MINISTÈRE DE L'ÉDUCATION ET DE L'ENSEIGNEMENT SUPÉRIEUR

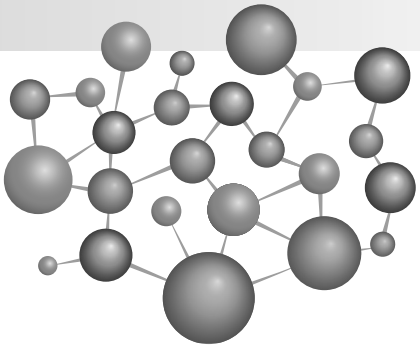
PROGRAM OF STUDY

COMPUTER SCIENCE

Adult general education
SUBJECT AREA: MATEHEMATICS, SCIENCE AND TECHNOLOGY

Diversified Basic Education **(DBE)**

Québec



PROGRAM OF STUDY

COMPUTER SCIENCE

Adult general education
SUBJECT AREA: MATEHEMATICS, SCIENCE AND TECHNOLOGY

Diversified Basic Education **(DBE)**

This document was updated in January 2020.

Coordination and content
Direction de l'éducation des adultes et de la formation professionnelle
Secteur de l'éducation préscolaire et de l'enseignement primaire et secondaire

English translation
Direction du soutien au réseau éducatif anglophone – Services langagiers

Title of original document:
PROGRAMME D'ÉTUDES, *Informatique, Formation générale des adultes*

For additional information, contact:

Direction de l'éducation des adultes et de la formation professionnelle
Ministère de l'Éducation et de l'Enseignement supérieur
1035, rue De La Chevrotière, 17e étage
Québec (Québec) G1R 5A5
Telephone: 418-646-4215

An electronic version of this document is available on the Web site of the Ministère de l'Éducation et de l'Enseignement supérieur at: **www.education.gouv.qc.ca**.

ISBN 978-2-550-85801-0 (PDF)
(French edition: ISBN 978-2-550-85802-7)

Legal deposit – Bibliothèque et Archives nationales du Québec, 2020

19-00463

Table of Contents

List of Tables and Figures

Chapter 1

Introduction

1.1 Contribution of the Subject to the Education of Adult Learners

The Computer Science program in diversified basic education (DBE) enables adult learners to develop a sense of empowerment and to structure their thinking so that they are able to adopt behaviours that reflect a concern for ethics, safety and critical thinking. It promotes the development of computer competencies that will allow adults to competently use the technological tools of today and tomorrow.

The goal of the Computer Science program is to help adult learners acquire a formal understanding of the main concepts associated with computer applications and enable them to develop the ability to deal with new situations and establish a solid foundation of knowledge on which they can build and organize their thinking. This goal goes beyond meeting the basic need to become computer literate, since the program allows adult learners to integrate their knowledge and apply it in different situations.

The Computer Science program includes courses that address a broad range of interests in areas such as the production of documents involving texts and calculations, image and sound processing, multimedia, the design and animation of 2D and 3D objects, database management and analysis, programming and Web document design tools.

It is intended for adult learners in DBE who wish to understand the technological world in which they live and who would like to learn how to use this technology proficiently.

The program centres on the development of three subject-specific competencies and provides adult learners with the opportunity to learn about computer science or expand their knowledge and skills in this field. The courses take into account the broad areas of learning and the cross-curricular competencies, among other things.

By developing the competency *Interacts in a computer environment*, adult learners enhance their understanding of the way in which they communicate with a computer system. Adult learners study the modes of communication used in different types of software, develop an understanding of them and assess their impact. They also explore the application of these modes of communication and put them into practice in meaningful learning situations.

By developing the competency *Produces computerized documents*, adult learners draw on their knowledge as they carry out activities that involve production and creation. They learn to analyze situations, plan and carry out projects, and reflect on the methods used and the results obtained.

By developing the competency *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*, adult learners learn to act prudently when doing computer work. They cultivate a sense of individual and social responsibility and gradually become aware of new issues and challenges arising in the field of computer science. This allows them to gradually develop critical judgment with regard to computerized media and to use their new competencies to improve

their ability to integrate into the workplace and society at large. The adult learners' personal commitment strengthens their sense of belonging and gradually leads them to adopt ethical behaviours.

The proliferation of computer applications in our society requires that adult learners develop a great capacity for processing information and, above all, the ability to adapt quickly to change. To do this, adult learners review their practices and adapt them to new learning contexts.

1.2 Approach to the Subject

Computer science deals with computers and their use in the rational automation of information-processing tasks. It covers many areas including office automation, multimedia, home automation and computer simulation. Although the program of study focuses mainly on office automation, multimedia, database management and computer programming, learning situations in other areas may also be added, particularly in the *Emerging Computer Applications* and *Supplementary Computer Training* courses.

Thus, the program promotes the development of competencies in all areas of computer science and may be adapted to all types of learning situations that give adult learners the opportunity to explore a variety of topics.

1.3 Connections Between the Subject and the Other Elements of the Diversified Basic Education Program

The components of the Diversified Basic Education Program, such as the broad areas of learning, the cross-curricular competencies and the other subject areas, enrich the Computer Science program through the many connections they allow adult learners to make.

1.3.1 Connections With the Broad Areas of Learning

The broad areas of learning (BAL) deal with major contemporary issues that adult learners confront both individually and collectively, in different areas of their lives. The Computer Science program takes these issues into account and enables adult learners to make connections between academic instruction on the one hand, and situations in their everyday lives, current events, new forms of information technology and social issues on the other. The broad areas of learning thus help contextualize tasks and make learning more meaningful.

Health and Well-Being

Applying simple ergonomic standards when using a computer is important in order to stay healthy. A person's comfort level at the computer as well as his or her physical health are

influenced by such factors as proper posture at the keyboard, chair height, the correct way of handling the mouse and control over the work environment (e.g. lighting, outside noises).

Furthermore, the courses in the Computer Science program give adult learners the opportunity to assert themselves, to feel accepted and respected, and to express their opinions and emotions, all of which promote good psychological health.

Career Planning and Entrepreneurship

The development of computer competencies can help adult learners better understand the world of work and how new information and communications technologies fit into the modern workplace. This knowledge helps adults examine their interests, aptitudes, strengths and weaknesses with regard to computer science. By developing computer competencies, adult learners increase their overall employability.

Meaningful learning situations will enable adult learners to carry out projects that will familiarize them with a given trade or occupation. Creating a Web page, doing bookkeeping for a student association, designing a poster and working on a school newspaper are all examples of learning activities that will provide adult learners with the opportunity to acquire additional skills that will make them more marketable.

Environmental Awareness and Consumer Rights and Responsibilities

In order to help them develop a sense of social responsibility, it is important to make adult learners aware of the environmental consequences associated with the rapid obsolescence of various types of equipment such as video cameras, cell phones, monitors, computers and various peripherals, and their potential ecological footprint. Thus, adult learners will become aware of the environmental impact of the production, consumption, recycling and eventual destruction of technological equipment.

This awareness can be imparted in a course on operating systems that involves a historical component or in a learning situation on recycling materials for other purposes. This issue can also be addressed in an office automation class that deals with printing. The lifespan of various types of equipment available to adult learners can also be discussed in a multimedia class.

Media Literacy

The Computer Science program allows adult learners to better understand how information is processed by the media. It encourages adult learners to ask questions about various sources of information, and how information is processed and then disseminated.

It also gives adult learners the opportunity to participate actively in public debates and express their viewpoints, by encouraging them to use computer graphics, compare published data with their own analyses, and produce structured text documents.

Citizenship and Community Life

The Computer Science program enables adult learners to acquire useful tools for managing their relationships with others. It gives them the opportunity to participate in meaningful learning situations that are related to social concerns. For example, in a multimedia class, adult learners can make a video that presents their beliefs, values or social ideals. In addition, work that involves cooperating with teachers or peers also teaches adult learners to apply some of the principles and rules of teamwork.

1.3.2 Connections With the Cross-Curricular Competencies

The Computer Science program contributes to the development of the cross-curricular competencies in a variety of learning contexts. Like subject-specific competencies, cross-curricular competencies involve the ability to act based on the effective use and mobilization of a range of resources. There are four types of cross-curricular competencies (intellectual, methodological, personal and social, and communication-related), all of which cut across subject boundaries.

Rooted in learning situations that stem from the broad areas of learning and the subject-specific competencies, cross-curricular competencies are not developed in a vacuum. To varying degrees, these competencies contribute to the development of subject-specific competencies, and vice versa.

Intellectual Competencies

Television, newspapers, the Internet—all provide access to a plethora of information. However, when it comes to collecting and *using information*, computers are more powerful than traditional tools. A spreadsheet, for example, makes it easy to illustrate population trends in a country and draw clear and accurate conclusions, or to formulate hypotheses based on the data illustrated. In this sense, computer science helps adult learners *exercise their critical judgment* by allowing them to quickly gather, analyze and interpret a large quantity of information.

Computers can also be used to effectively *solve problems*. They are ideal problem-solving tools: they allow users to break a problem down into individual steps, present these steps clearly on a screen, modify a step, change the results of the other steps accordingly without displaying any rough work, and provide easy access to documentation.

Moreover, by looking for strategies to solve problems in learning situations, adult learners may, for example, consider several possible solutions and explore various models. In this case, adult learners *use creativity,* which has less to do with the quantity of new resources or knowledge acquired than with the manner in which these are used.

Methodological Competencies

While the cross-curricular competency *Uses information and communications technologies* is intricately linked to all three subject-specific competencies, the cross-curricular competency

Adopts effective work methods is essential to computer science. When properly used in learning situations, it makes it possible to clarify and formalize one's thinking, whether it involves formatting a text, planning a budget, creating a Web site or creating a 3D model of an electric motor. Such activities involve planning the work in question, managing time, considering constraints, making the most of the required resources and using the appropriate tools.

Personal and Social Competencies

The variety of courses in the Computer Science program allows adult learners to use their talents and *achieve their potential*. Learning situations can be adapted to different personality types, as illustrated in the following diagram based on Holland's RIASEC types.

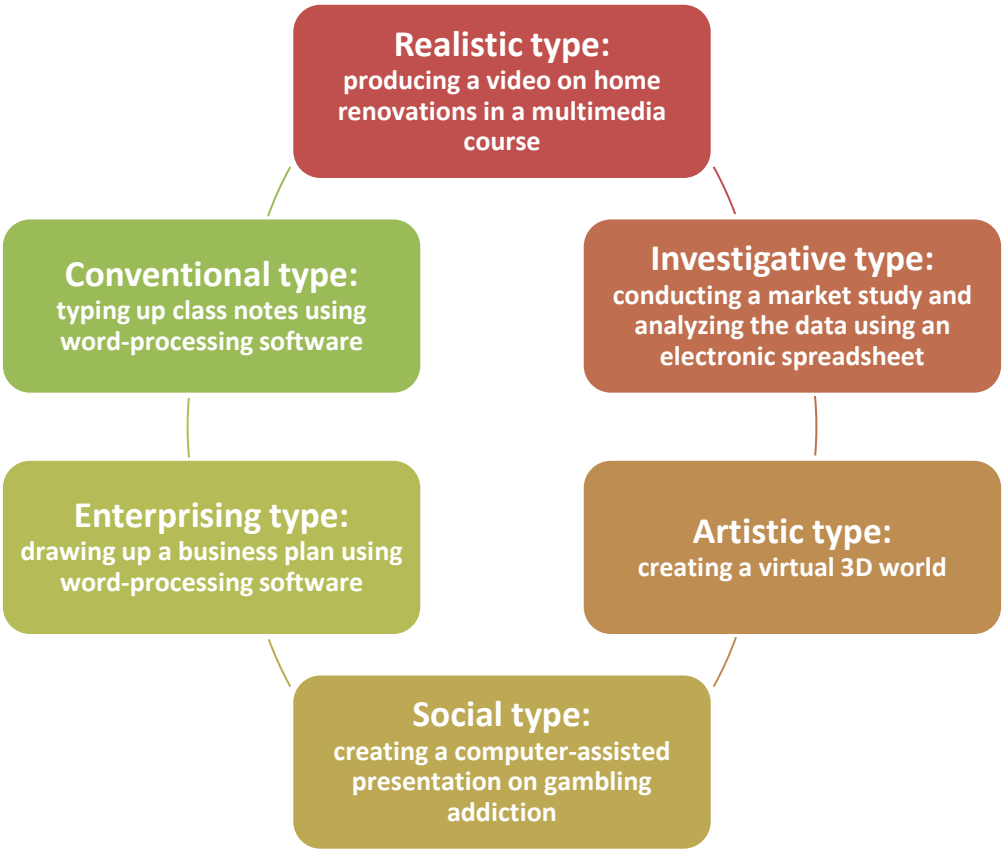


Figure 1 – Computer Science and Personality Types

In addition, the courses in the Computer Science program allow adult learners to increase their ability to *cooperate with others*. Adults' computer competencies will be appreciated if ever they take part in a project. For example, these competencies can be used to perform numerous tasks for a student association, such as bookkeeping using spreadsheet software, updating the minutes of a meeting using word-processing software or creating a poster for an event using graphics software.

Communication-Related Competency

Computers provide new ways of communicating. For instance, computer graphics or multimedia can be used to express a point of view, a state of mind or an emotion. Word processing can help adult learners better organize their thinking, notably through the use of styles to highlight headings, sub-headings and other text elements, thus enabling them to convey their ideas more effectively. Computers represent a world where communication plays a key role in that information is disseminated, received, processed and eventually redisseminated. The development of the subject-specific competency *Interacts in a computer environment* is thus intricately linked to the development of the cross-curricular competency *Communicates appropriately.*

1.3.3 Connections With the Other Subject Areas

The Computer Science program gives adult learners the opportunity to use the knowledge and competencies developed in other subjects.

Making connections between computer science and other subjects enriches and contextualizes the learning situations in which adult learners develop their subject-specific competencies. These connections maximize the development of competencies. The examples below, grouped by subject area, reflect the many different connections that can be made.

Languages

The Computer Science program can contribute to the development of language skills by allowing adult learners to make better use of the tools that can help them organize their thinking and express themselves more clearly. The word processor, which is the best known and undoubtedly the most commonly used tool, allows users to easily reorganize their ideas through such functions as text cutting and pasting, but also through various reference tools that are often incorporated into the application itself (e.g. dictionary, spell check, grammar check, statistics, readability index).

Adult learners also use *outliners* or *mindmappers* to organize ideas. They use computer-assisted presentation software to illustrate their ideas during an oral presentation or add interactive features to allow the audience to participate in the presentation. Adult learners also refer to encyclopedias and databases on all sorts of current topics to support their ideas, substantiate arguments and broaden their cultural knowledge. In short, various computer applications can be used to support learning in the area of languages by providing powerful tools and innovative ways of doing things.

Mathematics, Science and Technology

The first computer tools were created to increase the calculation capacity of machines and formally systematize arduous intellectual tasks. This gave rise to an explosion of knowledge and technologies unprecedented in human history. Historically, there has always been a close

relationship between computer science and mathematics, science and technology. A highly useful computer application in this field is the spreadsheet, which can be used, among other things, to graphically represent the sine function, illustrate statistics of all kinds and perform step-by-step calculations.

Adult learners can also use computer-assisted presentation software to present the results of a scientific research project or Web document creation software to make their work available to a larger audience. Where applicable, they will also be able to use an emerging computer application to do their work.

Social Sciences

To help adult learners further develop their sense of empowerment and improve their understanding of the world, the program emphasizes the ability to analyze, share and process information. For example, by using actual sociodemographic databases, adult learners can produce their own analyses and compare them with the information provided by the media. By developing their computer graphics and multimedia skills, adult learners not only become more critical of the images they see, but also learn to use effective tools to present their viewpoints and become more socially engaged.

Arts Education

Computers are regularly used in the arts: photographs, music and movies are produced and reproduced using digital equipment. Rock concert lighting and theatre special effects are just two of the many ways in which computers are used in the production, distribution and enjoyment of the arts.

Courses in the Computer Science program can serve to explore artistic activities, for example, through the use of computer graphics, computer-assisted presentation, 2D or 3D animation, or even multimedia.

Personal Development

The content of the courses in the Computer Science program elicits the personal engagement of adult learners and may involve learning situations that will prompt adults to question themselves and their relationships with others, to become aware of their responsibilities or to examine the realities that affect them directly or indirectly. For example, they may wish to keep a journal or prepare a presentation on the debate concerning reasonable accommodation.

Career Development

Computers can be of great use to the career development of adult learners by enabling them to collect information on the labour market or on various types of training and occupations, write and distribute their résumés, or search for and contact potential employers. Computers can be used effectively to complement information gathered through traditional means of communication.

Chapter 2

Pedagogical Context

2.1 Learning Situations

A learning situation usually consists of a set of interrelated learning activities that create conditions conducive to the construction of knowledge.

Learning situations can thus be defined as a set of conditions created by the teacher with a view to helping adults learn. Learning situations should involve an issue of interest to adult learners and consist of one or more complex tasks or activities aimed at helping adult learners acquire computer knowledge and skills associated with each of the courses and develop and apply subject-specific or cross-curricular competencies.

The development of the competencies in the Computer Science program is facilitated by learning situations that are meaningful, open-ended and complex. These situations place adult learners at the heart of the action and help them develop, construct and effectively use knowledge and mobilize a variety of resources. Learning situations should therefore pose a challenge to adult learners and give them the opportunity to reflect on the approaches used and the results obtained. They should also give rise to cognitive conflict, allowing learners to call into question their knowledge and personal views.

Developed by teachers, learning situations must above all be meaningful. They should encourage adult learners to become engaged in the learning process and take up challenges, particularly when adults have chosen the challenges themselves. They should also allow adult learners to clearly see the connections between what they have learned and how this knowledge can subsequently be applied in everyday life.

Learning situations must also be complex, that is, they must draw on more than one subject-specific or cross-curricular competency, pose an intellectual challenge, and enable adults to use a variety of resources, while allowing them to make connections among various concepts and cultural references.

Lastly, learning situations must be open-ended. They should involve initial data that can lead to different possible solutions and allow adult learners to choose from among various suggested methods. If some of these methods seem unsuitable, adult learners can search for information on the Internet and learn new things. Open-ended learning situations must also allow adult learners to perceive different ways of using, generalizing or transferring knowledge.

In these situations, adult learners are supported by the teacher and encouraged to take on challenges. By reflecting on their actions, adult learners become aware of their strengths and difficulties and make adjustments accordingly. A climate of trust is therefore essential and requires that the teacher adapt situations to the learning needs of adults in order to provide the necessary support for their success.

This personalized support is in keeping with the *Policy on the Evaluation of Learning*. Its aim is first and foremost to foster the progress of adult learners. The teacher encourages adult learners to evaluate themselves and explain their approach, using available tools and evaluation criteria, among other things. By evaluating the work of their peers and comparing their own judgment to that of the teacher and other adults, adult learners can refine their judgment and actively look for ways of improving.

In order to support teachers in the development of meaningful, complex and open-ended learning situations, an example of a learning activity is provided for each course.

2.2 Families of Learning Situations

Families of learning situations are groups of situations of varying complexity that are related based on the type of learning targeted and that share common issues or characteristics.

Families of learning situations provide specific learning contexts that make learning meaningful. They enable adult learners to make connections more easily between the educational aims of the broad areas of learning and particular elements of subject-specific learning.

The families of learning situations in the Computer Science program relate to information, creation and critical thinking. In order to be developed fully, the subject-specific competencies must be put into practice in a variety of learning situations. However, in some courses, certain families of learning situations may be used even if a particular competency is not targeted, simply because the context is considered favourable to learning.

Each family of learning situations involves coordinating actions, learning focuses and goals:

- Action results from understanding or the need to produce something and involves information, critical thinking and creation
- The focuses of learning give rise to the construction and mobilization of ideas and concepts, as well as cultural references, and involve drawing on a variety of resources
- The goals or purposes of action reflect a variety of needs and aims

Table 1 on the next page presents the families of learning situations for the Computer Science program.

Table 1 – Families of Learning Situations

	Families of learning situations related to . . .		
Subject-specific competencies	**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
	to . . . • understand the *what*, the *how* and the *why* of a thing or a situation • take action • conceptualize ways of thinking	to . . . • determine what is feasible • choose the right tool to perform a task or carry out a project • define his/her personal and occupational interests • envisage new career possibilities	to . . . • choose suitable applications • configure his/her environment appropriately
Produces computerized documents	Communicates by using computerized services	Creates by correctly using the appropriate functions	Evaluates his/her work by setting quality standards
	to . . . • share his/her experiences and ideas and express himself/herself • enlist cooperation • benefit from their advantages	to . . . • work more efficiently • become more versatile • work more effectively with others	to . . . • get an accurate sense of the results of his/her efforts • take corrective action, if necessary • have benchmarks to measure progress made in developing his/her competencies
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
	to . . . • transmit values, ideas and concepts • play a positive role • develop better relationships • maintain and develop self-esteem	to . . . • avoid fraud • avoid human error • prevent technical failures • deal with every eventuality	to . . . • put information in context • understand the significance of a piece of information • distinguish information from propaganda

2.3 Educational Resources

To promote the development of competencies, the Computer Science program encourages adult learners to draw on prior experiences and learning and explore a variety of resources. Certain resources are internal in that they refer to an individual's knowledge, past experiences (cultural references, competencies), attitudes and learning strategies. Other references are said to be external and refer to human and material resources. Below are examples of references and tools that may prove useful to adult learners.

Human resources:

- *school-related*: teacher, classmates, resource persons, etc.
- *artistic*: graphic designer, photographer, etc.
- *community*: journalist, expert, etc.

Material resources:

- *document*: library, data sheets, etc.
- *media*: television shows, scientific journals, newspapers, etc.
- *technological*: software applications, online encyclopedias, Web sites, etc.

The learning situations proposed by the teacher must encourage adults to use a variety of approaches and learning strategies, discover and appropriate new resources, and choose and use the necessary internal and external resources carefully. Internal resources, such as computer knowledge and skills, are essential since they allow adult learners to take appropriate action in a complex situation or to complete a given task. The quantity and quality of these resources contribute greatly to adults' ability to take action and to the development of their competencies.

