

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	
<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> </ul>	
<p><b>Examples of strategies</b></p>	<ul style="list-style-type: none"> <li>- Comparing the current situation with the desired situation</li> <li>- Determining the steps involved in carrying out the work</li> <li>- Drawing up a work schedule</li> <li>- Choosing a work method</li> <li>- Making adjustments to the plan as they work</li> <li>- Analyzing their results</li> </ul>

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
<b>Interacts in a computer environment</b>	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
<b>Produces computerized documents</b>	Communicates by using computerized services	Creates by correctly using the appropriate functions	Evaluates his/her work by setting quality standards
<b>Adopts behaviours that reflect a concern for ethics, safety and critical thinking</b>	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	
<b>Broad area of learning</b> (targeted) - Contextualizes learning to make learning more meaningful	<ul style="list-style-type: none"> <li>• Media Literacy</li> </ul>
<b>Subject-specific competencies</b> (prescribed) - Are developed in action and require the active participation of adult learners	<ul style="list-style-type: none"> <li>• Interacts in a computer environment</li> <li>• Produces computerized documents</li> </ul>
<b>Families of learning situations</b> (prescribed) - Group together situations appropriate to the course, based on issues drawn from reality - Promote the acquisition of computer knowledge and skills	<ul style="list-style-type: none"> <li>• <b>Creation</b> <ul style="list-style-type: none"> <li>○ Discovers what computers can do by consulting documentation and by experimenting</li> <li>○ Creates by correctly using the appropriate functions</li> </ul> </li> <li>• <b>Critical thinking</b> <ul style="list-style-type: none"> <li>○ Evaluates his/her work by setting quality standards</li> </ul> </li> </ul>
<b>Cross-curricular competencies</b> (targeted) - Are developed in context together with the subject-specific competencies	<ul style="list-style-type: none"> <li>• Uses creativity</li> <li>• Adopts effective work methods</li> </ul>
<b>Knowledge</b> (prescribed) - Includes computer knowledge and skills that adult learners must acquire in the course	<ul style="list-style-type: none"> <li>• Main components of an animation</li> <li>• Standard terminology associated with 2D animation</li> <li>• Creating and modifying objects</li> <li>• Planning a 2D animation using a storyboard</li> </ul>

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