus, they develop skills that may help them compare the characteristics of two operating systems based on the context, and are able to perform the same task using either operating system. In addition, they do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Accurate interpretation of messages and signals
- Use of appropriate strategies to interact and to troubleshoot
- Judicious application of evaluation criteria

Adopts behaviours that reflect a concern for ethics, safety and critical thinking

- Judicious integration of information in accordance with the constraints identified