In computer science, the knowledge and viewpoint of adult learners must always be taken into account, as they are invaluable resources. Although the teacher's role is essential, so is peer learning: by helping fellow classmates, adult learners consolidate their own learning and boost their self-confidence and self-esteem.

Chapter 3

Subject-Specific Competencies

3.1 How the Subject-Specific Competencies Work Together

The aim of this program is to develop three subject-specific competencies that complement one another. To develop these competencies, adult learners use approaches based on learning strategies, concepts and cultural references, among other things. They learn to mobilize these resources and relate them in various contexts.

- Competency 1: *Interacts in a computer environment*
- Competency 2: *Produces computerized documents*
- Competency 3: *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*

Figure 2 illustrates how the three subject-specific competencies work together. These competencies are of equal importance in the program and are developed in an interrelated manner.

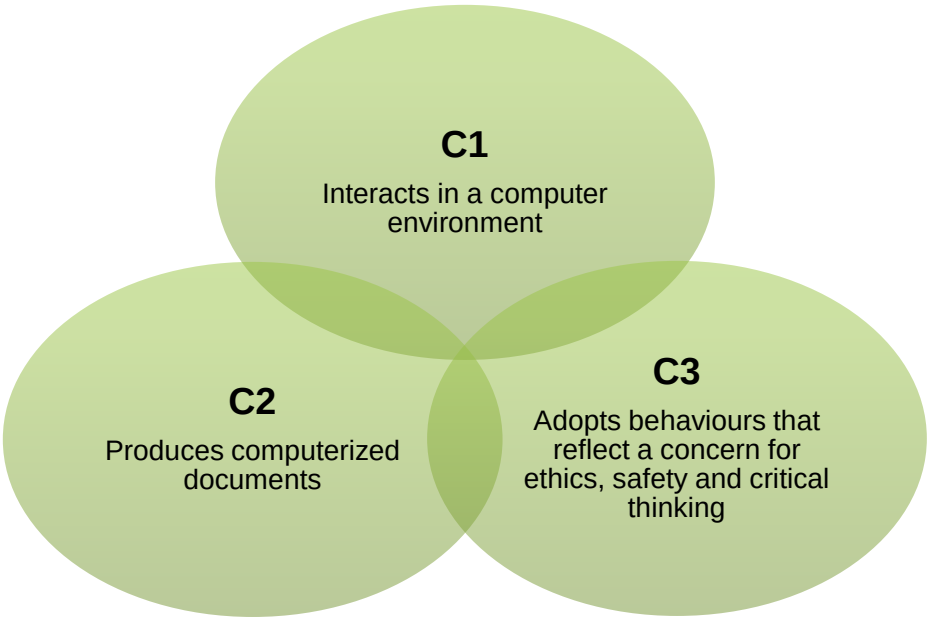


Figure 2 – How the Subject-Specific Competencies Work Together

The Computer Science program promotes the development of each of these competencies by taking into account three aspects: acting in context, the mobilization and availability of resources, and reflection and review.

Acting in context

In contextualized learning, adult learners encounter situations that reflect everyday life and make learning more meaningful and motivating. To develop their competencies, adult learners must take into consideration the constraints associated with the context and act accordingly. Thus, the Computer Science program emphasizes the adult learners' active participation in the learning process and encourages them to be enterprising, creative and autonomous.

Mobilization and availability of resources

Because competency development involves mobilizing and using a set of diversified resources, access to resources is essential. Internal resources, which include adult learners' knowledge and skills, are the first ones to come into play in the production of a computerized document. All other resources that adult learners mobilize and use are external. It is by building a repertoire of diversified and effectively organized resources that adult learners succeed in developing their competencies.

Reflection and review

To promote the development of competencies, learning situations must encourage adult learners to reflect on the issues, requirements and values that underpin their learning and to analyze constraints, while keeping in mind their goals and critically examining their learning methods, choices of action and quality of their achievements. Through reflection and review, adult learners are able to make adjustments and improve by regulating their actions more and more effectively.

3.2 Competency 1: Interacts in a computer environment

3.2.1 Focus of the Competency

In developing the competency *Interacts in a computer environment* throughout the Computer Science program, adult learners must often work with new peripherals, software, resources, interfaces and modes of communication. The pedagogical aim in this case is to enable adult learners to understand the general rules and standards governing the use of applications so that they can apply this knowledge in different contexts.

3.2.2 Key Features and Manifestations of the Competency

The competency *Interacts in a computer environment* consists of three key features, which are the steps that adult learners carry out when they exercise this competency. Each key feature is further defined in terms of manifestations, which give concrete expression to the competency.

Table 2 shows the key features and related manifestations of the competency *Interacts in a computer environment*.

Table 2 – Key Features and Manifestations of Competency 1

Interacts in a computer environment	
Communicates using the human-machine interface	• Understands the main elements of the user interface • Uses the interface • Adapts the user interface
Uses the elements of a computer environment	• Uses the software and hardware resources of different publishers and manufacturers • Uses the resources of a computer network
Evaluates his/her efficiency in using the computer environment	• Examines his/her results • Recognizes the obstacles to effective interaction and determines ways of overcoming them • Takes stock of his/her ability to interact in a computer environment

3.2.3 Development of the Competency

The learning situations that foster development of the competency *Interacts in a computer environment* encourage adult learners to call into question and reflect on their habits and automatic reflexes in terms of computer use. These learning situations also allow adult learners to observe and understand the principles and mechanisms underlying the operation of a computer system or an application, to reflect on the interpretation of signs and signals in graphic interfaces, to experiment and gather information in order to be able to grasp the commonalities of computer applications and to recognize the similarities and differences between applications.

This competency is developed in a complementary manner from one course to the next, and its degree of development will essentially be indicated by the adult learner's ability to reflect on the learning process and to draw on various resources in different contexts.

3.3 Competency 2: Produces computerized documents

3.3.1 Focus of the Competency

In developing the competency *Produces computerized documents*, adult learners have the opportunity to use their resources to process text and calculations, as well as multimedia and other types of information, and save their work in computerized documents. Acquiring this competency involves much more than basic instruction in software functions; it must make adult learners autonomous with regard to choosing the means they will use to achieve the desired results.

3.3.2 Key Features and Manifestations of the Competency

The competency *Produces computerized documents* consists of three key features, which are the steps that adult learners carry out when they exercise this competency. Each key feature is further defined in terms of manifestations, which give concrete expression to the competency.

Table 3 shows the key features and related manifestations of the competency *Produces computerized documents*.

Table 3 – Key Features and Manifestations of Competency 2

Produces computerized documents	
Plans his/her work	• Analyzes the current situation • Compares the current situation with the desired situation • Determines the steps involved in carrying out the work • Determines the necessary resources • Draws up a work schedule
Carries out the work	• Chooses a work method • Adheres to the plan • Monitors the work • Makes adjustments to the plan
Evaluates his/her efficiency in producing computerized documents	• Analyzes the results • Determines the improvements to be made and the means of doing so • Takes stock of his/her ability to produce computerized documents

3.3.3 Development of the Competency

The learning situations that foster development of the competency *Produces computerized documents* present adult learners with opportunities to apply what they have learned. They must not only be able to reproduce an operation, but also be capable of drawing up a plan according to a context, carrying it out and modifying it, if necessary. Even short-term planning requires that adult learners make choices. As a result, these learning situations are both demanding and rewarding. They enable adult learners to develop a solid sense of self-esteem and self-confidence.

This competency is developed in a complementary manner from one course to the next, and its degree of development will essentially be indicated by the adult learner's ability to reflect on the learning process and to draw on various resources in different contexts.

3.4 Competency 3: Adopts behaviours that reflect a concern for ethics, safety and critical thinking

3.4.1 Focus of the Competency

In developing the competency *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*, adults learn to recognize the importance of using computer and media resources responsibly, become aware of the social and economic aspects of their behaviour and start to adopt ethical behaviour so that they can contribute to the development of a healthy environment that takes into account individual and collective rights and responsibilities.

3.4.2 Key Features and Manifestations of the Competency

The competency *Adopts behaviours that reflect a concern for ethics, safety and critical thinking* consists of three key features, which are the steps that adult learners carry out when they exercise this competency. Each key feature is further defined in terms of manifestations, which give concrete expression to the competency.

Table 4 shows the key features and related manifestations of the competency *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*.

Table 4 – Key Features and Manifestations of Competency 3

Adopts behaviours that reflect a concern for ethics, safety and critical thinking	
Acts ethically	• Acts responsibly by taking into account users' agreements and codes of ethics • Respects copyright and the conditions for using digital materials
Analyzes information	• Interprets information • Evaluates the relevance of the information • Evaluates the reliability of the information • Checks the information against other sources
Acts prudently	• Protects his/her private life • Secures his/her data • Questions computer practices

3.4.3 Development of the Competency

The learning situations that foster development of the competency *Adopts behaviours that reflect a concern for ethics, safety and critical thinking* encourage adult learners to call behaviours and attitudes into question. Adults learn to strengthen their sense of ethics and critical judgment and to act prudently. Rather than providing adult learners with a set of ready-made solutions, the goal should be to help them integrate the rules that apply in certain contexts, the reasons for these rules and the consequences of not following them. This will enable them to act ethically and prudently and to use their critical judgment in different contexts.

This competency is developed in a complementary manner from one course to the next, and its degree of development will essentially be indicated by the adult learner's ability to reflect on the learning process and to draw on various resources in different contexts.

3.5 Processes and Strategies

Adult learners are called upon to use various learning strategies and processes in the different learning situations of the program. Use of effective strategies further empowers adult learners and helps them solve problems, meet challenges and, in general, acquire learning. For the most part, two main processes are used: the familiarization process and the production process. Use of these processes in the development of subject-specific competencies requires that adults adopt strategies that draw on their knowledge and cultural references.

Table 5 shows the two processes, an example of a strategy and the courses in which these processes are recommended.

Table 5 – Processes and Strategies

Familiarization process	
• 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.	
Example of a strategy	• Selecting the keyboard input language
Recommended in the following courses	• Operating Systems • Operating a Database • Emerging Computer Applications
Production process	
• This process involves applying knowledge to a methodical production that meets a given need. • The goal is not to be able to produce a perfect piece of work, but rather to realize the importance of choosing and adhering to a particular work method.	
Planning stage	
• At this stage, adult learners define the work to be done as precisely as possible. • They validate the work on a regular basis so that it corresponds to the needs expressed.	
Examples of strategies	• Determining the steps involved in carrying out the work • Setting up a work schedule • Choosing a work method
Production stage	
• At this stage, adult learners follow the plan they established. • They validate the work on a regular basis and make any necessary changes to ensure that it corresponds to the desired situation.	
Examples of strategies	• Comparing the current situation with the desired situation • Maintaining ongoing feedback and collaboration • Accepting change, even at the end of the production stage • Analyzing the results

Table 5 – Processes and Strategies

Recommended in the following courses	• Word Processing: Styles and Layout • Word Processing: Sections and Tables • Electronic Spreadsheets: Calculations and Data Presentation Basics • Electronic Spreadsheets: Data Analysis • Creating a Database • Introduction to Programming • Raster Graphics • Vector Graphics • Introduction to 3D Modeling • Introduction to 2D Animation • Introduction to 3D Animation • Creating Web Documents • Multimedia Production • Computer-Assisted Presentation • Supplementary Computer Training

Chapter 4

Subject-Specific Content

The subject-specific content of the Computer Science program in diversified basic education groups together resources that are essential to using and developing the competencies associated with this discipline. It consists of knowledge and cultural references.

4.1 Knowledge

The main topics for each course are described in the following pages. Table 6 provides an overview of the main topics covered in the program.

A detailed list of topics can be found in the description of each course in Chapter 6.

Table 6 – Main Topics Covered in the Computer Science Courses

Course title	Main topics
Office Automation	
Word Processing: Styles and Layout	• Standard terminology associated with word processing • Typographical conventions • Formatting elements • Styles • Techniques of removing text formatting
Word Processing: Sections and Tables	• Advanced techniques for arranging text on a page • Section properties • Table properties • Standard terminology associated with word processing • Formatting a document using sections • Presenting and arranging data using tables
Electronic Spreadsheets: Calculations and Data Presentation Basics	• Data type • Cell properties • Integrated functions in calculations • Terminology associated with electronic spreadsheets • Solving a problem using a spreadsheet • Working with a workbook • Presenting data

Course title	Main topics
Office Automation	
Electronic Spreadsheets: Data Analysis	• Data tables • Logical functions • Charts • Pivot tables (data pilots) • Terminology associated with electronic spreadsheets • Creating and using a data table • Creating a chart • Creating a pivot table (data pilot)
Operating a Database	• Nature, role and properties of the main objects of a database • Main databases • Standard terminology associated with databases • Translating a question from everyday language into database language • Using an existing database • Creating and modifying data
Creating a Database	• Main objects of a database • Concepts associated with relational databases • Standard terminology associated with relational databases • Prior needs analysis • Creating a relational database using a prior analysis • Designing a relational schema using a needs analysis

Course title	Main topics
Multimedia	
Vector Graphics	• Properties of a vector image file • Path components and attributes • Components and attributes of geometric objects • Functions and properties of layers • Rules of image composition • Standard terminology associated with vector graphics • Customizing the environment • Positioning and transforming geometric objects • Creating vector objects • Modifying vector objects • Managing layers • Bitmap to vector conversion • Printing illustrations
Introduction to 2D Animation	• Nature, role and properties of objects related to 2D animation • Main components of an animation • Frame rates • Types of animation • File formats associated with animation • Storyboard • Standard terminology associated with 2D animation • Film terminology • Managing animation files • Creating and modifying objects • Adding and modifying audio tracks • Managing layers • Controlling events in time • Exporting an animation in an appropriate format
Raster Graphics	• Definitions and properties of the main concepts associated with bitmap images • Rules of image composition • Standard terminology associated with raster graphics • Customizing the environment • Using selection tools and their related functions • Managing layers • Modifying parts of an image using layers • Saving an image in different formats in order to export it to other applications or to use it on the Web • Printing digital images by taking the main printing parameters into account

Course title	Main topics
Multimedia	
Introduction to 3D Modeling	• 3D environment • Object components (vertex, edge, polygon, texture) • Modeling techniques • Rules of scene composition • Standard terminology associated with 3D modeling • Modeling 3D objects • Creating and applying textures or materials to 3D objects • Adding or modifying lights • Adding or modifying cameras • Importing objects • Producing renders of varying qualities
Introduction to 3D Animation	• 3D environment • Object components (vertex, edge, polygon, texture) • 3D animation techniques • Frame rates • Storyboard • Standard terminology associated with 3D animation • Film terminology • Importing objects • Adding or modifying lights • Adding or modifying cameras • Object animation • Producing renders of varying qualities
Computer-Assisted Presentation	• Definitions and properties of the main concepts associated with a computer-assisted presentation • Roles of the presenter and the presentation • Situations in which a computer-assisted presentation is used • Rules of image composition • Standard terminology associated with a computer-assisted presentation • Creating a slide • Formatting a presentation • Integrating interactive elements into a presentation • Saving, exporting and printing slide shows

Course title	Main topics
Multimedia	
Creating Web Documents	• Main types of editors • Main characteristics of scripts for the Web • Display size of output devices • Interface ergonomics • Images • Standard terminology associated with mark-up languages and the Internet • Preparing images • Web site file management • Using a code generator or raw text editor • Validating a Web site using a validation tool (software or online) • Uploading a Web site to a Web server
Multimedia Production	• Characteristics of the main types of support for audiovisual equipment • Standardization of multimedia content • Ethics and intellectual property associated with multimedia works • Storyboard • Role of members of a production team • Standard terminology associated with multimedia • Film terminology • Using audiovisual equipment • Using audio processing software • Using nonlinear video editing software • Issuing an intellectual property licence for a work and distributing it

Course title	Main topics
Optimization	
Operating Systems	• Characteristics of at least two operating systems • Ergonomic characteristics of the work station • Terminology associated with operating systems • Configuring settings and basic functions of two operating systems • Workplace ergonomics • Managing files and folders (directories)
Introduction to Programming	• Introduction to the concept of algorithms • Structures and functions • Programming syntax • Controls • Types of programming • Main programming languages • Interface ergonomics • Standard terminology associated with the programming language selected • Reading an algorithm • Developing an algorithm to meet a need • Translating an algorithm into a structured programming language • Troubleshooting • Compilation
Emerging Computer Applications	• Context associated with specific situations that involves using a recent technological discovery or a computer technology newly accessible to the general public • Concepts involved in dealing with specific situations • Learning the commands and functions necessary for a project • Dealing with specific situations
Supplementary Computer Training	• Context associated with specific situations requiring the use and integration of subject-specific content that complements that of the other courses in the program • Conceptual models involved in dealing with specific situations • Understanding the necessary commands and functions • Dealing with specific situations

4.2 Cultural References

Different issues have given people cause for reflection through the ages. History and current events are replete with anecdotes that adult learners can use to develop their knowledge. To satisfy their curiosity, adult learners discover sources of inspiration by consulting an encyclopedia, a newspaper, a scientific magazine or an article on the Internet, and share their thoughts on the topics that concern or captivate them. They may also take advantage of a current event and analyze it from the point of view of computer science. The Computer Science program sheds new light on the past as well as on the present and opens up possibilities in all fields of interest.

The *Subject-Specific Content* section found in each course described in Chapter 6 suggests various cultural references that could be used to help adult learners identify the issues that have contributed to the advancement of computer science. These references give a cultural dimension to instruction, expand the adult learners' knowledge and make their learning meaningful.

Culture can be considered from different angles. The cultural references suggested in the courses are for illustrative purposes only and fall into one of the following categories: events and chronology, heritage objects, and regional or national references. Other cultural references may be used if they are deemed relevant or relate to the learning situations proposed.

Chapter 5

Organization of the Courses in the Program

5.1 Introduction to the Courses

The 18 courses in the Computer Science program are organized so that adult learners can create their own learning pathways. The courses may be taken in any order and do not require prerequisites. It should be noted, however, that knowledge acquired in one course may promote learning in another. For example, knowledge acquired in *Electronic Spreadsheets: Calculations and Data Presentation Basics* will be useful to adult learners who take *Electronic Spreadsheets: Data Analysis*. Similarly, knowledge and skills acquired in a given course can be applied in other courses. For example, Bézier curves are discussed in several courses, including *Vector Graphics*, *Introduction to 2D Animation*, *Introduction to 3D Modeling* and *Introduction to 3D Animation*. Adults who learn to manipulate Bézier curves in one of these courses will be able to put their skills to use in the other courses as well.

The courses of the program have been grouped into three separate blocks: Office Automation, Multimedia and Optimization.

Office Automation

Office Automation courses are specifically designed for adults who wish to learn about computer document production and communication techniques for personal, academic or work purposes. Office automation tools can be classified into three broad categories: document production tools (word processing, computer-assisted presentation, etc.), management tools (spreadsheets, databases, etc.) and communication tools (email, videoconferencing, etc.). This program covers the first two categories (document production and management), since the third category is covered in the Common Core Basic Education Program.

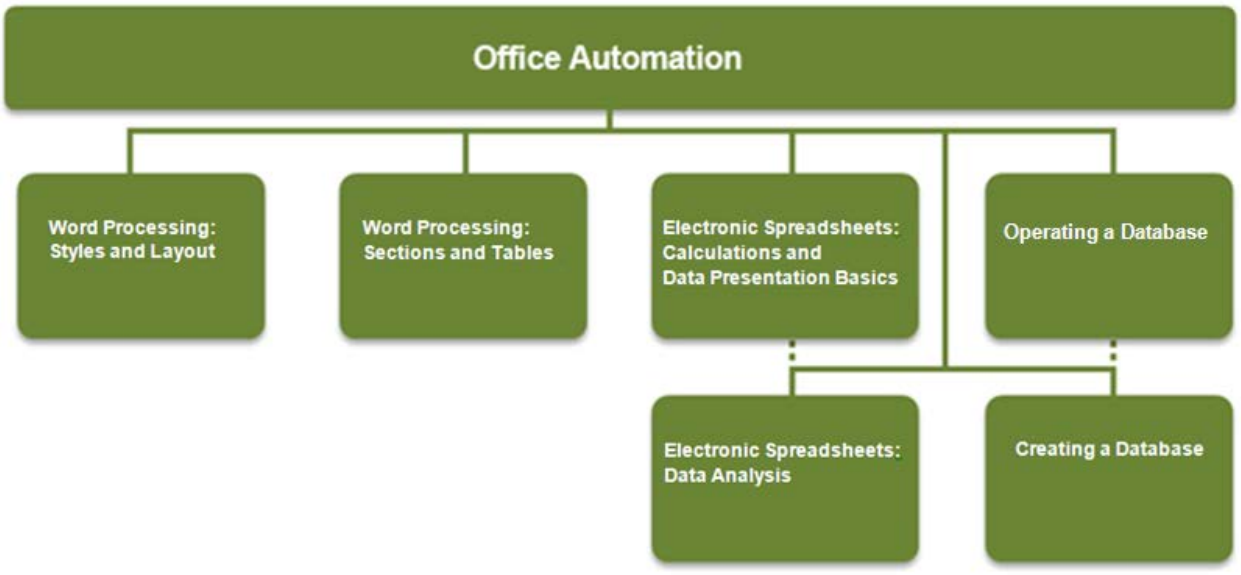


Figure 3 – Office Automation Courses

(In figures 3 and 4, a dotted line indicates a possible prerequisite relationship.)

Multimedia

Multimedia courses foster the development of creativity among adult learners by providing them with a computer platform with which to express themselves and showcase their artistic sensibility through the production of photomontages, animation, videos, etc. These courses may also cover computerized document production with a view to promoting the integration of information and communications technologies.

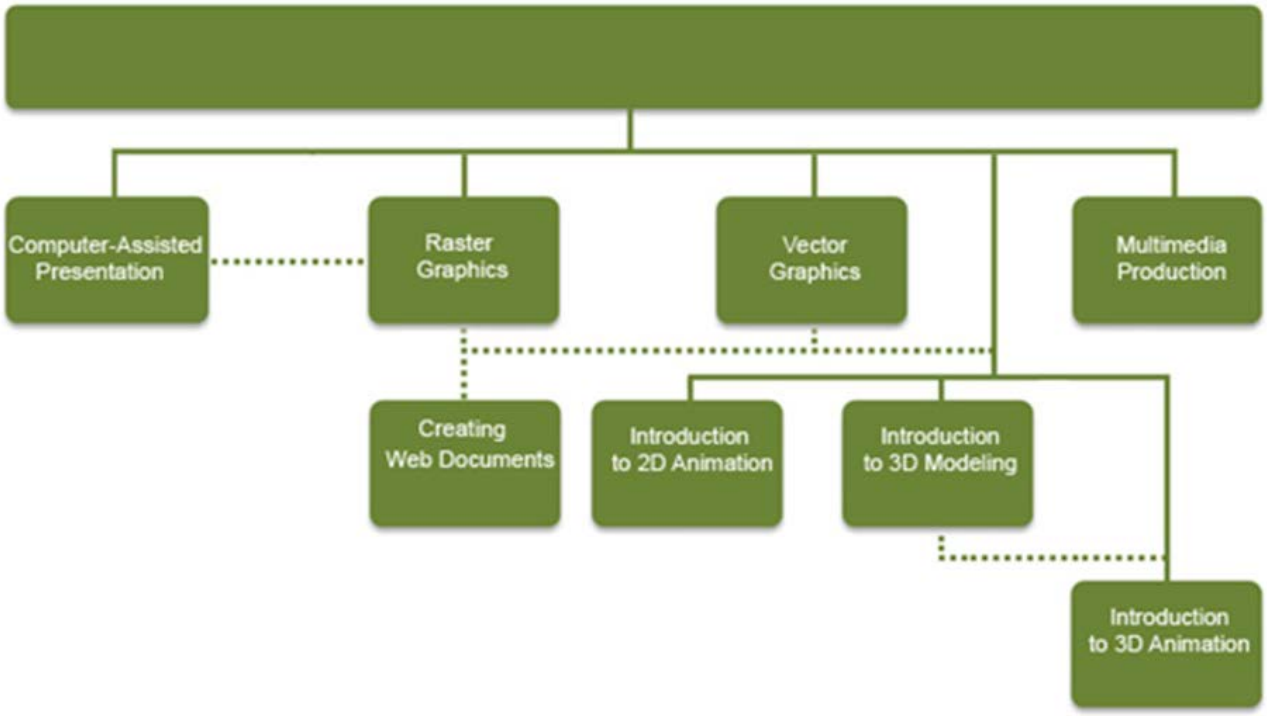


Figure 4 – Multimedia Courses

Optimization

Optimization courses give adult learners the opportunity to explore a new field in computer science or to broaden the knowledge acquired in another computer science course. Each of these courses offers adults a unique opportunity to validate their knowledge, discover new possibilities or practise their competencies in real-life situations.

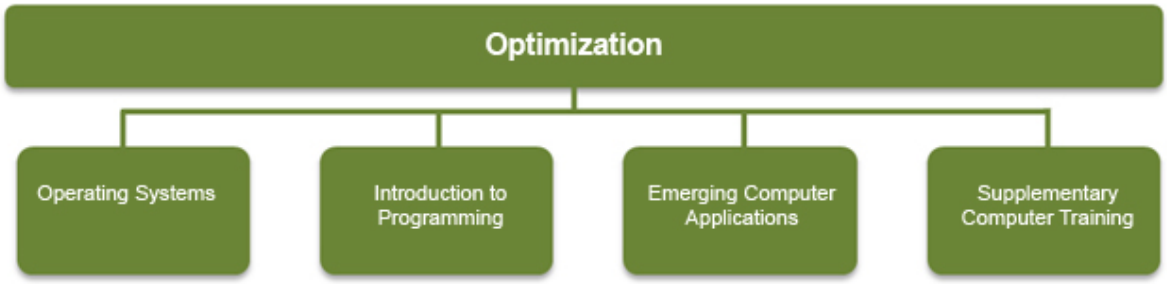


Figure 5 – Optimization Courses

5.2 Overview of the Courses in the Program

Table 7 provides an overview of the courses in the Computer Science program.

Table 7 – Courses in the Computer Science Program

Course title	Number of hours	Number of credits
Office Automation		
Word Processing: Styles and Layout	25	1
Word Processing: Sections and Tables	25	1
Electronic Spreadsheets: Calculations and Data Presentation Basics	25	1
Electronic Spreadsheets: Data Analysis	25	1
Operating a Database	50	2
Creating a Database	50	2
Multimedia		
Vector Graphics	50	2
Introduction to 2D Animation	50	2
Raster Graphics	50	2
Introduction to 3D Modeling	50	2
Introduction to 3D Animation	50	2
Computer-Assisted Presentation	50	2
Creating Web Documents	75	3
Multimedia Production	50	2
Optimization		
Operating Systems	25	1
Introduction to Programming	50	2
Emerging Computer Applications	50	2
Supplementary Computer Training	25	1

Chapter 6

Courses

6.1 Organization of Course Information

The Computer Science program in diversified basic education has been designed to take into account various factors. It meets the educational needs of adult learners, promotes the acquisition of knowledge, and fosters the development of subject-specific and cross-curricular competencies. Each course allows for the exploration of the broad areas of learning. The components of each course are presented in the following order:

Sections
Introduction
Subject-Specific Competencies
Processes and Strategies
Cross-Curricular Competencies
Subject-Specific Content
Families of Learning Situations
Broad Areas of Learning
Example of a Learning Situation
End-of-Course Outcomes
Evaluation Criteria

6.2 Office Automation

Course

CMP-5067-1

Word Processing: Styles and Layout

Computer Science

INTRODUCTION

The goal of the *Word Processing: Styles and Layout* course is to provide adult learners with work methods that will enable them to produce structured text documents in a satisfactory manner. Its focus is on advanced formatting tools.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about a word processing program. By creating and modifying documents using styles and formatting functions, adult learners discover what computers can do. Throughout the learning process, they evaluate their work by making sure they have met the standards that have been set.

By the end of this course, adult learners will be able to analyze text documents, understand their structure and plan their formatting. They will be able to edit and format texts more efficiently by using character and paragraph styles. They will be able to define character and paragraph styles as well as the main predefined styles and will understand the advantages and disadvantages of using formatting styles. They will also know how to plan the formatting of a document, clear the formatting from a text, and manage styles.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Interacts in a computer environment*
- *Produces computerized documents*

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 use the resources of a software program and a computer network. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments to their approach.

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 *Word Processing: Styles and Layout* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project. • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Word Processing: Styles and Layout* course. Two are considered particularly relevant to this course: *Solves problems* and *Adopts effective work methods*.

- **Intellectual Competency**

When adult learners produce a text using formatting styles, they demonstrate the competency *Solves problems*. They analyze the document in order to identify its structural elements and propose and experiment with styles that will provide the greatest flexibility in terms of formatting.

- **Methodological Competency**

Adult learners develop the competency *Adopts effective work methods* when formatting a document. They determine where it is useful to use styles and clear the formatting from a text in order to format it.

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

- ***Typographical conventions***
  - Spacing
    - Between words
    - Between sentences
    - Before and after punctuation marks
    - Between paragraphs (hard returns)
  - Apostrophe
  - Quotation marks
  - Abbreviations
  - Bibliography

- ***Formatting elements***
  - Line spacing
  - Indentation
  - Spacing before and after paragraphs
  - List bullets and numbered lists
  - Header and footer
  - Page numbering
  - Footnote and references

- ***Styles***
  - Advantages of using styles
  - Types of styles
    - Character

  - Paragraph
  - Linked
  - List
  - Table

- Text elements that can be altered by styles
  - Character attributes
  - Paragraph attributes
  - Tabs
  - Borders and shading
  - Bullets and numbering
  - Tables

- Built-in styles
- User-defined styles
- Style sets and themes

- Applying styles to text elements
  - Titles
  - Paragraphs
  - Tables
  - Bulleted or numbered lists
  - Header and footer
  - Table of contents
  - Bibliography
  - Footnote
  - Index

- Replacing a text element style
- Modifying predefined styles
- Creating new styles

- ***Techniques of removing text formatting***
  - Save in a file format that does not include formatting attributes (.TXT)
  - Using "Find and replace" function
  - Using the "Format painter" tool
  - Using the "Reveal formatting" task pane to see the attributes of a text
  - Using "Show/hide" button to show paragraph marks and other hidden formatting symbols

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***
  - Table showing the development of word processors over time
  - Evolution of calligraphy throughout the world and through the ages
  - History of printing and typography
- ***Heritage objects***
  - Different models of typewriters
  - Printing presses and cast metal sorts
  - Magazines and newspapers of the past
- ***Regional or national references***
  - Employers, publishers, printers
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Word Processing: Styles and Layout* course is to help adult learners acquire work methods that will enable them to produce structured text documents in a satisfactory manner. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment and produce quality computerized documents.

The shaded cells in the following table 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 discover what computers can do by consulting documentation and experimenting with different software and tools. For instance, they may determine what is feasible for a given tool or program, or choose the right tool to perform a task or carry out a project.

Then, they create documents by correctly using the appropriate functions and thus work more efficiently. They take the time to evaluate their work by setting quality standards, or by taking into account standards that have been set for them, in order to get an accurate sense of the results of their efforts.

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: Career Planning and Entrepreneurship and Media Literacy.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. A learning situation that aims to improve the visual impact of various types of documents and increases efficiency in document production meets the educational aim of the BAL Career Planning and Entrepreneurship.

- **Media Literacy**

Being able to better understand how media information is processed is one of the aims of the Computer Science program. A learning activity that requires that adult learners identify types of formatting that are conducive to the use of styles in newspapers, magazines and other print media meets the educational aim of the BAL Media Literacy.

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	• Career Planning and Entrepreneurship
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents
Families 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	▪ **Creation** o Discovers what computers can do o Creates by correctly using the appropriate functions • **Critical thinking** o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Planning how to format a document by determining where to use styles • Clearing formatting before formatting a text with styles • Formatting using character and paragraph styles

This section provides an example of a learning activity. It includes a context that can be used 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 previous table: 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

Minutes of the student committee meeting

Task: Review the layout of the student committee minutes and propose a format that is effective and suitable for this type of document.

To start off the activity, the teacher hands out a copy of minutes that are properly formatted and a copy of the minutes of a student committee meeting. Adult learners are then asked to compare the two documents, indicate what corrections they think should be made to the students' minutes and explain the approach they intend to follow to improve the format.

To carry out the activity, adult learners use the file provided by the teacher. They clear all the formatting in the document and use the appropriate formatting commands and functions to create the styles they planned. They validate their work on a regular basis with the teacher or their peers, consult help resources as needed, and make adjustments to their approach.

At the end of the activity, the adults and the teacher go over the approach and the tools used and evaluate the results obtained in order to determine the effectiveness and limitations of the approach and identify other contexts in which it could be applied.

END-OF-COURSE OUTCOMES

To deal with situations related to the use of styles and formatting in a word processing program, adult learners identify and use the required formatting commands and functions. To do this, they use the following subject-specific competencies: *Interacts in a computer environment* and *Produces computerized documents*.

Thus, when adult learners *discover what computers can do*, they consult the documentation provided and experiment in order to define the context, draw parallels with prior learning and identify the resources available. They determine what is feasible and choose the right tools to perform the task.

When adult learners *create*, they plan their work by familiarizing themselves with the objective of the task at hand and evaluating its complexity. As they carry out the task, they choose a solution, mobilize the necessary resources and make adjustments, if necessary. At this stage, adult learners correctly use the appropriate commands and functions and thus work more efficiently.

When adult learners *evaluate their work*, they check whether they have attained the quality standards that have been set and go over the steps they followed. This helps them determine the effectiveness and limitations of their approach and identify other contexts in which their approach could be applied.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they plan how to format a document; clear the formatting before formatting a text; manage character and paragraph styles; and format a document using character and paragraph styles. In addition, adult learners do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

Course

CMP-5068-1

Word Processing: Sections and Tables

Computer Science

INTRODUCTION

The goal of the *Word Processing: Sections and Tables* course is to provide adult learners with the means to define page setups and create layouts so that they can showcase their aesthetic sensibility and communication skills. Its focus is on advanced formatting tools.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about a word processing program. By creating documents using sections and tables, adult learners discover what computers can do. Throughout the learning process, they evaluate their work, making sure they have met the standards that have been set.

By the end of this course, adult learners will be able to use section breaks to modify the layout or formatting of one or more pages in a document and insert tables to improve the document's appearance. They will be able to plan the page layout of a document, arrange text on a page, insert section breaks and present data using tables.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Interacts in a computer environment*
- *Produces computerized documents*

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 use software resources and discover what computers can do. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments to their approach.

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 *Word Processing: Sections and Tables* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project. • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Word Processing: Sections and Tables* course. Two are considered particularly relevant to this course: *Solves problems* and *Adopts effective work methods*.

- **Intellectual Competency**

When adult learners arrange information in a text, they demonstrate the competency *Solves problems*. They analyze the current situation, determine what the desired situation should be, propose and experiment with available techniques and make the necessary adjustments.

- **Methodological Competency**

Adult learners develop the competency *Adopts effective work methods* when they determine where to insert section breaks and tables in order to format a text.

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

- ***Advanced techniques for arranging text on a page***
  - Tables
  - Sections
  - Tabs
  - Placeholder text (*lorem ipsum*)
- ***Section properties***
  - Page size
  - Page orientation
  - Header and footer
  - Page number
  - Section breaks
    - Continuous, next page
    - Even page, odd page
- ***Table properties***
  - Borders
  - Shading
  - Header row
  - Predefined table styles
  - Horizontal and vertical alignment
- ***Standard terminology associated with word processing***
- ***Formatting a document using sections***
  - Modifying elements in a section
    - Margins
    - Page size and orientation

        - Headers and footers (linked or unlinked to the previous sections)
        - Page numbering
        - Page borders
- ***Presenting and arranging data using tables***
    - Inserting or deleting rows or columns
    - Inserting a picture in a table
    - Adjusting column width and row height
    - Splitting and merging cells
    - Modifying text orientation in a cell
    - Adding or modifying borders and shading
    - Sorting a table
    - Converting a table into text or text into a table

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***
    - Page layout standards in different historical periods and cultures
    - Evolution of electronic publishing
    - Use of data tables through the ages
- ***Heritage objects***
    - American and European paper sizes
    - Old edition of a dictionary, Bible or other book
    - Textbooks
    - Sports statistics
- ***Regional or national references***
    - Employers, publishers, printers
    - Anecdotes
    - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Word Processing: Sections and Tables* course is to provide adult learners with the means to define page setups and create layouts so that they can showcase their aesthetic sensibility and communication skills. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment and produce quality computerized documents.

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 discover what computers can do by consulting documentation and by experimenting. For instance, they may discover new personal or occupational interests or consider new career possibilities.

Then, they create documents by correctly using the appropriate functions and thus work more efficiently. They take the time to evaluate their work by setting quality standards, or by taking into account standards that have been set for them, in order to have benchmarks with which to measure the progress they have made in developing their competencies, for example.

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: Career Planning and Entrepreneurship and Media Literacy.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. A learning situation that makes it easier to find information in an administrative document and increases efficiency in document production meets the educational aim of the BAL Career Planning and Entrepreneurship.

- **Media Literacy**

Being able to better understand how media information is processed is one of the aims of the Computer Science program. A learning activity that requires that adult learners analyze how the elements of a document (e.g. a newspaper, magazine or other print medium) are arranged and how this affects communication meets the educational aim of the BAL Media Literacy.

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 learning situations and highlights those used in 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	• Media Literacy
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents
Families 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	• **Creation** o Discovers what computers can do o Creates by correctly using the appropriate functions • **Critical thinking** o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Solves problems • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Planning the layout of a document by identifying where to insert section breaks and present data using tables • Creating a document where the headers, footers, orientation and other page setup elements vary from one section to the next

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

Updating the look of the school newspaper

Task: Create a document template for the school newspaper that includes such features as a cover page, headers and footers, columns, boxes for certain sections and graphics.

To start off the activity, the teacher asks the adult learners to meet with the newspaper team to find out what sections the newspaper normally contains and what the team's expectations are concerning the layout. They must then suggest a template that is suitable for the content and that meets the team's expectations.

To carry out the activity, adult learners look for inspiration in various newspapers and magazines. They create different sections, which they fill with placeholder text, and insert the required layout elements. They communicate regularly with the newspaper team in order to obtain feedback, consult help resources as needed, and make adjustments to their approach or template.

At the end of the activity, adult learners print out their final template and present it to the team. Together, they evaluate the results to determine the effectiveness and limitations of the approach used and identify other contexts in which their approach could be applied.

END-OF-COURSE OUTCOMES

To deal with situations related to the use of sections and tables in a word processing program, adult learners identify and use the required insert and page setup commands and functions. To do this, they use the following subject-specific competencies: *Interacts in a computer environment* and *Produces computerized documents*.

Thus, when adult learners *discover what computers can do*, they consult the documentation provided and experiment in order to define the context, draw parallels with prior learning and identify the resources available. They determine what is feasible and choose the right tools to perform the task.

When adult learners *create*, they plan their work by familiarizing themselves with the objective of the task at hand and evaluating its complexity. As they carry out the task, they choose a solution, mobilize the necessary resources and make adjustments, if necessary. At this stage, adult learners correctly use the appropriate commands and functions and thus work more efficiently.

When adult learners *evaluate their work*, they check whether they have attained the quality standards that have been set and go over the steps they followed. This helps them determine the effectiveness and limitations of their approach and identify other contexts in which it could be applied.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they plan the layout of a document; format it using section breaks in order to modify the page layout and tables; and improve the appearance of the document. In addition, adult learners do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

Course

CMP-5069-1

Electronic Spreadsheets:

Calculations and Data Presentation Basics

Computer Science

INTRODUCTION

The goal of the *Electronic Spreadsheets: Calculations and Data Presentation Basics* course is to provide adult learners with the means to solve various problems using spreadsheet formulas and calculation functions.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about the fundamentals of spreadsheets. By creating and modifying worksheets, adult learners discover what computers can do. They also evaluate their work by making sure they have met the standards that have been set.

By the end of this course, adult learners will be able to create and process a data table. They will be able to plan their work and break calculations down into several operations. They will know how to analyze a problem situation, look for the mathematical equation that can solve it, and express this equation in syntax that is compatible with a spreadsheet program, using formulas or integrated functions. They will be able to distinguish different display formats and apply the correct format to cells in a data table.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Interacts in a computer environment*
- *Produces computerized documents*

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 use the resources of a software program and a computer network. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments to their approach.

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 *Electronic Spreadsheets: Calculations and Data Presentation Basics* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project. • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Electronic Spreadsheets: Calculations and Data Presentation Basics* course. Two are considered particularly relevant to this course: *Solves problems* and *Adopts effective work methods*.

- **Intellectual Competency**

Solving problems is the focus of this course. In fact, using a spreadsheet makes problem solving easier, clearer, and more explicit. Spreadsheets make it possible to break a problem down into steps, present these steps clearly and make corrections efficiently.

- **Methodological Competency**

Using relative and absolute references and spreading data over one or more worksheets are tasks that require attention and rigour. Adult learners must therefore *adopt effective work methods* if they wish to perform their work in a satisfactory manner.

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

- ***Data formatting***
  - Formatting numbers
  - Formatting alphanumerical values
  - Formatting dates
- ***Cell properties***
  - Character attributes
  - Number display format
  - Text alignment and orientation
  - Borders and shading
- ***Integrated functions in calculations***
  - Statistics
    - Maximum
    - Minimum
    - Mean
    - Number
  - Date
    - Today
    - Now
  - Text
    - Concatenation
    - Uppercase

        - Lowercase
        - Left
        - Right
- ***Terminology associated with electronic spreadsheets***
        - Worksheets and workbooks
        - Relative and absolute references
        - Labels and values
        - Variables and constants
        - Formulas and functions
        - Incrementation
        - Cell merge
- ***Solving a problem using a spreadsheet***
    - Creating formulas
    - Controlling the order of operations
    - Using relative and absolute references
    - Using integrated functions
    - Using the increment function
- ***Working with a workbook***
    - Spreading data over several worksheets
    - Renaming worksheets
    - Processing data over several worksheets
- ***Presenting data***
    - Number format
    - Font
    - Alignment
    - Borders and shading
    - Conditional formatting
    - Cell merge

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***
  - Evolution of calculation tools
  - History of spreadsheets
- ***Heritage objects***
  - Accounting spreadsheet (hardcopy version)
  - Abacus, slide rule, Pascal's calculator, tabulating machine
  - Mechanical calculator, incandescent display calculator and other types of obsolete calculators
  - First modern electronic spreadsheet (VisiCalc)
- ***Regional or national references***
  - Employers, accounting, administration, engineering, aerospace
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Electronic Spreadsheets: Calculations and Data Presentation Basics* course is to help adult learners solve various problems using the formulas and calculation functions of a spreadsheet. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment and produce quality computerized documents.

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 discover what computers can do by consulting documentation and by experimenting. For example, they may determine what is feasible or consider new career possibilities.

Then, they create documents by correctly using the appropriate functions and thus become more versatile. They take the time to evaluate their work by setting quality standards in order, for example, to take corrective action, if necessary.

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: Career Planning and Entrepreneurship, and Environmental Awareness and Consumer Rights and Responsibilities.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. A learning situation that makes it easier to prepare a budget and make simple financial calculations for their business meets the educational aim of the BAL Career Planning and Entrepreneurship.

- **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 activity that requires that adult learners evaluate their needs as consumers, establish a personal budget and calculate the interest on a loan 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 learning situations and highlights those used in 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	• Environmental Awareness and Consumer Rights and Responsibilities
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents
Families 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	• **Creation** o Discovers what computers can do o Creates by correctly using the appropriate functions • **Critical thinking** o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Solves problems • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Solving a problem using a spreadsheet

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 previous table: 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 each step in the problem-solving process, the subject-specific or the cross-curricular competencies or the prescribed knowledge that adults must acquire.

EXAMPLE OF A LEARNING SITUATION

Calculations to suit all needs

Task: Modify a schedule in order to see how much time one has and how it can be divided it up among school, work and other activities.

To start off the activity, the teacher tells a few anecdotes about juggling work, school and family responsibilities. Adult learners are asked to look at how they divide up their own time and to adapt a schedule template to their needs.

To carry out the activity, adult learners record the duration of the various activities they engage in over the course of a day in order to define the context and identify the similarities with the template provided. They modify and complete the template so that it reflects their particular situation.

At the end of the activity, together with the teacher, adult learners evaluate the feasibility of their schedule as well as the accuracy of their calculations.

END-OF-COURSE OUTCOMES

To deal with situations related to the use of a worksheet, adult learners solve various mathematical problems using the formulas and calculation functions of a spreadsheet. To do this, they use the following subject-specific competencies: *Interacts in a computer environment* and *Produces computerized documents*.

Thus, when adult learners *discover what computers can do*, they consult the documentation provided in order to define the context, and experiment in order to analyze the current situation. This helps them determine the steps involved in carrying out the work and draw up a work schedule.

When adult learners *create*, they plan their work by choosing the best method to follow. As they carry out their work, they mobilize the necessary resources and follow their plan. At this stage, they use the appropriate commands and functions, perform the correct operations and calculations, and thus demonstrate their efficiency. They make adjustments to their plan, as needed.

When adult learners *evaluate their work*, they check whether they have attained the quality standards that have been set and analyze their results by identifying successful strategies and examining the difficulties encountered. They identify other contexts in which their approach could be applied.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they plan the setup of a worksheet; solve a problem using a spreadsheet; work with a workbook; and present data in the appropriate format. They develop the skills needed to create and modify a data table. In addition, adult learners do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

Course

CMP-5070-1

Electronic Spreadsheets: Data Analysis

Computer Science

INTRODUCTION

The goal of the *Electronic Spreadsheets: Data Analysis* course is to provide adults with the means to analyze data so that they can hone their ability to analyze and synthesize information. Its focus is on advanced data analysis concepts.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about data analysis using an electronic spreadsheet. By presenting data in charts or pivot tables (data pilots), adult learners discover what computers can do. They work with care, evaluate their work and make sure they have met the standards that have been set.

By the end of this course, adult learners will be able to create charts and pivot tables (data pilots) to present data to be analyzed. They will understand the nature, usefulness and purpose of charts and pivot tables (data pilots) as well as the commands and functions that are used to create them.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Interacts in a computer environment*
- *Produces computerized documents*

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 use the resources of a computer network, while carefully planning their work and making adjustments to their plan as they work. When they analyze information, they make sure it is relevant and check it against other sources.

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 *Electronic Spreadsheets: Data Analysis* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Electronic Spreadsheets: Data Analysis* course. Two are considered particularly relevant to this course: *Uses information* and *Adopts effective work methods.*

- **Intellectual Competency**

By using data tables, adults learn to *use information* based on its source. By sorting and filtering information, or even using a pivot table (data pilot), adult learners systematize the information-gathering process and gather information in order to eventually put it to use.

- **Methodological Competency**

To arrive at meaningful results, adult learners must *adopt effective work methods*. Thus, they learn to consider all aspects of a problem involving adding calculated fields to a table before going on to the next steps. They understand and thoroughly plan the steps in their work.

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

- ***Data tables***
  - Heading row
  - Field
  - Record
- ***Logical functions***
  - "If"
  - "True," "False"
  - "And," "Or"
- ***Charts***
  - Types of charts
  - Nature of data to be presented
  - Cell range
- ***Pivot tables (data pilots)***
  - Source
  - Structure
  - Data
  - Column, row
  - Page
- ***Terminology associated with electronic spreadsheets***
- ***Creating and using a data table***
  - Naming fields based on the data to be inserted
  - Arranging data
  - Freezing a pane

- Formatting data and cells
- Filtering and sorting data
- Using logical functions
- Adding a calculated field

- ***Creating a chart***
  - Selecting a cell range
  - Making the chart
  - Choosing the chart type based on the data to be presented
  - Vertical and horizontal scales
  - Properties of the chart
  - Understanding how data is organized and presented in order to analyze it
- ***Creating a pivot table (data pilot)***
  - Manipulating the data source
  - Grouping items
  - Layout
  - Understanding how data is organized in order to analyze it

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***
  - Herman Hollerith and the 1890 U.S. census
  - Spreadsheets and technological advances (space exploration, statistics, etc.)
  - Spreadsheet file used in business
- ***Heritage objects***
  - Examination answer sheets to be completed with an HB pencil so they can be scanned by an optical reader
  - Tabulating machine

- ***Regional or national references***
  - Employers
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Electronic Spreadsheets: Data Analysis* course is to help adult learners use means to analyze data so that they can hone their ability to analyze and synthesize information. This course gives adult learners the opportunity to perform actions that will enable them to produce quality computerized documents while adopting behaviours that reflect a concern for ethics, safety and critical thinking.

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, to discover what computers can do, adult learners create documents by correctly using the appropriate functions. This allows them, for example, to work more efficiently and become more versatile.

As they create documents, adult learners evaluate their work by setting quality standards in order to take corrective action, if necessary.

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 Career Planning and Entrepreneurship.

- **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 requires that adult learners analyze health statistics helps them become aware of health issues and meets the educational aim of the BAL Health and Well-Being.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. Thus, a learning situation that introduces adult learners to the analysis of business data meets the educational aim of the BAL Career Planning and Entrepreneurship.

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 learning situations and highlights those used in 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	• Career Planning and Entrepreneurship
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents
Families 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	• **Creation** o Discovers what computers can do by consulting documentation and by experimenting o Creates by correctly using the appropriate functions • **Critical thinking** o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses information • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Selecting a range of cells and presenting it as a chart in order to analyze it

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

Analyzing market study data

Task: Use the results of a student survey regarding the implementation of a cooperative video club at the adult education centre, and analyze and present the data to be included in a market study report.

To start off the activity, adult learners become familiar with the survey results and the report. They plan how they will present the results and determine the procedure to follow.

To carry out the activity, adult learners enter the survey results in one or more worksheets. They compile and analyze the data in accordance with their plan, and create charts to illustrate the survey results in the best way possible. To do this, they use the commands and functions that allow them to clearly present data in a chart.

At the end of the activity, adult learners attach their charts to the market study report. The teacher comments on the report and the accuracy of the analysis.

END-OF-COURSE OUTCOMES

To deal with situations related to data analysis using a spreadsheet, adult learners identify and use the required functions. To do this, they use the following subject-specific competencies: *Interacts in a computer environment* and *Produces computerized documents*.

Thus, when adult learners *discover what computers can do*, they consult the documentation provided, interpret information, and experiment in order to develop research strategies. They identify essential data and are able to accurately define the work they need to do before they carry out the task.

When adults *create*, they plan their work by becoming familiar with the objective of the task and evaluating its complexity. As they carry out their work, they mobilize the necessary resources and follow their plan. At this stage, they use the appropriate commands and functions and thus demonstrate their efficiency.

When adult learners *evaluate their work*, they check whether they have achieved the objectives that have been set and go over the steps they have taken in order to determine the effectiveness and the limits of their approach. They question their computer practices related to data analysis.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they create and use data tables, charts and pivot tables (data pilots). They also develop the skills that allow them to present data in a worksheet for analytical purposes. In addition, they do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

Course

CMP-5071-2

Operating a Database

Computer Science

INTRODUCTION

The goal of the *Operating a Database* course is to help adult learners acquire a general understanding of the main concepts related to searching and modifying databases.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about databases while discovering what computers can do. By creating queries and reports and modifying data in a table, adults ensure that they put into context the information gathered. Throughout the learning process, they evaluate their work while making sure they have met the standards that have been set.

By the end of this course, adult learners will be able to understand the principles associated with operating a database, create and modify queries and reports according to specific instructions, and recognize the role of objects in a database. They will be able to use help and support tools when operating a database.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

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

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

During the learning situations, adult learners use the resources of a software program and a computer network. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments to their approach.

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 a Database* course, the suggested approach is the familiarization process.

Familiarization process	
• 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	- Determining the necessary resources - Taking stock of their ability to interact in a computer environment - Comparing the current situation with the desired situation - Adhering to the plan - Making adjustments to the plan as they work - 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 they 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 a Database* course. Two are considered particularly relevant to this course: *Uses information and communications technologies* and *Adopts effective work methods*.

- **Methodological Competencies**

Databases play an important role in nearly all computer applications. By familiarizing themselves with the main elements of databases, adult learners develop the competency *Uses information and communications technologies*. They understand how data is stored and how it can be used.

To search a database and modify its main objects, adult learners must *adopt effective work methods*. This requires having an overall view of all the steps involved in their work and using rigour at every step.

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

- ***Nature, role and properties of the main objects of a database***
  - Table
  - Record
  - Field
  - Primary key
  - Queries
  - Selection (sort, filter, without criteria)
  - Simple query, single criterion query, use of logic operators **(< = >)**
  - Complex query, multiple criteria query, use of relational operators **(AND, OR)**
  - Reports
- ***Main databases***
  - Database management systems (DBMS)
  - Internet search engines
- ***Standard terminology associated with databases***
- ***Translating a question from everyday language into database language***
- ***Using an existing database***
  - Using queries
  - Using reports
  - Adding, deleting and changing data in a table
- ***Creating and modifying data***
  - Queries
  - Single criterion query
  - Multiple criteria query
  - Calculated field

- Reports
- Grouping levels
- Formatting results

CULTURAL REFERENCES

The following cultural references will help adults understand some of the factors that influenced the development of computers. 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***
  - Common uses of databases
    - Electoral lists
    - Civil and criminal records
    - Library catalogues
  - Explosion of identity theft
  - Call lists
  - Class lists
- ***Heritage objects***
  - Internet search engines
  - List of personal contacts
  - Old mail-order catalogues
- ***Regional or national references***
  - Employers, inventory, payroll management
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Operating a Database* course is to help adult learners acquire a general understanding of the main concepts related to searching and modifying databases. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment and produce quality computerized documents.

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 discover what computers can do by consulting documentation and by experimenting.

Then, they create queries and reports by correctly using the appropriate functions and thus work more efficiently. They make sure they act prudently by adopting safe behaviours in order to avoid errors, and regularly evaluate their work in order to make the necessary adjustments. They validate information using criteria that puts the information in context.

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: Environmental Awareness and Consumer Rights and Responsibilities, and Citizenship and Community Life.

- **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 activity that enables adult learners to become aware of the importance of databases in marketing meets the educational aim of the BAL Environmental Awareness and Consumer Rights and Responsibilities.

- **Citizenship and Community Life**

The Computer Science program gives adult learners the opportunity to experience the principles that are the basis of equal rights in our society. A learning situation that makes adult learners aware of database-related errors and fraud meets the educational aim of the BAL Citizenship and Community Life.

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 learning situations and highlights those used in 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	• Citizenship and Community Life
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents • Adopts behaviours that reflect a concern for ethics, safety and critical thinking
Families 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	• **Creation** o Discovers what computers can do o Creates by correctly using the appropriate functions o Acts prudently by adopting safe behaviours • **Critical thinking** o Evaluates his/her work by setting quality standards o Validates information by using validation criteria
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses information and communications technologies • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Consulting an existing database by creating simple or complex queries and presenting results in a report

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 previous table: 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

School library

Task: Update the database of the adult education centre's library by creating new queries and reports.

To start off the activity, adult learners meet with the person in charge of the library, who gives them a list of the most frequently requested books and types of books in the library.

To carry out the activity, adult learners refer to the list and create the required queries and reports to make it easier to search for the most popular books.

At the end of the activity, adult learners ask some of their classmates, the teacher and the person in charge of the library to test the queries created. They identify possible errors and make the necessary corrections.

END-OF-COURSE OUTCOMES

To deal with situations related to operating a database, adult learners search a database by creating queries and generating results in reports. They modify the content of a table by adding, deleting and modifying certain data. To do this, they use the following subject-specific competencies: *Interacts in a computer environment*, *Produces computerized documents* and *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*.

Thus, when adult learners *discover what computers can do*, they consult the documentation provided in order to define the context, and experiment in order to analyze the situation. This helps them determine the possibilities offered by databases as well as the consequences and risks associated with their actions.

When adult learners *create,* they consider all aspects of a task, plan it and evaluate its complexity. They respect the constraints of databases as they create queries, forms and reports. They also create, delete or modify data. Thus, they adopt a flexible approach by identifying successful strategies, and review the steps followed and the results obtained.

When adult learners *act prudently*, they *adopt effective work methods* by determining the best way to proceed in order to avoid errors. They also make sure to put the information gathered in context.

When adult learners *validate information* obtained through database searches (e.g. queries, sorting, filtering or reports), they put the information in context by comparing it with the initial question in natural language. If necessary, they correct the search parameters and repeat the search.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they search an existing database, produce reports and modify data. In addition, adult learners do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

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

- Appropriate adoption of ethical and safe behaviours
- Judicious integration of information in accordance with the constraints identified

Course

CMP-5072-2

Creating a Database

Computer Science

INTRODUCTION

The goal of the *Creating a Database* course is to provide adult learners with the means to use their analytical skills and logic to create a relational database.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about database design and creation. While creating databases, adults act prudently in order to prevent design errors. Throughout the learning process, they evaluate their work while making sure they have met the standards that have been set.

By the end of this course, adult learners will be able to produce a normalized database using unnormalized data. They will also be able to create a relational database to meet a specific need. They will be familiar with the factors to consider prior to designing a database, as well as the creation and modification of a database and its main objects (tables, relationships, queries, forms, reports).

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Produces computerized documents*
- *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 use software resources and discover what computers can do. As they carefully plan their work and adapt their plan, they act ethically and prudently. When they analyze information, they make sure it is relevant and take the time to validate it by checking it against other sources.

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 *Creating a Database* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project. • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Creating a Database* course. Two are considered particularly relevant to this course: *Solves problems* and *Adopts effective work methods*.

- **Intellectual Competency**

When adult learners standardize a database, they learn to *solve problems* by respecting various constraints, such as avoiding redundant information, optimizing database performance, taking into account certain practical aspects, and protecting the integrity of data at all times.

- **Methodological Competency**

To plan and create a database, adult learners need to *adopt effective work methods*. In fact, database creation requires having an overall vision of the work involved and following certain steps: needs must first be analyzed; tables and their relationships must then be built; and finally,

forms, queries and reports must be created. By adopting effective work methods, adult learners reduce the number of corrections they may have to make later on.

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

- ***Main objects of a database***
  - Table
    - Data
    - Record, field
    - Primary key
  - Query
  - Form
  - Report
- ***Concepts associated with relational databases***
  - Relationships between tables
    - One-to-one relationship
    - One-to-many relationship
  - Normalization
    - Principle of non-redundancy of information
    - Distribution of information in the tables
    - Definition of the appropriate primary keys
  - Modeling
    - Types of data
    - Normalized relational schema
- ***Standard terminology associated with relational databases***
- ***Prior needs analysis***
  - Collecting data
  - Identifying types of data
  - Identifying data redundancy (unnormalized)

- Designing a normalized relational schema (without data redundancy within and between tables)

- ***Creating a relational database using a prior analysis***
  - Creating a table and choosing the field properties
    - Types of data
    - Size
    - Default values
    - Format
    - Input mask
    - List box
    - Primary key
  - Creating a select query (sorting, without criteria)
  - Creating forms
    - Form and sub-forms
    - Adding objects
    - Properties and layout of objects
    - Activation
    - Tabulation order
    - Arranging and aligning objects
    - Adding graphic elements (e.g. lines, boxes, images)
  - Creating a report

- ***Designing a relational schema using a needs analysis***

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***
  - Centralization of computer data and Y2K
  - Computerized ticketing system
  - Computer-assisted medical diagnosis
  - Canadian Geographical Names Data Base (CGNDB)

- ***Heritage objects***
  - Microfiches and other obsolete computerized media
  - DBase documentation and other obsolete databases
  - Colour-coded medical files
- ***Regional or national references***
  - Employers, material resources, inventory, payroll management
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Creating a Database* course is to provide adult learners with the means to use their analytical skills and their logic to create a relational database. This course gives adult learners the opportunity to perform actions that will enable them to produce quality computerized documents and adopt behaviours that reflect a concern for ethics, safety and critical thinking.

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

During the learning situations, adult learners create databases by correctly using the appropriate functions and thus work more efficiently. They evaluate their work by setting quality standards, or by taking into account those that have been set for them, in order to make the necessary corrections. They make sure they act prudently by adopting safe behaviours in order

to avoid errors, and validate information by using criteria to put the information in context, among other things.

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: Career Planning and Entrepreneurship, and Environmental Awareness and Consumer Rights and Responsibilities.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. A learning situation that introduces adult learners to the use of business data meets the educational aim of the BAL Career Planning and Entrepreneurship.

- **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 activity that makes adult learners aware of the importance of databases in telemarketing 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	• Environmental Awareness and Consumer Rights and Responsibilities
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Produces computerized documents • Adopts behaviours that reflect a concern for ethics, safety and critical thinking
Families 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	• **Creation** o Creates by correctly using the appropriate functions o Acts prudently by adopting safe behaviours • **Critical thinking** o Evaluates his/her work by setting quality standards o Validates information by using validation criteria
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Solves problems • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Prior needs analysis

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

Equipment depot

Task: The equipment depot at the adult education centre lends out laptops, video cameras and MP3 players to students for certain courses. The depot could therefore use a database to keep track of the equipment that is lent out and returned.

To start off the activity, the teacher explains what the depot needs and hands out a list of available equipment, a list of information that users could provide, and a list of courses offered at the adult education centre. Adult learners are then asked to prepare a relational schema for a database.

To carry out the activity, adult learners divide up the equipment into different categories and identify common characteristics in order to define the first table. Then, they determine common information about users in order to define the second table. The third table consists of the list of courses. Using this information, adult learners create the relational schema while avoiding data redundancy within and between the tables.

At the end of the activity, together with the teacher, the adult learners evaluate their schema based on the needs expressed and the lists provided. They make the necessary corrections and determine how they can create a relational database based on their schema—a task that could be done in another learning situation.

END-OF-COURSE OUTCOMES

To deal with situations related to database design and creation, adult learners analyze a need, design a relational schema and create a database (including tables, queries, forms and reports). To do this, they use the following subject-specific competencies: *Produces computerized documents* and *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*.

Thus, when adult learners *create,* they consider all aspects of a task, plan it and evaluate its complexity. They then create the schema or the database itself, while respecting the constraints of normalized relational databases.

When adult learners *act prudently*, they begin by analyzing a prior need and take into account the risk associated with the use of a database under construction. They determine the best way to proceed. This means they adopt a flexible approach by identifying successful strategies and by reviewing the steps followed and the results obtained.

When adult learners *evaluate their production,* they check whether they have achieved their objective and the quality standards that have been set; they review the steps followed, and they test their database. This gives them an accurate sense of the results of their efforts. They make the necessary corrections and imagine other contexts in which their approach could be applied.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they analyze a need while taking into account certain conditions, and use a prior analysis to create a database while making sure the data is not redundant. In addition, adult learners do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

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

- Appropriate adoption of ethical and safe behaviours
- Judicious integration of information in accordance with the constraints identified

6.3 Multimedia

Course

CMP-5073-2

Vector Graphics

Computer Science

INTRODUCTION

The goal of the *Vector Graphics* course is to provide adult learners with the means to express their creativity and to produce vector images that reflect their artistic sensibility. It provides a computer platform for the development of vector graphics skills.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about a vector graphics program. They explore the environment of the program and make sure they understand how its tools and commands work. They carry out a project by choosing the appropriate images and correctly using the tools and commands of the program required. They adopt ethical behaviour when communicating ideas and respect intellectual property.

By the end of this course, adult learners will be able to understand the main concepts related to vector graphics. They will identify the most common image formats and understand the concept of transparency in computer graphics. They will be able to use the main tools and commands of a vector graphics program and produce original images from sketches, bitmap images or various creations. They will demonstrate a sense of ethics in their communications and understand the importance of respecting intellectual property. They will know how to prepare images to be used in future projects, such as a Web page, a multimedia project, a 2D or 3D animation project or any other application or environment that uses vector-based images.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

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

Thus, it is by activating and integrating all three 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 and evaluate their efficiency in using a computer environment. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments while adopting ethical behaviour.

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 *Vector Graphics* course, the suggested approach is the production process.

<table>
<tr><th colspan="2">Production process</th></tr>
<tr><td colspan="2">• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change.
• During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project.
• During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.</td></tr>
<tr><td>Examples of strategies</td><td>- Comparing the current situation with the desired situation
- Determining the steps involved in carrying out the work
- Drawing up a work schedule
- Choosing a work method
- Making adjustments to the plan as they work
- Analyzing their results</td></tr>
</table>

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Vector Graphics* course. Two are considered particularly relevant to this course: *Uses creativity* and *Adopts effective work methods*.

- **Intellectual Competency**

When adult learners manipulate images, they learn to *use creativity*. They immerse themselves in a context or intention and engage in their work while adopting a flexible approach.

- **Methodological Competency**

Before creating a vector-based image, adult learners collect their thoughts and express them using sketches. This step allows them to analyze and organize their ideas, plan their resources, draw up a work schedule and thus develop their ability to *adopt effective work methods*. As they complete their project, adult learners follow the plan they have drawn up and make adjustments to it as the need arises.

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

- ***Properties of a vector image file***
  - File size
  - Colourimetry (RGB, CMYK)
  - Open format
    - Scalable vector graphics (SVG)
  - Proprietary formats
    - Adobe Illustrator (AI, EPS)
    - Adobe Flash (SWF)
    - Corel Draw (CDR)
    - AutoCad (DXF, DWG)
- ***Path components and attributes***
  - Curve, straight line, Bézier curve
  - Stroke weight, colour, pattern, gradient
- ***Components and attributes of geometric objects***
  - Number of paths
  - Line style
  - Shape (rectangle, ellipse, polygon)
  - Outline (stroke weight, colour, pattern, gradient)
  - Fill (colour, pattern, gradient)

- Opacity

- ***Functions and properties of layers***
- ***Rules of image composition***
- ***Standard terminology associated with vector graphics***
- ***Customizing the environment***
  - Modifying the zoom
  - Showing, hiding and changing the properties of the grid, ruler and guides
  - Activating the magnet feature
- ***Positioning and transforming geometric objects***
  - Selecting several objects
  - Changing the stacking order of objects
  - Aligning objects
  - Resizing objects
- ***Creating vector objects***
  - Drawing geometric shapes
  - Drawing paths
- ***Modifying vector objects***
  - Moving the terminal anchor points and control handles
  - Filling (colour, pattern, gradient, opacity)
  - Modifying stroke types
  - Rotation, symmetry and translation
  - Grouping
  - Using Boolean operations on objects
    - Union
    - Difference
    - Intersection
    - Exclusion
    - Division
  - Deforming a vector object with respect to a path
  - Combining and separating paths

- Using filters and special effects

- ***Managing layers***
  - Adding layers
  - Renaming layers
  - Showing or hiding layers
- ***Bitmap to vector conversion***
  - Using auto-trace functions
  - Modifying and correcting the resulting image
- ***Printing illustrations***
  - Choosing the image format
  - Choosing the paper size and orientation

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***
  - Evolution of the advertising industry
- ***Heritage objects***
  - Publications from different time periods
  - Works by graphic designers
- ***Regional or national references***
  - Advertising and marketing firms, printing companies
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Vector Graphics* course is to provide adult learners with the means to express their creativity and to produce vector images that reflect their artistic sensibility. 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.

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 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.

Then, adult learners create documents by correctly using the appropriate functions and thus work more efficiently. Throughout the project, they communicate respectfully, using the conventions of a given medium.

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: Environmental Awareness and Consumer Rights and Responsibilities, and Media Literacy.

- **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 activity that makes adult learners aware of the importance of business images meets the educational aim of the BAL Environmental Awareness and Consumer Rights and Responsibilities.

- **Media Literacy**

Being able to better understand how media information is processed is one of the aims of the Computer Science program. A learning activity that helps adult learners become aware of the means used to produce media images meets the educational aim of the BAL Media Literacy.

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	• Media Literacy
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents • Adopts behaviours that reflect a concern for ethics, safety and critical thinking
Families 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	• **Information** o Communicates respectfully, using the conventions of a given medium • **Creation** o Discovers what computers can do by consulting documentation and by experimenting o Creates by correctly using the appropriate functions
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses creativity • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Creating vector objects • Modifying vector objects • Managing layers

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 previous table: 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

Organizational chart for the governing board

Task: Create an organizational chart for the adult education centre's governing board.

The teacher asks the adult learners to create an organizational chart for the adult education centre's governing board to show the board's structure and its various members (teachers, nonteaching professionals, community representatives and students). In order to prepare for the task, adult learners are asked to draw a sketch of the chart and plan the steps involved in the project. Once the project is completed, the adult learners present it in a medium of their choice.

To carry out the activity, adult learners will draw on their existing knowledge and skills. They are not expected to master all of the course content before they start their project; rather, they will construct their knowledge as they work, using the means at their disposal: the documentation provided, planning, communication with peers (when the situation permits), and reflection and review. The teacher encourages the adult learners to create an image that allows them to use only some of the software's features. By proceeding this way, adult learners can validate their knowledge by integrating it gradually into concrete actions.

During this activity, adult learners use mainly geometric shapes, text and layers to divide up and manipulate objects. They may also use colours, gradients, a background or special effects to enhance the appearance of their organizational chart. They plan their work in advance and, in collaboration with the teacher or their peers, analyze their results at each step, adjusting their approach based on their needs.

END-OF-COURSE OUTCOMES

Computer graphics refers to the creation, manipulation, storage and display of images using computer equipment and techniques. The *Vector Graphics* course gives adult learners the opportunity to discover the world of computer graphics by allowing them to apply different techniques to the creation, modification and manipulation of vector images.

When adults *discover what computers can do*, they become familiar with the main concepts of vector graphics by consulting available software documentation, tutorials and guides. They search the Internet for information or consult their peers. They explore the capabilities and limitations of the application's tools and commands by using these features in concrete activities. In this way, they develop strategies that they can apply in their project. They look for inspiration in images from various sources or draw sketches to plan their project.

When adult learners *create* a vector image, they determine the objective of the task, are open to different ways of doing things, analyze the task to be carried out and mobilize the necessary resources. They apply their knowledge to the tools available, manage layers, use different levels of transparency, and draw curves or straight lines as well as geometric figures in order to create complex shapes. They combine paths or geometric figures using Boolean operations, and process text by applying different functions to change its appearance. They use selection tools and their functions to regroup, align or transform selected objects; they apply gradients, filters or patterns; they insert bitmap images and know how to convert these images into vector images. They save or export the resulting images in the appropriate format and print them out, taking into account the main printing parameters.

When adults *communicate*, they demonstrate their sense of ethics, act responsibly by respecting copyright and use the conventions of a given medium.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they create vector images by adding and modifying objects, colours, filters and special effects; and use the basic features of a vector graphics application in order to produce original images from sketches, bitmap images or various creations. In addition, adult learners do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions

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

- Adequate communication using the conventions of a given medium

Course

CMP-5074-2

Introduction to 2D Animation

Computer Science

INTRODUCTION

The goal of the *Introduction to 2D Animation* course is to provide adult learners with the means to express their creativity and to produce 2D animations that reflect their artistic sensibility.

In this course, adult learners deal with various learning situations that help them acquire theoretical and practical knowledge about a 2D animation program. They explore the environment of a program of their choice and make sure they understand how its tools and commands work. To carry out their project, they use the tools and commands of the program correctly to create a model and animate 2D objects. At every step in the process, they evaluate their work by setting quality standards.

By the end of this course, adult learners will be able to create an animation scenario and transpose it in a 2D animation project. They will be able to identify the most common animation formats and understand the concept of a timeline. They will produce vector- or raster-based animations and create scenes using the tools and commands of an animation program. They will know how to prepare animated images to be used in future projects, such as a Web page, a multimedia project, or any other environment that uses 2D animation.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Interacts in a computer environment*
- *Produces computerized documents*

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 and evaluate their efficiency in using a computer environment. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments.

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 *Introduction to 2D Animation* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project. • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Introduction to 2D Animation* course. Two are considered particularly relevant to this course: *Uses creativity* and *Adopts effective work methods*.

▪ Intellectual Competency

When adult learners create an animation, they *use creativity*. They immerse themselves in a context or intention and engage in their work while adopting a flexible approach.

▪ Methodological Competency

Before creating an animation, adult learners gather ideas and express them using a storyboard. This step allows them to analyze and organize their ideas, plan their resources, draw up a work schedule and thus develop the competency *Adopts effective work methods*. As they complete

their animation, adult learners follow the plan they have drawn up and make adjustments to it as the need arises.

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

- ***Nature, role and properties of objects related to 2D animation***
- ***Main components of an animation***
  - Scenes and sequences
  - Keyframes
  - Symbols
  - Animation clips
  - Instances
  - Vector-based and bitmap images
  - Videos
  - Sounds
- ***Frame rates***
  - Web
  - PAL
  - NTSC
- ***Types of animation***
  - Frame-by-frame animation
  - Interpolation or transformation
- ***File formats associated with animation***
  - Raster-based animation (GIF, PNG)
  - Vector-based animation (SWF, SVG)

- ***Storyboard***
- ***Standard terminology associated with 2D animation***
- ***Film terminology***
- ***Managing animation files***
  - Using the library to store and retrieve objects
  - Choosing the types of images (vector or bitmap) appropriate to the situation
- ***Creating and modifying objects***
  - Drawing objects using drawing tools
  - Importing objects
  - Arranging objects in a scene
  - Changing the properties of objects
  - Grouping objects
- ***Adding or modifying audio track(s)***
- ***Managing layers***
  - Adding and deleting layers
    - Normal layers
    - Mask layers
    - Guide layers
  - Naming layers
  - Arranging objects in layers
  - Grouping and ungrouping layers
- ***Controlling events in time***
  - Determining keyframes
  - Tweening
    - Shape tweening
    - Motion tweening
- ***Exporting an animation in an appropriate format***
  - Compatibility
  - File size
  - Compression
  - Quality

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***
  - Evolution of 2D animation technologies
  - Animation and interactive advertising on the Internet
  - History of film animation
- ***Heritage objects***
  - Animated emoticons
  - Frame-by-frame cartoon animation
  - Lightboxes and cels
- ***Regional or national references***
  - Web site design, advertising and marketing firms
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Introduction to 2D Animation* course is to provide adult learners with the means to express their creativity and to produce 2D animations that reflect their artistic sensibility. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment and produce quality computerized documents.

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 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.

Then, adult learners create documents by correctly using the appropriate functions and thus work more efficiently. They take the time to evaluate their work by setting quality standards, or by taking into account standards that have been set for them, in order to get an accurate sense of the results of their efforts.

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: Career Planning and Entrepreneurship, and Media Literacy.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. A learning situation that helps adult learners create and disseminate promotional content meets the educational aim of the BAL Career Planning and Entrepreneurship.

- **Media Literacy**

Being able to better understand how media information is processed is one of the aims of the Computer Science program. A learning activity that helps adult learners recognize 2D animation techniques in the media meets the educational aim of the BAL Media Literacy.

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	• Media Literacy
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents
Families 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	• **Creation** o Discovers what computers can do by consulting documentation and by experimenting o Creates by correctly using the appropriate functions • **Critical thinking** o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses creativity • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Main components of an animation • Standard terminology associated with 2D animation • Creating and modifying objects • Planning a 2D animation using a storyboard

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

Green beach

Task: Create a 2D animation to promote awareness about the importance of keeping a local lake or river beach clean.

In preparation for the task, the teacher asks the adult learners to design a storyboard, choose a broadcast medium and plan the steps in their project.

For the project, adult learners use text or 2D objects that they animate using the animation tools and techniques they know. Based on 2D objects they have already modelled, adult learners compose the scene for their animation. To make the scene more realistic, they use a bitmap image of a beach in the background and add sound effects as well as a music track.

Depending on the medium selected, the animation will then be used for advertising purposes and incorporated into a Web site, an advertising video or a souvenir video.

To carry out the activity, adult learners will draw on animation techniques they know. They are not expected to master all of the course content before they start their project; rather, they will construct their knowledge as they work, using the means at their disposal: the documentation provided, planning, communication with peers (when the situation permits), and reflection and review. They plan their work in advance and, in collaboration with the teacher or their peers, analyze their results at each step, adjusting their approach based on their needs.

END-OF-COURSE OUTCOMES

In computer science, animation is a technique used to bring inert objects to life. The *Introduction to 2D Animation* course gives adult learners the opportunity to discover this technique during a project in which they create, modify and manipulate images.

When adults *discover what computers can do*, they become familiar with the main concepts of 2D animation by consulting available software documentation, tutorials and guides. They search the Internet for information or consult their peers. They explore the capabilities and limitations of the tools and commands of an application they have chosen, by using these features in concrete activities. In this way, they develop strategies they can apply in their project. They look for inspiration in animations from various sources and choose a work method that is appropriate for their project.

When adult learners *create* a 2D animation, they plan their work by designing a storyboard to determine the end result, choose the resources to use, and draw up a work schedule. They use the library to store and retrieve the objects in their scene. They choose the types of images (vector or bitmap) that are appropriate to the scene they are creating. They draw or import objects that they arrange in the scene and use layers in order to work on them individually, change their properties and group them, if necessary. When adult learners animate objects in a scene, they place them on a timeline and apply different animation techniques. They determine the keyframes, tween them, generate transformations or produce a frame-by-frame animation. Lastly, they save or export their work in an appropriate format.

When adults *evaluate their work*, they make the necessary corrections and analyze their results to ensure they have achieved the standards that have been set. Where applicable, they determine the improvements to be made and the means of doing so.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they create and modify 2D objects, arrange them in a scene and animate them using the most common animation techniques. They produce renderings while complying with instructions. In addition, they do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

Course

CMP-5075-2

Raster Graphics

Computer Science

INTRODUCTION

The goal of the *Raster Graphics* course is to provide adult learners with the means to express their creativity and to produce images and photomontages that reflect their artistic sensibility. This course goes beyond mere photo retouching and offers adult learners a computer platform for the development of raster graphics skills.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about a raster graphics program. They explore the environment of the program and make sure they understand how its tools and commands work. They carry out a project by choosing appropriate images and correctly using the tools and commands of the program required. They adopt ethical behaviour when communicating ideas and respect intellectual property.

By the end of this course, adult learners will be able to produce bitmap images by adding and modifying objects, colours, filters and special effects. They will be able to identify the most common image formats and understand the concept of transparency in computer graphics. They will be able to use the basic tools of the raster graphics program required to produce images or photomontages using sketches or images from a digital camera, an image bank or the Web. They will know how to prepare images to be used in various future projects, such as a Web page, a multimedia project, a 2D or 3D animation project or any other application or environment that uses bitmap images. They will demonstrate a sense of ethics in their communications and understand the importance of respecting copyright.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

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

Thus, it is by activating and integrating all three 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 and evaluate their efficiency in using a computer environment. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary corrections while adopting ethical behaviour.

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 *Raster Graphics* course, the suggested approach is the production process.

<table>
<tr><th colspan="2">Production process</th></tr>
<tr><td colspan="2">• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change.
• During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project.
• During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.</td></tr>
<tr><td>Examples of strategies</td><td>- Comparing the current situation with the desired situation
- Determining the steps involved in carrying out the work
- Drawing up a work schedule
- Choosing a work method
- Making adjustments to the plan as they work
- Analyzing their results</td></tr>
</table>

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Raster Graphics* course. Two are considered particularly relevant to this course: *Uses creativity* and *Adopts effective work methods*.

- **Intellectual Competency**

When adult learners manipulate images, they *use creativity*. They immerse themselves in a context or intention and engage in their work while adopting a flexible approach.

- **Methodological Competency**

Before creating a bitmap image, adult learners gather ideas and express them using sketches. This step allows them to analyze and organize their ideas, plan their resources, draw up a work schedule and thus develop their ability to *adopt effective work methods*. As they complete their project, adult learners follow the plan they have drawn up and make adjustments to it as the need arises.

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

- ***Definitions and properties of the main concepts associated with bitmap images***
  - Basic unit: the pixel
    - Pixel definition
    - Number of bytes of a pixel and its impact on the number of colors
    - Pixel dimension
  - Properties of a bitmap image
    - Definition
    - Settings of colours, shades and contrasts
    - Resolution
    - Dimension
    - Number of colours
    - Compression
    - File size
    - Transparency
    - Animation
    - Aliasing
  - Image formats
    - PNG, TIFF, JPEG, GIF, BMP
    - Proprietary formats (PSD, CPT, XCF)

- ***Rules of image composition***
- ***Standard terminology associated with raster graphics***
- ***Customizing the environment***
  - Modifying the zoom
  - Showing, hiding or changing the properties of the grid, ruler and guides
  - Activating the grid's magnet feature
- ***Using selection tools and their related functions***
  - Select by zone
  - Select by colour
  - Select by path
  - Inverse selection
  - Select all
  - Expand or contract (to increase or decrease the size of the selection)
- ***Managing layers***
  - Creating, merging and linking layers
  - Changing the properties of layers
    - Name
    - Opacity
    - Visibility
    - Lock
    - Order
    - Blending modes
- ***Modifying parts of an image using layers***
  - Arranging the parts of an image over several layers
  - Transforming part of an image
    - Stretching or shrinking
    - Modifying the proportions
    - Cutting or pasting
    - Using a layer
    - Using a selection of pixels
    - Rotating (specifying the centre and the angle of rotation)
    - Smoothing

- Using tools to draw
    - Paint
    - Choosing a foreground or background pattern or colour
    - Align
    - Delete
    - Clone
- Adding text
    - Using text boxes
    - Changing the properties of a text box
    - Converting a text box into pixels
    - Applying filters and special effects

- ***Saving an image in different formats in order to export it to other applications or to use it on the Web***
- ***Printing digital images by taking the main printing parameters into account***

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***
    - Evolution of the advertising industry
- ***Heritage objects***
    - Publications from different time periods
    - Works by graphic designers and photographers
    - Pictorial art
- ***Regional or national references***
    - Advertising and marketing firms; Web site and video game designers; film producers
    - Anecdotes
    - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Raster Graphics* course is to provide adult learners with the means to express their creativity and to produce images and photomontages that reflect their artistic sensibility.

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.

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 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.

Then, adult learners create documents by correctly using the appropriate functions in order to work more efficiently. Throughout the project, they communicate respectfully, using the conventions of a given medium.

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: Environmental Awareness and Consumer Rights and Responsibilities, and Media Literacy.

- **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 activity that makes adult learners aware of the importance of business images meets the educational aim of the BAL Environmental Awareness and Consumer Rights and Responsibilities.

- **Media Literacy**

Being able to better understand how media information is processed is one of the aims of the Computer Science program. A learning activity that helps adult learners become aware of the means used to produce media images meets the educational aim of the BAL Media Literacy.

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	• Media Literacy
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents • Adopts behaviours that reflect a concern for ethics, safety and critical thinking
Families 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	• **Information** o Communicates respectfully, using the conventions of a given medium • **Creation** o Discovers what computers can do by consulting documentation and by experimenting o Creates by correctly using the appropriate functions
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses creativity • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Properties of bitmap images • Rules of image composition • Modifying parts of an image using layers • Planning a project • Creating photomontages • Preparing an image for mass media projects

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 previous table: 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

An ideal world

Task: Create a photomontage of an ideal world.

The teacher can ask adult learners to create an image of an ideal world using photomontage techniques. Using images they have collected, adult learners cut out the parts they want to keep and then distribute them among various layers in order to process them. To prepare for the task, adult learners are asked to draw a sketch of what they intend to do and plan the steps involved in their project. Once the project is completed, the adult learners present it in a medium of their choice.

To carry out the activity, adult learners will draw on their existing knowledge and skills. They are not expected to master all of the course content before they start their project; rather, they will construct their knowledge as they work, using the means at their disposal: the documentation provided, planning, communication with peers (when the situation permits), and reflection and review. The teacher encourages the adult learners to create an image that allows them to use only a few of the software's features. By proceeding in this way, adult learners can validate their knowledge by integrating it gradually into concrete actions.

During this activity, adult learners use mainly selection tools to cut out objects, and layers to distribute and manipulate these objects. They plan their work in advance and, in collaboration with the teacher or their peers, analyze their results at each step, adjusting their approach based on their needs.

END-OF-COURSE OUTCOMES

Computer graphics refers to the creation, manipulation, storage and display of images using computer equipment and techniques. The *Raster Graphics* course gives adult learners the opportunity to discover the world of computer graphics by allowing them to apply different techniques to the creation, modification and manipulation of bitmap images.

When adult learners *discover what computers can do*, they become familiar with the main concepts of raster graphics by consulting available software documentation, tutorials and guides. They search the Internet for information or consult their peers. They explore the capabilities and limitations of the application's tools and commands by using these features in concrete activities. In this way, they develop strategies that they can apply in their project. They look for inspiration in images from various sources or draw sketches to plan their project.

When adult learners *create* a bitmap image, they determine the objective of the task, are open to different ways of doing things, analyze the task to be carried out and mobilize the necessary resources. They apply their knowledge to the tools available, manage layers and use transparency; they import images from a digital camera, an image bank or the Web; select the parts they want to use and process them in a consistent and harmonious manner. They save or export their images in the appropriate format and print them out, taking into account the main printing parameters. Thus, adults become more versatile and efficient in using a raster graphics program.

When adult learners *communicate*, they demonstrate their sense of ethics, act responsibly by respecting copyright and use the conventions of a given medium.

Throughout the learning process, adult learners develop competence in the following knowledge and skills: they create bitmap images by adding and modifying objects, colours, filters and special effects; and use the basic features of a raster graphics program in order to produce images or photomontages. In addition, they do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions

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

- Adequate communication using the conventions of a given medium

Course

CMP-5076-2

Introduction to 3D Modeling

Computer Science

INTRODUCTION

The goal of the *Introduction to 3D Modeling* course is to provide adult learners with the means to express their creativity and to develop skills associated with the production of 3D objects and scenes.

In this course, adult learners deal with various learning situations that help them acquire theoretical and practical knowledge about 3D modeling. They explore the environment of a 3D modeling program and make sure they understand how its tools and commands work. They imagine and model 3D objects, which they arrange in a scene, and add lights and cameras. At every step in the process, they evaluate their work by setting quality standards. They adopt ethical behaviour to communicate their ideas and respect intellectual property.

By the end of this course, adult learners will be able to create 3D scenes containing modelled and textured objects, as well as lights and cameras. They will demonstrate a sense of ethics in their communications and understand the importance of respecting intellectual property.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

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

Thus, it is by activating and integrating all three 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 and evaluate their efficiency in using a computer environment. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments, while adopting ethical behaviour.

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 *Introduction to 3D Modeling* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project. • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Introduction to 3D Modeling* course. Two are considered particularly relevant to this course: *Uses creativity* and *Adopts effective work methods.*

- **Intellectual Competency**

When adult learners work on a 3D modeling project, they learn to *use creativity*. When they model 3D objects or prepare a scene, they create a virtual world that reflects their vision of a real or imaginary world.

- **Methodological Competency**

Working on a 3D modeling project requires sound planning. There are many steps involved, adults must constantly reflect on their approach and make corrections before moving on to the next step. Thus, at each step in their project, they immerse themselves in a context or intention

and engage in their work while adopting a flexible approach. This enables them to develop the competency *Adopts effective work methods.*

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

- ***3D environment***
  - Spatial representation on a coordinate system with three axes
  - Display modes (wireframe, solid, texture) and work modes (orthographic and perspective projections)
  - Texture mapping
  - Lights
  - Cameras
  - Renders
- ***Object components (vertex, edge, polygon, texture)***
- ***Modeling techniques***
- ***Rules of scene composition***
- ***Standard terminology associated with 3D modeling***
- ***Modeling 3D objects***
  - Using the polygonal modeling technique
  - Using the Bézier curve modeling technique
  - Using modeling tools
    - Extrusion
    - Boolean operators
    - Revolution
  - Editing text
    - Modifying attributes (e.g. font, font size)
    - Applying textures or materials
    - Deforming text

- ***Creating and applying textures or materials to objects***
  - Creating basic materials
  - Modifying the properties of materials and textures
    - Transparency
    - Shading
    - Reflection (mirror effect)
    - Positioning bitmap images over 3D objects (mapping)
  - Combining materials
- ***Adding and modifying lights***
- ***Adding and modifying cameras***
- ***Importing objects***
- ***Producing renders of varying qualities***
  - Image
  - Video
  - Printing

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***
  - Video games
  - Computer simulation
  - Films on virtual reality
  - Special effects in film productions
  - History of sculpture
- ***Heritage objects***
  - 3D photography: from stereoscopy to polarizing filters
  - 3D modeling peripherals
  - Storyboards (sketches for films using special effects or 3D animation)
  - Video game or film action figures

- ***Regional or national references***
  - Video game designers, film producers, advertising and marketing firms, digital artists
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Introduction to 3D Modeling* course is to provide adult learners with the means to express their creativity and to develop their skills in the production of 3D objects and scenes. 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.

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 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.

Then, adult learners create documents by correctly using the appropriate functions and thus work more efficiently. They evaluate their work on a regular basis by setting quality standards or by taking into account standards that have been set for them. Throughout their project, they communicate respectfully, using the conventions of a given medium.

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 Career Planning and Entrepreneurship.

- **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 helps make adult learners aware of how virtual reality affects health and well-being meets the educational aim of the BAL Health and Well-Being.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. A learning situation that introduces adult learners to the creation of three-dimensional scenes for the movie or video game industry meets the educational aim of the BAL Career Planning and Entrepreneurship.

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	• Career Planning and Entrepreneurship
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents • 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	• **Information** o Communicates respectfully, using the conventions of a given medium • **Creation** o Discovers what computers can do by consulting documentation and by experimenting o Creates by correctly using the appropriate functions • **Critical thinking** o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses creativity • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• 3D environment • Object components • Modeling 3D objects • Creating and applying textures or materials to objects • Texturing 3D objects • Adding and modifying lights and cameras

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

3D model of a laptop

Task: Create a 3D model of a laptop.

The teacher asks adult learners to create a 3D model of a laptop, which they can then integrate into a 3D scene containing a background and various objects such as a workstation and chair. This will allow them to demonstrate their knowledge of work methods associated with certain contexts.

To prepare for the task, adult learners are asked to draw a sketch of a laptop and to plan the steps involved in the project. Once the project is completed, the adult learners present it in the medium of their choice.

To carry out the activity, adult learners will use a popular modeling technique: polygonal or Bézier modeling. They will apply to their object textures created by them based on photos or images culled from the Web.

They are not expected to master all of the course content before they begin their project; rather, they will construct their knowledge as they work, using the means at their disposal: the documentation provided, planning, communication with peers (when the situation permits), and reflection and review. They will plan their work in advance and, in collaboration with the teacher or their peers, will analyze their results at each step, regulating their approach in accordance with their needs.

END-OF-COURSE OUTCOMES

We perceive the world around us in terms of three dimensions: length, width and depth. The *Introduction to 3D Modeling* course gives adult learners the opportunity to better understand this representation of the universe through the creation, modification and manipulation of three-dimensional objects.

When adult learners *discover what computers can do*, they consult available software documentation, tutorials and guides. They search the Internet for information that may help them. They look for inspiration in available creations in order to design an original product.

When adult learners *create*, they consider all aspects of the task at hand and plan their work using sketches to determine the desired result. They determine the resources to use, break the work down into steps and draw up a work schedule. They choose a work method that is appropriate for their project. At each step in their project, they analyze their results in order to determine the improvements to be made and the means of doing so.

When adult learners *model* 3D objects, they use libraries to store and retrieve the objects they draw or import; they modify the properties of the objects and group them, if necessary. They use

the most common modeling techniques, namely polygonal and Bézier modeling. They use such modeling tools as extrusion, Boolean operators and revolution. They edit text and change attributes; they apply textures or materials to the objects they model.

When adult learners *design* a scene, they arrange objects harmoniously within it while respecting the rules of spatial perception. They add lighting to bring light and shadow into their scene and integrate cameras to produce various points of view. If necessary, they use layers to distribute the objects in the scene and make it easier to manipulate them.

When adult learners *evaluate their work*, they record their observations and establish quality standards that they will be able to use in subsequent work.

When adult learners *communicate*, they demonstrate their sense of ethics and act responsibly by respecting the copyright of the digital material they use.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they create 3D models of objects and arrange them in a scene, to which they add lights and cameras. In addition, they do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

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

- Adequate communication using the conventions of a given medium

Course
CMP-5077-2
Introduction to 3D Animation

Computer Science

INTRODUCTION

The goal of the *Introduction to 3D Animation* course is to provide adult learners with the means to express their creativity and to develop skills to produce 3D animated scenes.

In this course, adult learners deal with various learning situations that help them acquire theoretical and practical knowledge about 3D animation. They explore the environment of a 3D animation program and make sure they understand how its tools and commands work. They create scenes composed of several objects, lights and cameras by correctly using the tools and commands of the required program. They animate objects in the scene, using the most common techniques, and produce renders in accordance with instructions. At every step in their process, they evaluate their work by setting quality standards. They adopt ethical behaviour to communicate their ideas and respect intellectual property.

By the end of this course, adult learners will be able to animate scenes in a virtual 3D world containing modelled and textured objects, lights and cameras. They will be able to create an animation by using techniques for moving and transforming objects, applying lighting or camera techniques, and modifying object properties. They will demonstrate a sense of ethics in their communications and understand the importance of respecting intellectual property.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

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

Thus, it is by activating and integrating all three 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 and evaluate their efficiency in using a computer environment. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments, while adopting ethical behaviour.

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 *Introduction to 3D Animation* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project. • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Introduction to 3D Animation* course. Two are considered particularly relevant to this course: *Uses creativity* and *Adopts effective work methods*.

- **Intellectual Competency**

When adult learners work on a 3D animation project, they learn to *use creativity*. When they prepare a scene or animate 3D objects in it, they create a virtual world that reflects their vision of a real or imaginary world.

- **Methodological Competency**

Working on a 3D animation project requires sound planning. There are many steps involved, and adults must constantly reflect on their approach and make the necessary corrections before moving on to the next step. Thus, at each step in their project, they immerse themselves in a context or intention and engage in their work while adopting a flexible approach. This enables them to develop the competency *Adopts effective work methods.*

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

- ***3D environment***
  - Spatial representation on a coordinate system with three axes
  - Display modes (wireframe, solid, texture) and work modes (orthographic and perspective projections)
  - Texture mapping
  - Lights
  - Cameras
  - Renders
- ***Object components (vertex, edge, polygon, texture)***
- ***3D animation techniques***
- ***Frame rates***
  - Web
  - PAL
  - NTSC

- ***Storyboard***
- ***Standard terminology associated with 3D animation***
- ***Film terminology***
- ***Importing objects***
- ***Adding and modifying lights***
- ***Adding and modifying cameras***
- ***Object animation***
  - Creating movement using keyframes to create interpolations
  - Creating movement using motion curves
  - Creating movement along a path
  - Creating movement using constraints
  - Modifying the properties of an object (visible object, lights, cameras)
- ***Producing renders of varying qualities***
  - Image
  - Video
  - Printing

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***
  - Video games
  - Computer simulation
  - Films on virtual reality
  - Special effects in film productions
- ***Heritage objects***
  - 3D cinema: from stereoscopy to polarizing filters
  - 3D animation peripheral
  - Claymation
  - Movie storyboard

- ***Regional or national references***
  - Video game designers, film producers, advertising and marketing firms
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Introduction to 3D Animation* course is to provide adult learners with the means to express their creativity and to develop their skills in the animation of 3D scenes. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment, and produce quality computerized documents and adopt ethical behaviours.

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 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.

Then, adult learners create documents by correctly using the appropriate functions and thus work more efficiently. They evaluate their work on a regular basis by setting quality standards or by taking into account standards that have been set for them. Throughout their project, they communicate respectfully, using the conventions of a given medium.

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 Career Planning and Entrepreneurship.

- **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 helps make adult learners aware of how virtual reality affects health and well-being meets the educational aim of the BAL Health and Well-Being.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. A learning situation that introduces adult learners to the creation of three-dimensional scenes for the movie or video game industry meets the educational aim of the BAL Career Planning and Entrepreneurship.

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	• Career Planning and Entrepreneurship
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents • 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	• **Information** o Communicates respectfully, using the conventions of a given medium • **Creation** o Discovers what computers can do by consulting documentation and by experimenting o Creates by correctly using the appropriate functions • **Critical thinking** o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses creativity • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• 3D environment • Terminology associated with 3D animation • Object animation techniques • Creating a 3D scene with textured objects, cameras and lighting • Creating a 3D animation

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

A soccer ball

Task: Create a 3D animation of a soccer ball.

The teacher asks adult learners to create a 3D animation of a soccer ball for their child's soccer team. The animation could then be used for advertising purposes for the team and incorporated into a Web site, an advertising video or a souvenir video.

In preparation for the task, the teacher asks the adult learners to design a storyboard and plan the steps in their project.

Using three-dimensional objects they have already modelled or found on the Web, adult learners compose the scene for their animation. To make the scene more realistic, they can use an image of a soccer field in the background, add text or sound effects and a music track. Once the project is completed, the adult learners present it in a medium of their choice.

To carry out the activity, adult learners draw on common animation techniques: using keyframes to create interpolations, using paths or objects deformation. They are not expected to master all of the course content before they start their project; rather, they will construct their knowledge as they work, using the means at their disposal: the documentation provided, planning, communication with peers (when the situation permits), and reflection and review. They will plan their work in advance and, in collaboration with the teacher or their peers, will analyze their results at each step, regulating their approach based on their needs.

END-OF-COURSE OUTCOMES

We perceive the world around us in terms of three dimensions: length, width and depth. The *Introduction to 3D Animation* course gives adult learners the opportunity to better understand this representation of the universe through the use of 3D animation techniques.

When adult learners *discover what computers can do*, they consult available software documentation, tutorials and guides. They search the Internet for information that may help them. They look for inspiration in available creations in order to design an original product.

When adult learners *create* an animation, they consider all aspects of the task at hand and plan their work using a sketch or storyboard to establish the desired result. They determine the resources to use, break the work down into steps and draw up a work schedule. They choose a work method that is appropriate for their project. At each step in the project, they analyze their results in order to determine the improvements to be made and the means of doing so.

When adult learners *design* a scene, they arrange objects in a harmonious manner and respect the rules of spatial perception. They add lighting to bring light and shadow into the scene, and integrate cameras to produce various points of view. If necessary, they use layers to distribute the objects in the scene and make it easier to animate them.

When adult learners *animate* objects in 3D, they create movement by using keyframes, motion curves or paths. They modify object, light and camera attributes. They add keyframes on the timeline and create interpolations. They produce renderings and export their animation in an appropriate format.

When adult learners *evaluate their work*, they note their observations and establish quality standards that they will be able to apply in subsequent projects.

When adult learners *communicate*, they demonstrate a sense of ethics and act responsibly by respecting the copyright of the digital material they use.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they position 3D objects in a scene using the most common animation techniques and produce renderings in accordance with instructions. In addition, they do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

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

- Adequate communication using the conventions of a given medium

Course

CMP-5078-2

Computer-Assisted Presentation

Computer Science

INTRODUCTION

The goal of the *Computer-Assisted Presentation* course is to provide adult learners with the means to improve their communication skills and to enable them to produce multimedia documents that present their ideas effectively.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about a computer-assisted presentation program. By creating and presenting slides, adult learners take a critical look at their communication tool; they communicate their ideas effectively, in accordance with language rules and their target audience. Throughout the learning process, they evaluate their work by making sure they have met the standards that have been set.

By the end of this course, adult learners will be able to create a multimedia presentation for which they will have customized the slides and user interaction. They will be familiar with different contexts in which computer-assisted presentations are used and will be able to plan, create and standardize presentations.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

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

Thus, it is by activating and integrating all three 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. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments.

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 *Computer-Assisted Presentation* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project. • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Computer-Assisted Presentation* course. Two are considered particularly relevant to this course: *Uses information* and *Communicates appropriately*.

- **Intellectual Competency**

By preparing presentations, adults learn to *use information* in order to convey their ideas and to bring in elements to support these ideas They systematize the information-gathering process, assimilate the information before using it, and put it to use while respecting intellectual property.

- **Communication-Related Competency**

By sharing computer-assisted presentations, adults learn to *communicate appropriately*. They adapt their work to a communication intention, a message or a target audience.

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

- ***Definitions and properties of the main concepts associated with computer-assisted presentations***
  - Slides and slide shows
  - Slide layouts
  - Objects
  - Masks (master slides)
  - Transitions
  - Animation effects
  - Grids
  - Timing and timeline
  - Comments
  - View modes (outline view, slide view, slide show)
- ***Roles of the presenter and the presentation***
  - Presenter-reader
  - Presenter-speaker
  - Linear, non-linear, interactive presentation
  - Self-running presentation
  - Presentations on computer, projector, interactive whiteboard
- ***Situations in which computer-assisted presentations are used***
  - Situations in which it may be appropriate to use a presentation
  - Situations in which it may be appropriate to use masks (master slides)
  - Situations in which it may be appropriate to use templates

- ***Rules of image composition***
- ***Standard terminology associated with computer-assisted presentations***
- ***Creating a slide***
  - Inserting objects
  - Defining the stacking order
  - Adding comments
- ***Formatting a presentation***
  - Using presentation templates
  - Modifying the layout of a slide
  - Modifying colours
  - Creating slide masks
  - Rearranging slides
- ***Integrating interactive elements in a presentation***
  - Choosing view options
    - Automatic or manual startup
    - Simple or looped presentation
  - Changing parameters for animating objects
    - Display order
    - Zoom in or fading
    - Speed
    - Grouping
  - Changing the parameters for transitions between slides
    - Speed
    - Sound
    - Effects
    - Timing
  - Creating links to slides or other resources (Web site, document)
  - Set timing for animations and transitions
- ***Saving, exporting and printing slide shows***

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***
  - Evolution of teaching tools (blackboard, chalkboard, whiteboard, interactive whiteboard, photocopies, overhead projector, computer-assisted presentation)
  - Computer-assisted presentations in different forms
    - Speaker's presentation using an overhead projector and presentation software
    - Advertising on digital message boards
    - Interactive terminals
    - Election campaigns
- ***Heritage objects***
  - Overhead projector
  - Flipchart
- ***Regional or national references***
  - Employers
  - Anecdotes
  - School-related elements

FAMILY OF LEARNING SITUATIONS

The goal of the *Computer-Assisted Presentation* course is to provide adult learners with the means to improve their communication skills and to enable them to produce multimedia documents that present their ideas effectively. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment and produce quality computerized documents.

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 critically examine the computerized communication tools by applying evaluation criteria. For example, they may choose the appropriate programs or configure their environment in a manner that suits them.

Then, they communicate using computerized services, in order to share their experiences and ideas and to express themselves, among other things. They create documents by correctly using the appropriate functions and thus work more efficiently. They evaluate their work regularly by setting quality standards or by taking into account standards that have been set for them. Throughout the project, they communicate respectfully, using the conventions of a given medium.

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: Career Planning and Entrepreneurship, and Media Literacy.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. A learning situation that enables adult learners to present products or services meets the educational aim of the BAL Career Planning and Entrepreneurship.

- **Media Literacy**

Being able to better understand how media information is processed is one of the aims of the Computer Science program. A learning activity that allows adult learners to disseminate audiovisual content meets the educational aim of the BAL Media Literacy.

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	• Career Planning and Entrepreneurship
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents • Adopts behaviours that reflect a concern for ethics, safety and critical thinking
Families 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	• **Information** o Communicates by using computerized services o Communicates respectfully, using the conventions of a given medium • **Creation** o Creates by correctly using the appropriate functions • **Critical thinking** o Critically examines computerized communication tools by applying evaluation criteria o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses information • Communicates appropriately
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Definitions and properties of the main concepts associated with computer-assisted presentation • Integrating interactive elements in a presentation • Inserting and animating various objects in a slide

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 previous table: 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

Promoting awareness of occupational health and safety

Task: Design a presentation to make students aware of the health and safety risks associated with certain jobs.

To start off the activity, the teacher asks the adult learners to read about a job of their choice and select information they consider relevant for their presentation.

To carry out the activity, adult learners must first develop a model to plan their presentation. Then, they create their presentation by inserting objects (text boxes and images) into the slides and standardize the slides using templates. In order to add impact to certain elements and generate interest among their audience, they add animation and transitions.

At the end of the activity, each adult presents his or her slide show to the class, using an interactive whiteboard, a multimedia projector or a computer monitor, depending on what equipment is available at the centre. The class then discusses the risks associated with the job in question and the way in which the information was organized in the presentation.

END-OF-COURSE OUTCOMES

To deal with situations related to computer-assisted presentation, adult learners identify the contexts in which such presentations are used and determine the roles of the presenter and the presentation. They identify and use the required commands and functions. To do this, they use the following subject-specific competencies: *Interacts in a computer environment*, *Produces computerized documents* and *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*.

When adult learners *critically examine computerized communication tools*, they distinguish between essential and secondary elements in the program and gather information by consulting the documentation provided and other help resources. In this way, they choose the features of the program that best meet their communications needs.

When adult learners *create*, they plan their work by becoming familiar with the objective of the task and by evaluating its complexity. As they carry out their work, they choose a solution, mobilize the necessary resources, and make adjustments, as needed. At this stage, they use the appropriate commands and functions correctly and work more efficiently.

When adult learners *communicate* using computerized services, they use computer resources to share their ideas and to express them clearly and aesthetically. They identify the context in which the presentation is to be used and determine the role of the presenter and the presentation. They take into account factors that can help or hinder communication. They adapt their communication to their target audience and comply with language rules.

When adult learners *evaluate their work*, they check whether they have attained the communication objective and the quality standards that have been set by going over the steps they followed. This helps them get an accurate sense of the results obtained and identify other contexts in which their approach could be applied.

When adult learners *communicate* respectfully using the conventions of a given medium, they use computer resources to disseminate ideas and content. They determine the available resources and consider the best way to proceed. They take into account factors that can help or hinder communication. They respect the rules, codes and conventions of the various computer languages they are called upon to use.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they identify the context and the roles involved. They plan and create a presentation that takes into account the information gathered and the communication need. They refine their presentation by standardizing it and adding interactive elements. In addition, they do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Judicious application of evaluation criteria

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified
- Proper presentation of the information based on the context

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

- Adequate communication using the conventions of a given medium

Course

CMP-5079-3

Creating Web Documents

Computer Science

INTRODUCTION

The goal of the *Creating Web Documents* course is to provide adult learners with the means to create Web pages and Web sites in order to disseminate content or ideas on the Internet.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about Web document creation. By creating Web pages and Web sites, adult learners understand the objective of a task and mobilize the necessary resources. They communicate using computer resources and respect the codes and conventions of the language used. In their interactions, they validate the information exchanged in order to get an accurate sense of their approach and results.

By the end of this course, adult learners will be able to design formatted documents in a language that can be interpreted by different browsers and whose content can be consulted by Web users. They will understand the different structural elements of an HTML page, including tags, syntax, style sheets and the insertion of objects such as images. They will know how to use a code generator and a text editor. They will understand and apply the standards associated with Web-based documents and Web site document management, and will be able to plan their work.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

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

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

During the learning situations, adult learners use the elements of a computer environment. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments to their approach, while adopting ethical and safe behaviours.

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 *Creating Web Documents* course, the suggested approach is the production process.

<table>
<tr><th colspan="2">Production process</th></tr>
<tr><td colspan="2">• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change.
• During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project.
• During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.</td></tr>
<tr><td>Examples of strategies</td><td>- Comparing the current situation with the desired situation
- Determining the steps involved in carrying out the work
- Drawing up a work schedule
- Choosing a work method
- Making adjustments to the plan as they work
- Analyzing their results</td></tr>
</table>

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Creating Web Documents* course. Two are considered particularly relevant to this course: *Adopts effective work methods* and *Communicates appropriately.*

- **Methodological Competency**

When producing Web-based documents, adults learn to *adopt effective work methods.* Script editing implies complying with specific standards, while handling a large number of files requires using a clear filing and naming system. When creating Web pages, adult learners must be able plan and monitor their work.

- **Communication-Related Competency**

Web sites are of little interest if they are not based on a communication intention. When creating Web-based documents, adults learn to *communicate appropriately,* taking into account the means at their disposal, the target audiences and the messages to convey.

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

- ***Main types of editors***
  - Web editor
    - Display mode: source mode (code generator)
    - Display mode: WYSIWYG
  - Raw text editor (without formatting or styles)
  - Online editor
- ***Main characteristics of scripts for the Web***
  - Mark-up languages (HTML, XML, XHTML)
  - Cascading style sheets (CSS)
  - Programming languages (JavaScript, ActionScript)
  - Combinations of languages (DHTML, AJAX)
  - Mark-up language syntax
    - Document structure
    - Tags
    - Elements
    - Event handlers (onclick, onmouseover, onmouseout)
  - CSS syntax
    - Selector
    - Rule blocks {property: value;}
  - Basics of Web browsing
    - Hypertext links
    - Internet addresses (URL)

        - Anchors (bookmarks)
- ***Display sizes of output devices***
    - Computer monitors (definitions: SVGA, XGA, HD, etc.)
    - Smart phones
    - Tablets
- ***Interface ergonomics***
    - ISO 9241-210
    - Architecture
    - Colour code chart
- ***Images***
    - Computer graphics software
    - Stock images
    - Formats (PNG, JPG, GIF)
    - Optimization (size, resolution, compression)
- ***Standard terminology associated with mark-up languages and the Internet***
- ***Preparing images***
    - Creating or modifying images to be used in Web pages
    - Optimizing images for the Web
- ***Web site file management***
    - Organizing files in folders according to a logical structure
    - Following standards for naming files and folders
- ***Using a code generator or raw text editor***
    - Using tags and tag attributes to format a document
        - Document header
        - META tags
        - Document body
        - Paragraphs, headings, characters
        - Images
        - Comments
    - Creating hypertext links to Web resources

        - Internal hypertext links
        - External hypertext links
        - Browsing menu
    - Layout of elements
        - Table
        - DIV tags (relative and absolute values)
    - Formatting a document using style sheets
        - Links to an external style sheet
        - Creating internal styles
    - Using external resources
        - Inserting JavaScript
        - Inserting an existing DHTML or AJAX code
        - Linking an image, animation, video or widget from another Web site
- ***Validating a Web site using a validation tool (software or online)***
- ***Uploading a Web site to a Web server***
    - Using file transfer mode (FTP or Web hosting control panel)
    - Updating documents on a Web site

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***
    - Evolution of HTML (1, 2, 3, 4, 5, etc.)
    - Evolution of the Web (1.0, 2.0, 3.0, etc.)
    - Table illustrating the development of the Internet
    - Transmission of information before the Internet
- ***Heritage objects***
    - 14.4 Kbps modem and fibre optics
    - Obsolete Web sites
    - Types of mass media
    - Photo albums and social networks

- ***Regional or national references***
  - Québec Web design firms
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Creating Web Documents* course is to provide adult learners with the means to create Web pages and Web sites in order to disseminate content or ideas on the Internet. 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.

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 that they receive and by using input and output peripherals, in particular to take action.

Then, they communicate using computerized services, in order to share their experiences and ideas and to express themselves. They create documents by correctly using the appropriate functions and thus work more efficiently. They communicate respectfully, using the conventions of a given medium.

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: Media Literacy, and Citizenship and Community Life.

- **Media Literacy**

Being able to better understand how media information is processed is one of the aims of the Computer Science program. A learning activity that allows adult learners to be aware of problems related to the Internet and data security and confidentiality meets the educational aim of the BAL Media Literacy.

- **Citizenship and Community Life**

The Computer Science program gives adult learners the opportunity to experience the principles that are the basis of equal rights in our society. A learning situation that makes adult learners aware of ethical problems related to the Internet and its use meets the educational aim of the BAL Citizenship and Community Life.

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	• Media Literacy
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents • Adopts behaviours that reflect a concern for ethics, safety and critical thinking
Families 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	• **Information** o Interacts by interpreting signals he/she receives and using input and output peripherals o Communicates by using computerized services o Communicates respectfully, using the conventions of a given medium • **Creation** o Creates by correctly using the appropriate functions
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Adopts effective work methods • Communicates appropriately
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Main characteristics of scripts for the Web • Interface ergonomics • Formatting documents using style sheets by interpreting signals that they receive and using input and output peripherals • Using external resources • Uploading a Web site to a Web server

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

Class blog

Task: Add a blog to the class Web site where students can hold discussions with their classmates and the teacher and get help with homework.

To start off the activity, adult learners identify the type of mark-up language of the Web site to be modified. They search the Internet for scripts, widgets or blogs they could incorporate into the class Web site. Once they have chosen the ones they want to add to their site, they make sure they have the right to do so.

To carry out the activity, adult learners modify a Web page so that it is technically and aesthetically possible to integrate the object. If necessary, they adapt the corresponding style sheet and make the required changes to the object. Throughout the project, they consult help resources and check both their approach and their results.

At the end of the activity, adult learners present their blog to their teacher and classmates. Using their blog as a means of communication, they discuss and evaluate the effectiveness of their new communication tool and think of different uses for their blog.

END-OF-COURSE OUTCOMES

To deal with situations related to the creation of Web documents, adult learners identify and use the required commands and functions. To do this, they use the following subject-specific competencies: *Interacts in a computer environment*, *Produces computerized documents* and *Adopts behaviours that reflect a concern for ethics, safety and critical thinking*.

When adult learners *create* a Web document, they plan their work by becoming familiar with the objective of the task and evaluating its complexity. As they carry out their work, they choose a solution, mobilize the necessary resources, and make adjustments as needed. At this stage, they correctly use the appropriate commands and functions and become more versatile.

When adult learners *interact,* they write code using the appropriate language and interpret messages from the code generator or text editor. They check whether they have attained the communication objective and the quality standards that have been set by going over the steps they followed. This helps them get an accurate sense of their results and identify other contexts in which their approach could be applied.

When adult learners *communicate*, they use computer resources to disseminate ideas and content. They determine the available resources and consider the best way to proceed. They take into account factors that can help or hinder communication. They respect the rules, codes and conventions of the various computer languages they are called upon to use.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they use the main characteristics of scripts for the Web, plan a Web site based on the display size of the output devices, create or modify images and optimize them for the Web, create a Web site by applying interface ergonomic standards, and manage documents appropriately. They validate their work and upload it to an appropriate Web space. 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

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Proper presentation of the information based on the context

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

- Adequate communication using the conventions of a given medium

Course

CMP-5080-2

Multimedia Production

Computer Science

INTRODUCTION

The goal of the *Multimedia Production* course is to provide adult learners with the means to express their creativity; to convert an idea into sound, images and video clips using audiovisual equipment; and to assemble these multimedia elements using nonlinear video editing software. It provides adult learners with a computer platform for the development of multimedia production skills.

In this course, adult learners deal with various learning situations that help them acquire theoretical and practical knowledge about video production. To interact in the situations presented, adults learn to identify and correctly use the main types of support for multimedia equipment. They employ a variety of tools and techniques to create material that can be used in a multimedia production. They process information, prepare complex scenes that they convert into digital files, and assemble these files using a nonlinear video editing program. They produce renders that they export in various formats for use on DVD or a Web page.

At the end of this course, adult learners will be able to plan and carry out a multimedia project. They will understand the standardization of multimedia content and manage projects while adopting ethical behaviour and respecting the intellectual property rights that apply to multimedia works. They will be able to use the basic functions of a nonlinear video editing program and develop an original production using images, sound and video clips created with the help of audiovisual equipment.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

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

Thus, it is by activating and integrating all three 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 multimedia equipment and evaluate their efficiency in a computer environment. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments while adopting ethical behaviour.

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 carrying out their learning activities in general.

For the *Multimedia Production* course, the suggested approach is the production process.

<table>
<tr><th colspan="2">Production process</th></tr>
<tr><td colspan="2">• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change.
• During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project.
• During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.</td></tr>
<tr><td>Examples of strategies</td><td>- Comparing the current situation with the desired situation
- Determining the steps involved in carrying out the work
- Drawing up a work schedule
- Choosing a work method
- Making adjustments to the plan as they work
- Analyzing their results</td></tr>
</table>

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Multimedia Production* course. Two are considered particularly relevant to this course: *Uses creativity* and *Cooperates with others*.

- **Intellectual Competency**

When adult learners work on a multimedia production, they *use creativity*. They do so as they choose a topic and the means they will use to develop it. From scriptwriting to filming, recording and postproduction, adult learners *use creativity* to come up with new approaches.

- **Personal and Social Competency**

The *Multimedia Production* course is the perfect opportunity to make adult learners aware of the need to *cooperate with others*. Although multimedia projects can be carried out alone, they are complex and generally require the help of several people, as they involve many tasks that must be completed in a short period of time. The work must therefore be carefully planned, and tasks must be identified and assigned to team members. Each member must contribute to the team's efforts and cooperate in creating the final product. Cooperation is therefore essential in completing such projects.

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 the main types of support for multimedia equipment***
  - Bitmap images (BMP, GIF, PNG, JPEG)
  - Audio files
    - Standard formats (WAV, AIFF, MP3)
    - Protected files (WMA)
  - Music files (MIDI)
  - Video files
    - Standard formats (AVI)
    - Compressed formats (MPEG, WMV, MOV, FLV, MPEG-4, 3GP)
- ***Standardization of multimedia content***
  - Encoding (codecs)
  - International standards (PAL, NTSC, HD)
- ***Ethics and intellectual property associated with multimedia works***
  - International conventions
  - Copyright (Society of Composers, Authors and Music Publishers of Canada [SOCAN]), mechanical reproduction rights (Society for Reproduction Rights of Authors, Composers and Publishers in Canada [SODRAC])
  - Collecting rights and royalties
  - Alternative licences (Copyleft, GNU, Creative Commons)

- ***Storyboard***
- ***Role of members of a production team***
- ***Standard terminology associated with multimedia***
- ***Film terminology***
- ***Using audiovisual equipment***
  - Video and digital cameras
    - Controls and basic principles
    - Camera shot
    - Available storage space
    - Transferring information to a computer (USB cable, FireWire, adapted software)
  - Webcam
  - Headset and microphone
  - Audio ripping
- ***Using audio processing software***
  - Importing sound tracks
  - Processing sound tracks
  - Storing and exporting sound tracks in different formats
- ***Using nonlinear video editing software***
  - Importing images, sound and video clips
  - Processing images, sound and video clips
  - Controlling the convergence of multimedia elements in real time
  - Creating transitions and special effects
  - Incorporating text and digital images
  - Storing and exporting in different video file formats
- ***Issuing an intellectual property licence for a work and distributing it***

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***
  - History of multimedia accessories and peripherals
  - Evolution of film and television techniques
  - Influence of the development of multimedia on the economic market
  - Worldwide dissemination of digital information
- ***Heritage objects***
  - Old video games
  - Darkroom accessories
  - Film reels, VHS and Beta cassettes
  - Cassette tape recorder, vinyl records, slide projectors
- ***Regional or national references***
  - Film production, advertising and marketing firms, National Film Board (NFB), CBC, regional or national television station
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Multimedia Production* course is to provide adult learners with the means to express their creativity, to convert an idea into sound, images and video clips using audiovisual equipment, and to assemble these multimedia elements using nonlinear video editing software. 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.

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 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.

Then, adult learners create documents by correctly using the appropriate functions and thus work more efficiently. They evaluate their work regularly by setting quality standards or by taking into account standards that have been set for them. They communicate respectfully, using the conventions of a given medium.

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 helps make adult learners aware of the effects of multimedia consumption on health and well-being meets the educational aim of the BAL Health and Well-Being.

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

Learning 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 activity that requires that adult learners make an informational video about an environmental problem of particular concern to them 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	• Environmental Awareness and Consumer Rights and Responsibilities
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents • Adopts behaviours that reflect a concern for ethics, safety and critical thinking
Families 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	• **Information** o Communicates respectfully, using the conventions of a given medium • **Creation** o Discovers what computers can do by consulting documentation and by experimenting o Creates by correctly using the appropriate functions • **Critical thinking** o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses creativity • Cooperates with others
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Creating a storyboard • Concepts associated with multimedia production • Types of data (textual, visual, audio) • Encoding standards • Rendering formats • Using audiovisual equipment • Ethics and intellectual property associated with multimedia works

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

Environmental cause

Task: Create a multimedia production that highlights an environmental problem in your area.

To start off the activity, the teacher asks adult learners whether they are concerned by an environmental problem in their area—a polluting factory, toxic waste, an open garbage dump, agricultural waste.

The teacher then suggests that a group of adults get together and make an informational video on a regional, municipal or local environmental issue of particular concern to them. To prepare for the activity, the team is asked to create a storyboard, determine the materials and equipment it will need to shoot the video, divide up the tasks among the team members and define the steps involved in the project.

In this activity, the team members are not expected to master all of the course content; rather, each member should specialize in a certain task and carry out it out according to his or her abilities and goals. For example, one person could handle the camera, another could take care of sound (musical score, sound effects) and narration, another could create the scene using the software program available at the adult education centre. Although each member would play a specific role, everyone would contribute to the end result by suggesting improvements or possible changes. Throughout the project, all members of the team use the means at their disposal to construct their knowledge: the documentation provided, planning, communication with peers, and reflection and review.

END-OF-COURSE OUTCOMES

Creating a multimedia production involves using several types of data at the same time: textual, visual and audio.

When adult learners *discover what multimedia can do*, they familiarize themselves with the main concepts associated with multimedia production. They find out about the types of data they will use in their production and the encoding standards, rendering formats and intellectual property rights associated with multimedia works. They consult the documentation for audiovisual equipment and understand how these devices work. They also consult the documentation and tutorials for the programs they want to use and experiment with them.

When adult learners *create* a video, they plan their work; design a storyboard; draw a model or a sketch; write the script; create or import images; and determine the audio and video equipment they will need. They break the work down into steps, draw up a work schedule and choose an appropriate work method for the project. They use a resource bank to store and retrieve the digital data they use, record the audio and video clips, and place them in the appropriate folders. Using a video editing program of their choice, they arrange the data on a timeline and use separate tracks to divide up the titles, images, audio, narration and video sequences. They add transitions and visual effects. They export their project in an appropriate format and issue an intellectual property licence to their work.

When adult learners *evaluate their work*, they analyze their results, check whether they have attained the standards that have been set and, if applicable, determine the improvements to be made and the means of doing so. They take stock of their ability to produce computerized documents by recording their observations, which they will be able to apply in future projects.

When adult learners *communicate*, they act ethically and responsibly, taking into account agreements for using digital materials, copyright and the conventions of the medium used.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they use audiovisual equipment to produce sound, images and video clips and assemble these elements using a nonlinear video editing program. They store and export their project in a format appropriate to the medium. In addition, they do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Appropriate formatting based on document type
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

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

- Adequate communication using the conventions of a given medium

6.4 Optimization

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	
• 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	- 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	• Environmental Awareness and Consumer Rights and Responsibilities
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• 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	• **Information** o Interacts by interpreting signals he/she receives and using input and output peripherals • **Creation** o Discovers what computers can do by consulting documentation and by experimenting • **Critical thinking** o Critically examines computerized communication tools by applying evaluation criteria o Validates information by using validation criteria
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• 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	• 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

Course

CMP-5082-2

Introduction to Programming

Computer Science

INTRODUCTION

The goal of the *Introduction to Programming* course is to provide adult learners with the means to solve problems using a structured programming language. It is designed to introduce adult learners to the development of computer algorithms and the logic of structured programming.

In this course, adult learners deal with various learning situations that help them acquire practical knowledge about programming. By translating an algorithm or correcting a computer program, adult learners interact by interpreting the codes they are given, and critically examine the tools they use by choosing and applying the necessary solutions. Thus, they communicate in a specific language, use computer resources and respect the codes and conventions of the language. They evaluate their work on a regular basis to make sure it meets the standards that have been set. Throughout the entire process, adult learners discover what computers can do.

By the end of this course, adult learners will be able to translate a predefined algorithm into a structured language, produce the visual design of the application, correct syntax errors, and compile and execute the program. They will understand algorithms, programming syntax and the structures and functions of a structured programming language.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Interacts in a computer environment*
- *Produces computerized documents*

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. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments to their approach.

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 *Introduction to Programming* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Introduction to Programming* course. Two are considered particularly relevant to this course: *Solves problems* and *Adopts effective work methods*.

- **Intellectual Competency**

Programming is essentially a problem-solving activity. Designing an algorithm, writing code or looking for actual or potential errors requires the ability to *solve problems* in a formal manner, i.e. to rigorously analyze each element of the situation, test possible solutions and adopt a critical approach.

- **Methodological Competency**

When programming, adult learners are encouraged to *adopt effective work methods*. They use these methods when they plan their work and adhere to their plan, among other things. They

demonstrate rigour when they translate algorithms and write code, and when they program, they analyze their approach and results regularly in order to make the necessary corrections.

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

- ***Introduction to the concept of algorithms***
  - Definition
  - Flowchart
    - Symbols
    - Flow direction
  - Pseudo code
- ***Structures and functions***
  - Variables
    - Types (whole, real and Boolean, characters, character string)
    - Allocation
    - Scope
  - Mathematical operators
  - Logical operators
  - Elements of simple alternative structures
  - Elements of repetitive structures
  - Functions integrated in different classes of objects
    - Syntax
    - Arguments
    - Function return
- ***Programming syntax***
    - Instructions
    - Reserved words
    - Input and output

- ***Controls***
    - Button
    - Checkbox, option button
    - Image
    - Label, text box
    - Listbox
    - Frame
- ***Types of programming***
    - Event-driven
    - Sequential
- ***Main programming languages***
    - C, C++
    - Java, JavaScript
    - Visual Basic
    - PHP
    - ActionScript
- ***Interface ergonomics***
    - ISO 9241-210
    - Architecture
- ***Standard terminology associated with the programming language selected***
- ***Reading an algorithm***
- ***Developing an algorithm to meet a need***
- ***Translating an algorithm into a structured programming language***
    - Interpreting an algorithm
    - Designing the program's user interface
    - Applying ergonomic standards to the interface
    - Writing code using indentation
    - Following the programming syntax
    - Adding comments to the source code
- ***Troubleshooting***
    - Making the algorithm more efficient

- Identifying possible inaccuracies in the program code
- Solving the inaccuracies identified

- ***Compilation***
  - Generating the executable version of the program
  - Executing and validating the definitive version of the program using test data

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***
  - History of computers
  - Y2K bug
- ***Heritage objects***
  - Perforated cards or tape
  - First adding machines
  - Vacuum tube computers
  - Integrated circuits
  - Program in linear programming language
- ***Regional or national references***
  - Québec software publishers, Web application developers
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Introduction to Programming* course is to provide adult learners with the means to solve problems using a structured programming language. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment and produce quality computerized documents.

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 the signals they receive and by using input and output peripherals, in particular to take action. Thus, 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. They critically examine computerized communication tools by applying evaluation criteria to configure their environment appropriately, among other things.

Then, they communicate using computerized services, in order to share their experiences and ideas and to express themselves. They take the time to evaluate their work by setting quality standards, or by taking into account standards that have been set for them, in order to get an accurate sense of the results of their efforts.

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: Career Planning and Entrepreneurship, and Citizenship and Community Life.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. Thus, a learning situation that makes adult learners aware of the creative potential of programming as it applies to entrepreneurship meets the educational aim of the BAL Career Planning and Entrepreneurship.

- **Citizenship and Community Life**

The Computer Science program gives adult learners the opportunity to experience the principles that are the basis of equal rights in our society. A learning situation that helps adult learners become aware of security problems related to computer programs meets the educational aim of the BAL Citizenship and Community Life.

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 learning situations and highlights those used in 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	• Career Planning and Entrepreneurship
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents
Families 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	• **Information** o Interacts by interpreting signals he/she receives and using input and output peripherals o Communicates by using computerized services • **Creation** o Discovers what computers can do by consulting documentation and by experimenting • **Critical thinking** o Critically examines computerized communication tools by applying evaluation criteria o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Solves problems • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Standard terminology associated with the programming language selected • Correcting and compiling an existing computer program

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

Password generator

Task: Modify a password generator that takes into account certain parameters (number and type of characters) in order to manage access to certain sections of the adult education centre's Web site more efficiently.

To start off the activity, the teacher provides an overview of the desired improvements to the password generator and gives adult learners an uncompiled version of the program.

To carry out the activity, adult learners plan their work by familiarizing themselves with the lines of code and testing the existing version of the program. They note the changes they wish to make to the program and validate their plan with the teacher. They then proceed with the second part of the task, which is to make the desired changes, test the program, correct potential errors and compile the program in order to have the students at the adult education centre use it.

At the end of the activity, students use the password generator in a real situation, in the presence of the adult learners and the teacher, who observe the effectiveness of the improvements made as well as any remaining errors.

END-OF-COURSE OUTCOMES

To deal with situations related to programming, adult learners prepare an algorithm, validate it and translate it into a structured programming language. To do this, they use the following subject-specific competencies: *Interacts in a computer environment* and *Produces computerized documents*.

When adult learners *discover what computers can do*, they consult the documentation provided in order to define the context and experiment to analyze the current situation. This allows them to determine the step involved in the work and to draw up a work schedule.

When adult learners *interact* or *communicate using computerized services,* they interpret the codes, rules and conventions of the programming language and respond by correctly using the appropriate commands, functions and syntax.

When adult learners c*ritically examine computerized communication tools*, they analyze the task to be carried out and select and mobilize the necessary computer resources.

When adult learners *evaluate their work*, they check whether they have attained their objective, as well as the quality standards that have been set, by going over the steps they followed and testing their program. They make the necessary corrections and identify other contexts in which their approach could be applied.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they solve problems requiring the use of a computer program by writing an algorithm which they validate and translate into a structured programming language. 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

Produces computerized documents

- Proper presentation of the information based on the context
- Rigorous compliance with the constraints identified

Course

CMP-5083-2

Emerging Computer Applications

Computer Science

INTRODUCTION

The goal of the *Emerging Computer Applications* course is to stimulate the curiosity of adult learners, to encourage them to take initiative and to help them master an emerging computer technology.

In this course, adults learn to use computer tools to plan and deal with specific situations that involve applying a recent technological discovery or a technology newly accessible to the general public in areas such as telecommunications, virtual reality, voice recognition, language tools, robotics or home automation, or any other field in which emerging computer applications are found. This course focuses mainly on the context leading to the discovery of a new application and the concepts involved. Adult learners explore the environment of an emerging computer application and make sure they understand how its tools and commands work. They carry out a project in which they identify a situation where the application is used and correctly use the tools and commands of the required application. At each step in their process, adult learners evaluate their work and determine the improvements to be made and the means of doing so.

By the end of this course, adult learners will be able to analyze and understand the context that led to the emergence of a new application. They will be able to identify the main concepts of the application and understand how it is used in various situations. They will be able to implement its main tools and will be able to carry out a project in which they will correctly use the tools and commands of the application selected.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Interacts in a computer environment*
- *Produces computerized documents*

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 and evaluate their efficiency in using a computer environment. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments.

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 *Emerging Computer Applications* course, the suggested approach is the familiarization process.

Familiarization process	
• 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	- Selecting the keyboard input language - Determining the necessary resources - Adhering to the plan - Making adjustments to the plan as they work - 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 *Emerging Computer Applications* course. Two are considered particularly relevant to this course: *Uses information* and *Adopts effective work methods*.

- **Intellectual Competency**

In order to deal effectively with specific situations in which an emerging application is used, adults learn to *use information*. They do so when they gather the documentation and resources they will need to learn and to carry out a project.

- **Methodological Competency**

To deal effectively with a specific situation in the *Emerging Computer Applications* course, adult learners must *adopt effective work methods*. They consult the documentation available, get an idea of the desired result and learn to use the interface while evaluating their efficiency. This preliminary step allows them to analyze the situation, organize their ideas, determine the necessary resources and draw up a work schedule. As they carry out their project, adult learners follow their plan and make adjustments to it as needed.

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

- ***Context associated with a specific situation that involves using a recent technological discovery or a computer technology newly accessible to the general public***
  - Context before the emergence of the computer application
  - Advantages and disadvantages of the emerging computer application
  - Socioeconomic impact (environment, labour market, business opportunities)
- ***Concepts involved in dealing with specific situations***
  - Main concepts, objects and properties of objects
  - Functions and procedures
  - Input and output
- ***Understanding the commands and functions required for the project***
  - Determining the possibilities of the application
  - Identifying the commands and functions required for a project
  - Using the documentation and resources required for a project
- ***Dealing with specific situations***
  - Using the tools and commands and, if applicable, creating and modifying objects
  - Reviewing the product or process
  - If applicable, disseminating the final product

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***
  - Portrayal of technology in science fiction films
  - Present and future uses of new information and communications technologies (NICT)
  - From science fiction to reality (cell phones, CD-ROM, etc.)
  - History of the development of an innovation
- ***Heritage objects***
  - Use of new applications by the military
  - Non-military uses of military applications (the Internet, GPS, etc.)
- ***Regional or national references***
  - Employers
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Emerging Computer Applications* course is to stimulate the curiosity of adult learners, to encourage them to take initiative and to help them master an emerging computer technology. This course gives adult learners the opportunity to perform actions that will enable them to interact in a computer environment and produce quality computerized documents.

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 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.

Then, they create documents by correctly using the appropriate functions in order to work more efficiently and become more versatile, among other things.

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: Career Planning and Entrepreneurship, and Citizenship and Community Life.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. Thus, a learning situation that makes adult learners aware of the fact that emerging computer applications often present new business opportunities meets the educational aim of the BAL Career Planning and Entrepreneurship.

- **Citizenship and Community Life**

The Computer Science program gives adult learners the opportunity to experience the principles that are the basis of equal rights in our society. A learning situation that helps adult learners measure the impact of the changes resulting from the emerging application as they relate to the possibilities for creating or reorganizing communities meets the educational aim of the BAL Citizenship and Community Life.

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	• Career Planning and Entrepreneurship
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents
Families 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	• Information o Interacts by interpreting signals he/she receives and using input and output peripherals • **Creation** o Discovers what computers can do by consulting documentation and by experimenting o Creates by correctly using the appropriate functions
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Uses information • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Planning how to deal with specific situations • Dealing with specific situations: approach to consider • Planning and dealing with specific situations involving the use of an emerging computer application

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 previous table: 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

Voice recognition

Task: Test a voice recognition program

The teacher suggests that adult learners experiment with a voice recognition program so that they can discover its uses in business and other sectors. In this activity, adult learners will discover that the program leaves no room for error and that recognition rates depend on two basic rules: clear articulation and no hesitation.

To prepare for the activity, adult learners are asked to consult the documentation provided and familiarize themselves with the program's tools and commands. They begin their experimentation by recording a personal list of words and then test the program out. They compile their results on an observation checklist and make adjustments to their word list, if necessary.

Since the familiarization process is suggested for this course, adult learners use the means at their disposal to construct their knowledge: the documentation provided, planning, communication with peers (when the situation permits), and reflection and review. They carry out the activity using the tools and commands available. They plan their work in advance and analyze their results at each step, adjusting their approach based on their needs.

END-OF-COURSE OUTCOMES

When adult learners *discover what computers can do,* they become familiar with the main concepts of the emerging application by consulting available software documentation, tutorials and guides. They search the Internet for information that may help them. They explore the capabilities of the application they have chosen, learn about the context that led to its emergence, and consider its advantages and disadvantages as well as its socioeconomic impact on the environment, the job market and business opportunities.

When adult learners *interact,* they interpret the messages and signals of the application and use the input and output peripherals appropriately. They validate their understanding of the concepts involved in dealing with specific situations, objects and properties of objects, functions and procedures, and input and output.

When adult learners *create,* they choose a work method that is suitable for their project and adopt an appropriate approach. They plan the necessary resources, break the work down into steps and draw up a work schedule. They use the tools, commands and functions of the application and process the signals received. If applicable, they create or modify objects. They analyze their results in order to determine the improvements to be made and the means of doing so.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they identify the objectives of the task to be carried out, interact, interpret signals, and use the basic tools of an emerging application. 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

Produces computerized documents

- Thorough planning of the work
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

Course

CMP-5084-1

Supplementary Computer Training

Computer Science

INTRODUCTION

The goal of the *Supplementary Computer Training* course is to provide adult learners with the means to use their insight, acquire new knowledge and develop computer competencies beyond the level required in the other courses in the program. Two learning situations are possible.

Situation 1

An adult learner may have completed one of the courses in the program (or possess equivalent knowledge) and want to further his or her knowledge in a particular area. This can involve additional training in word processing, electronic spreadsheets, databases or 3D modeling, provided the subject-specific content is in no way covered in the other courses. The subject-specific content must complement at least one course in the Computer Science program in diversified basic education. Note that the *Supplementary Computer Training* course must neither replace nor duplicate the material covered in the other courses in the program.

Situation 2

An adult learner may be interested in a particular area or application which is not considered emerging and is not covered by the other courses of the program. For example, an adult learner may wish to develop music competencies and want to learn about digital audio editors or music sequencers. Such a case could be dealt with in the *Supplementary Computer Training* course, provided the adult uses and integrates subject-specific content other than that covered in the other Computer Science courses in diversified basic education or in common core basic education.

By the end of this course, adult learners will have acquired greater knowledge of a given application and a better understanding of how the tools of the application work. They will be able to plan, carry out and evaluate the production of a computer document.

SUBJECT-SPECIFIC COMPETENCIES

This course targets the following subject-specific competencies:

- *Interacts in a computer environment*
- *Produces computerized documents*

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 use software resources. They carefully plan their work and adapt their plan as they work. As they carry out a project and upon its completion, they evaluate their efficiency and make any necessary adjustments to their approach.

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 *Supplementary Computer Training* course, the suggested approach is the production process.

Production process	
• This process consists of two steps: planning and production. Four values are associated with it: communicate clearly; validate the production on a regular basis; maintain ongoing feedback and collaboration; accept the change. • During the planning stage, adult learners must define the work to be done as precisely as possible. Planning must be flexible and allow adjustments throughout the project. • During the production stage, adult learners must complete the project according to the planning established; maintain ongoing feedback and collaboration; accept change, even at the end of the production stage, and respond to change rather than following the initial plan.	
Examples of strategies	- Comparing the current situation with the desired situation - Determining the steps involved in carrying out the work - Drawing up a work schedule - Choosing a work method - Making adjustments to the plan as they work - Analyzing their results

To meet the requirements of the production process, the initial plan must be flexible enough to allow for adjustments throughout the project. Through discussions with the teacher or with their peers, adults learn to reflect on each step in their process and arrive at a result that will differ from their original plan. By applying the above process, they learn to cooperate with others and to accept changes during the course of a project.

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 *Supplementary Computer Training* course. Two are considered particularly relevant to this course: *Solves problems* and *Adopts effective work methods.*

- **Intellectual Competency**

Adult learners who take this course deal with situations that are not covered in the other courses. They must analyze the elements of a situation, test different solutions and adopt a flexible work method. For example, adult learners who construct a table of values for a Canadian mortgage loan analyze the situation and break it down into steps. They find the appropriate calculation method, reproduce it on a worksheet and customize functions. They test solutions for each situation and adopt a flexible work method that will allow them to make adjustments at each step. In this way, they develop the ability to *solve problems*.

- **Methodological Competency**

In order to deal effectively with specific situations requiring the use and integration of supplementary subject-specific content, adult learners must *adopt effective work methods*. They consult the documentation available and get an idea of the desired result. This step allows them to analyze the situation, organize their ideas, determine the necessary resources and draw up a work schedule. As they carry out their project, adult learners follow their plan and make adjustments to it, as needed.

SUBJECT-SPECIFIC CONTENT

The subject-specific content consists of knowledge and cultural references.

KNOWLEDGE

- ***Context associated with specific situations requiring the use and integration of subject-specific content that complements that of the other courses in the program***
- ***Conceptual schemes involved in dealing with specific situations***
  - Main concepts, objects and properties of objects
  - Functions and procedures
  - Tools and commands
  - Input and output
- ***Understanding the necessary commands and functions***
  - Identifying the possibilities of the application
  - Identifying the commands and functions required for the project
  - Using the necessary documentation and resources

- ***Dealing with specific situations***
  - Using the commands and functions and, if applicable, creating and modifying objects
  - Reviewing the product or process
  - If applicable, disseminating the final product

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***
  - Evolution of specialized software addressing the issues associated with the situation
  - Genealogy of families of computer applications
- ***Heritage objects***
  - Old objects used to address the issues associated with the situation
- ***Regional or national references***
  - Employers
  - Anecdotes
  - School-related elements

FAMILIES OF LEARNING SITUATIONS

The goal of the *Supplementary Computer Training* course is to help adult learners develop the means to use their insight, acquire new knowledge and develop computer competencies beyond the level required in the other courses in the program. This course gives adult learners the opportunity to produce quality computerized documents.

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 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.

Then, adult learners create documents by correctly using the appropriate functions and thus work more efficiently. They take the time to evaluate their work by setting quality standards, or by taking into account the standards that have been set for them, in order to get an accurate sense of the results of their efforts.

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: Career Planning and Entrepreneurship, and Citizenship and Community Life.

- **Career Planning and Entrepreneurship**

By developing computer competencies, adult learners increase their overall employability. A learning situation that helps adult learners become aware of the importance of continuing education in the workplace meets the educational aim of the BAL Career Planning and Entrepreneurship.

- **Citizenship and Community Life**

The Computer Science program gives adult learners the opportunity to experience the principles that are the basis of equal rights in our society. A learning situation that makes adult learners aware of networks that can help them further develop their competencies meets the educational aim of the BAL Citizenship and Community Life.

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	• Career Planning and Entrepreneurship
Subject-specific competencies (prescribed) - Are developed in action and require the active participation of adult learners	• Interacts in a computer environment • Produces computerized documents
Families 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	• **Creation** o Discovers what computers can do by consulting documentation and by experimenting o Creates by correctly using the appropriate functions • **Critical thinking** o Evaluates his/her work by setting quality standards
Cross-curricular competencies (targeted) - Are developed in context together with the subject-specific competencies	• Solves problems • Adopts effective work methods
Knowledge (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	• Conceptual schemes involved in dealing with specific situations • Planning and dealing with specific situations requiring the use and integration of subject-specific content that complements that of the other courses in the program

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 previous table: 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

Mortgage or personal loan

Task: Using an electronic spreadsheet, produce a file to accurately calculate monthly payments for a Canadian mortgage and a personal loan, based on two functions created by adult learners.

To start off the activity, the teacher explains that, although most electronic spreadsheets contain a financial function for calculating reimbursement payments (PMT), this function does not yield the same results as those of Canadian financial institutions. This is because, in Canada, mortgage interest is calculated semiannually, whereas interest on a personal loan is calculated monthly. It is therefore more appropriate to create two new functions to calculate these two types of payments.

In this activity, adult learners use an electronic spreadsheet mainly to create macros or new functions and integrate them into a worksheet. They plan their project in advance and, in collaboration with the teacher or their peers, analyze their results at each step, regulating their approach based on the requirements of the situation.

To carry out the activity, adult learners must draw on their existing knowledge. They are not expected to master all of the course content before they start their project; rather, they will construct their knowledge as they work, using the means at their disposal: the documentation provided, planning, communication with peers (when the situation permits), and reflection and review.

END-OF-COURSE OUTCOMES

This course deals with the context surrounding specific situations requiring the use and integration of subject-specific content that complements that of the other courses in the program, the related concepts, the planning involved, and the treatment of these specific situations.

When adult learners *discover what computers can do*, they familiarize themselves with the main concepts of the application by consulting the program's documentation, the tutorials and any other relevant source of information. They explore the capabilities and limitations of the application's tools and commands by using these in concrete activities. In this way, they develop strategies that they can apply in their project.

When adult learners *create*, they analyze the current situation and determine the additions or modifications they will make to obtain the desired result. After the analysis, they develop an approach, determine the steps involved in carrying out the work, identify the necessary resources and draw up a work schedule. They mobilize their knowledge and skills, and use the application's commands and functions appropriately. They adopt a flexible approach that allows them to make adjustments as they carry out their project.

When adult learners *evaluate their work*, they analyze their results and determine the improvements to be made and the means of doing so. They take stock of their ability to produce computerized documents by recording their observations, and set quality standards that they will be able to apply in future projects.

Throughout the learning process, adult learners develop competence in the following computer knowledge and skills: they define the objectives of the work to be done, plan their project, and use the application's commands and functions appropriately. In addition, they do not hesitate to consult various resources to obtain help when difficulties arise.

EVALUATION CRITERIA

Interacts in a computer environment

- Use of appropriate strategies to interact and to troubleshoot

Produces computerized documents

- Thorough planning of the work
- Application of appropriate tools and functions
- Rigorous compliance with the constraints identified

APPENDIXES

Appendix 1
Cross-Curricular Competencies

The Computer Science program contributes to the development of cross-curricular competencies.

Cross-curricular competencies may be defined as the capacity to act by mobilizing and effectively using a set of resources. These competencies provide a broad frame of reference in that they cut across subject boundaries and allow for greater scope of action. They often have the advantage of drawing on the resources of more than one subject in a single situation.

Cross-curricular competencies complement one another, so that when one of them is applied, it generally opens doors to the others. Thus, *using information* usually involves *exercising critical judgment, solving problems* is facilitated by *adopting effective work methods,* and *cooperating with others* is based on the capacity to *communicate appropriately.* Furthermore, it is obvious that complex learning situations draw on several cross-curricular competencies simultaneously.

By bringing out the similarities among the subject-specific competencies, the cross-curricular competencies serve as a lever for their development. They are related to the most generic aspects of human thinking and personal and social skills and, along with the subject-specific competencies, they encourage reflection on the major concerns of modern society. Finally, they make clear to adult learners the importance of reflecting on their learning process.

The subject-specific competencies of the Computer Science program all require, to varying degrees, the exercise of cross-curricular competencies. In all, there are nine cross-curricular competencies grouped into four categories.

Table 8 – Cross-Curricular Competencies

Category	Competency
Intellectual	• Uses information • Solves problems • Exercises critical judgment • Uses creativity
Methodological	• Adopts effective work methods • Uses information and communications technologies
Personal and social	• Achieves his/her potential • Cooperates with others
Communication-related	• Communicates appropriately

Appendix 2
List of Evaluation Criteria

Course	Criteria
Office Automation	
Word Processing: Styles and Layout	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified
Word Processing: Sections and Tables	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified
Electronic Spreadsheets: Calculations and Data Presentation Basics	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified
Electronic Spreadsheets: Data Analysis	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified

Course	Criteria
Office Automation	
Operating a Database	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified ***Adopts behaviours that reflect a concern for ethics, safety and critical thinking*** ■ Appropriate adoption of ethical and safe behaviours ■ Judicious integration of information in accordance with the constraints identified
Creating a Database	***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified ***Adopts behaviours that reflect a concern for ethics, safety and critical thinking*** ■ Appropriate adoption of ethical and safe behaviours ■ Judicious integration of information in accordance with the constraints identified

Course	Criteria
Multimedia	
Vector Graphics	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ***Adopts behaviours that reflect a concern for ethics, safety and critical thinking*** ■ Adequate communication using the conventions of a given medium

Course	Criteria
Multimedia	
Introduction to 2D Animation	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified
Raster Graphics	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ***Adopts behaviours that reflect a concern for ethics, safety and critical thinking*** ■ Adequate communication using the conventions of a given medium
Introduction to 3D Modeling	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified ***Adopts behaviours that reflect a concern for ethics, safety and critical thinking*** ■ Adequate communication using the conventions of a given medium
Introduction to 3D Animation	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified ***Adopts behaviours that reflect a concern for ethics, safety and critical thinking*** ■ Adequate communication using the conventions of a given medium

Course	Criteria
Multimedia	
Computer-Assisted Presentations	***Interacts in a computer environment*** ■ Judicious application of evaluation criteria ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified ■ Proper presentation of the information based on the context ***Adopts behaviours that reflect a concern for ethics, safety and critical thinking*** ■ Adequate communication using the conventions of a given medium
Creating Web Documents	***Interacts in a computer environment*** ■ Accurate interpretation of messages and signals ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Proper presentation of the information based on the context ***Adopts behaviours that reflect a concern for ethics, safety and critical thinking*** ■ Adequate communication using the conventions of a given medium
Multimedia Production	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Appropriate formatting based on document type ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified ***Adopts behaviours that reflect a concern for ethics, safety and critical thinking*** ■ Adequate communication using the conventions of a given medium

Course	Criteria
Optimization	
Operating Systems	***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
Introduction to Programming	***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 ***Produces computerized documents*** ■ Proper presentation of the information based on the context ■ Rigorous compliance with the constraints identified
Emerging Computer Applications	***Interacts in a computer environment*** ■ Accurate interpretation of messages and signals ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified
Supplementary Computer Training	***Interacts in a computer environment*** ■ Use of appropriate strategies to interact and to troubleshoot ***Produces computerized documents*** ■ Thorough planning of the work ■ Application of appropriate tools and functions ■ Rigorous compliance with the constraints identified

Appendix 3
Particulars and Scope of Certain Theoretical Concepts

The development of computer competencies occasionally requires the acquisition of knowledge and practices outside the discipline. For example, in courses such as *Raster Graphics* and *Vector Graphics*, simply introducing adult learners to a program's tools (paint brush, pencil, colour palette, etc.) and showing them how to use these tools will not make them proficient enough to create a visually pleasing work. To do so, adult learners must also possess basic knowledge about image composition, including colour harmony.

The following table presents the scope and some of the particulars of certain theoretical concepts covered in the courses.

Word Processing: Styles and Layout CMP-5067-1	
Type colour	• Type colour refers to the visual effect of a mass of text on a page:  • Even type colour is affected by factors such as the typeface itself, font size, the weight used, the use of capitals, justification, line space (leading) and letter spacing (kerning).

Computer-Assisted Presentations CMP-5078-2 **Raster Graphics CMP-5075-2** **Vector Graphics CMP-5073-2**	
Rules of image composition	• Rule of thirds (golden ratio) • Framing • Format and layout of elements • Colour harmony

Introduction to 3D Animation CMP-5077-2 **Introduction to 2D Animation CMP-5074-2** **Multimedia Production CMP-5080-2**	
Film terminology	• Camera movements (panning, travelling, zoom) • Camera shots (angles, scale, subjectivity, objectivity)

Creating Web Documents CMP-5079-3 Introduction to Programming CMP-5082-2	
ISO 9241-210	ISO 9241-210 provides user-centred design guidelines for software and Web site interfaces. In broad terms, this standard asks designers to: • Understand the context of use • Understand user/need requirements • Focus interface design on the user • Propose ergonomic design solutions • Test and evaluate the design against requirements

Architecture	Web site and software architecture refers to:
	
	• Navigation structure between pages (Web site) or screens (software)
	• Layout of elements on a page (or a screen) in one or two main zones:
	  o Information, interaction
	  o Navigation

Graphic charter	A graphic charter is a document that defines the visual identity of a Web site or program. It ensures that all of the pages of a Web site or screens and dialog boxes of a program are consistent. Usually, the following elements are defined and harmonized: • Choice of colours • Page layout (positioning of elements) • Style (character fonts and paragraphs) • Graphic and navigation elements (logo, icons, buttons)

Introduction to 3D Modeling CMP-5076-2	

Rules of scene composition	• Rule of thirds (golden ratio)
	• Framing
	• Format and layout of elements
	• Colour harmony
	• Three-dimensional rules
	  o Perspective
	  o Depth of field
	  o Atmospheric scattering
	  o Reflections and mirrors
	  o Shadows

Bibliography

Adobe Creative Team. *Flash CS5 Classroom in a Book*. San Jose, CA: Adobe Press, 2010.

_____. *Illustrator CS5 Classroom in a Book.* San Jose, CA: Adobe Press, 2010.

_____. *Photoshop CS5 Classroom in a Book.* San Jose, CA: Adobe Press, 2010.

Barth, B.-M. *Le savoir en construction: Former à une pédagogie de la compréhension*. Paris: Retz, 1993.

Blender. *Blender Wiki.* http://wiki.blender.org/index.php/Main_Page. (2010-2011).

Gimp.org. *Gimp 2.6 User Manual.* http://docs.gimp.org/2.6/en/. (2010-2011).

Jonnaert, P. *Compétences et socioconstructivisme, un cadre théorique*. Brussels: De Boeck, 2002.

Lafortune, L., and C. Deaudelin. *Accompagnement socioconstructiviste.* Sainte-Foy: Presses de l'Université du Québec, 2002.

Lafortune L., P. Mongeau and R. Pallascio. *Métacognition et compétences réflexives*. Montréal: Logiques, 1988.

Laville, C., and J. Dionne. *La construction des savoirs.* Montréal: Chenelière/McGraw-Hill, 1996.

Legendre, R. *Dictionnaire actuel de l'éducation*. 3rd ed. Montréal: Guérin, 2005.

Office Québécois de la langue française. *Le grand dictionnaire terminologique.* http://granddictionnaire.com. (2009-2011).

_____. *Le signet informatique*. http://w3.olf.gouv.qc.ca/banque. (2009-2011).

Perrenoud. P. *Pédagogie différenciée: Des intentions à l'action*. 3rd ed. Paris: ESF, 2004.

Perry, G. *Teach Yourself Beginning Programming in 24 Hours.* Indianapolis: Sams Publishing, 1998.

Québec. Ministère de l'Éducation du Québec. *Government Policy on Adult Education and Continuing Education and Training.* Québec: Gouvernement du Québec, 2002.

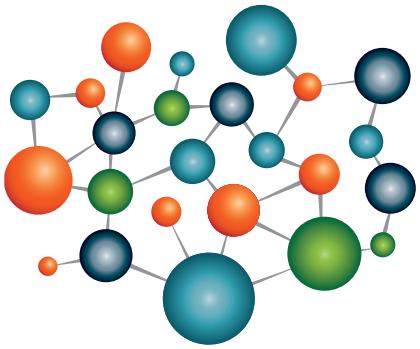
_____. *Policy on the Evaluation of Learning: General Education in the Youth Sector, General Education in the Adult Sector, Vocational Training*. Québec: Gouvernement du Québec, 2003.

Québec. Ministère de l'Éducation, du Loisir et du Sport. *Computer Science. Common Core Basic Education.* Québec: Gouvernement du Québec, 2007.

Tardif, J. *Pour un enseignement stratégique: L'apport de la psychologie cognitive*. Montréal: Logiques, 1992.

_____. *Le transfert des apprentissages*. Montréal: Logiques, 1999.

Wikipedia. *Wikipedia.* http://en.wikipedia.org/wiki/Main_Page. (2009-2011).



education.gouv.qc.ca

Éducation
et Enseignement
supérieur
Québec