T4.3.2 Technical Skills Library – Infographic course

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Chapter 5. Contents of the course

At the beginning of the course, we will show a [video](#) that introduces the two main topics, "Design process and visual design basics in UX" and "Realization of an infographic", in order to have a general overview of the course structure.

Furthermore, some infographics about some cultural heritages that are part of the O-City World platform are presented as inspiration for the activities that will be carried out during the lessons and as a reference for the final assignment of the course.

The first topic is divided into three lessons, the second into four:

TOPIC	LESSON
T1. Design process and visual design basics in UX	L1. User-Centered Design
	L2. Visual language and principles
	L3. Basic visual elements in UX
T2. Realization of an infographic	L1. Effectiveness of infographics and data visualizations
	L2. Visual representation of data and information
	L3. Different applications of information visualization
	L4. Creating an infographic

Table 1. Structure of the course in topics and lessons

The first topic analyses the more general aspects concerning the design process and the basics in visual design that are useful to improve the User eXperience (UX) with infographics (and more in general with interactive or multimedia products and systems). This knowledge is necessary to adequately learn how to deal with the different design steps and how to manage the different visual design basic elements that should be accurately considered and applied when creating an infographic. Indeed, the focus on the user in the design process and the visual design basics in UX represent the foundations allowing to make correct choices when developing an infographic.

During this first part, examples and activities concerning natural and cultural heritage will be proposed to show how visual elements can be used to improve the awareness about and the experience with the heritage.

The lessons of the second topic are more focused on the visualization of data and information and on the practical realization of an infographic.

First, infographics and data visualizations are introduced as effective ways of communicating and facilitating the understanding of different kind of issues, including those related to natural and cultural heritage. Moreover, some suggestion about how to make information visualization truly effective are provided. Next, the following lessons show different ways of visually represent data and information, considering some different practical applications of information visualization. In addition, some online tools for creating infographics and data visualizations are presented. Lastly, one lesson is dedicated to explaining key steps in creating infographics, using a graphics software and some free online repositories as an example. In the end, students will be able to create infographics that can be uploaded on the O-City World platform.

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In the following sections, each topic and its lessons will be indicated in detail.

Topic 1. Design process and visual design basics in UX

This topic explores the more general aspects of the design process and offers an overview on the visual principles and elements that are fundamental in creating an infographic. The main objectives of the topic are described in a [video](#).
In detail, it is divided into three lessons:

1. **User-Centered Design:** This lesson highlights the importance of focusing on the user and his/her goals and needs during the design process. It provides some knowledge about the main steps to follow and it introduces the concepts of usability, context of use and requirements of a user interface or an information visualization, such as an infographic aiming to promote natural and cultural heritage;

2. **Visual language and principles**: In this lesson, the language of images is introduced, and the main principles of human perception are explained, thanks to the Gestalt laws, since they are a key knowledge for creating an infographic. Some examples about visual representations and user interfaces are provided. Based on this lesson, student can improve their skills regarding the analysis and the design of visual contents;

3. **Basic visual elements in UX**: In this last lesson of Topic 1, the use of basic visual elements, such as layout, colours, and typography, is explained showing how they can influence the usability and the user experience of a user interface or an information visualization. To facilitate understanding, several examples, also concerning natural and cultural and natural heritage, are shown.

Tables 2, 3 and 4 describe the materials provided to the teacher for each lesson. Each lesson corresponds to one class of the teacher with his/her students. The materials (videos and pills) prepared for the teacher to learn (T2L) can also be used directly in the classroom (teacher to teach – T2T), or a task for the students can be assigned, which consists in watching the videos at home before the class (in green colour in the tables). The latter option is known as flip-teaching, in which the time in class is used to solve doubts and go further into the project. Videos explain the theoretical concepts of a lesson, whereas pills show practical examples of these theoretical concepts to help in the understanding.

As said, the aim of the course is that at the end the students, guided by a teacher who has followed this course, will be able to create infographics regarding natural and cultural heritage, which can be uploaded on the O-City World platform.

To achieve this goal several activities are recommended for each lesson:

- Activities (T2T – in blue colour). It is detailed if the students need to work in the classroom, in the street or at home.

- Extra activities (S2P – in salmon colour) are proposed for those teachers who want to go deeper into the topic of the lesson.

Additionally, recommendations on what to do in class in each lesson are included. All the prepared materials (lesson content in pdf, videos, video contents in pdf, and activity factsheets

in pdf) are linked in the tables. Students should deliver all the proposed activities before the following lesson, when the teacher will solve their doubts (if students do not do/deliver the activity, they won't have doubts). After solving their doubts, students should correct their activities and deliver them again to the teacher.

Lesson	Type	Materials	Description	Student workload	Where the student work?	What to do in class
1 User-Centered Design	T2L/T2T	Video T1.L1. User-Centered Design (lesson content in pdf, video, video content in pdf)	Introduction to the main steps and principles of the design process used to create visual elements, such as UIs and infographics, with the aim of promoting cultural and natural heritage	20'	at home (previous to the lesson -flip-teaching) or in the classroom	Present O-City World platform (watch some examples for simplify tasks at home)
	T2L/T2T	Pill. User needs, requirements, and functions of the O-City platform (video)		5'	at home	Explain Video T1.L1 or solve doubts (if flip-teaching)
	T2T	Activity T1.L1.1. Identify context of use and users' needs (video, video content in pdf, activity factsheet in pdf)	Identify a product or service visualizing information about a natural or cultural asset of a city (for example a museum collection) and define the related context of use and users' needs	2h	at home	
	T2T	Activity T1.L1.2. Identify functional requirements (video, video content in pdf, activity factsheet in pdf)	Based on Activity T1.L1.1, identify the functional requirements according to the users wants and needs	2h	at home	Explain Activities T1.L1.1 and T1.L1.2 (for students to do at home), and optionally propose the Extra activity T1.L1.1
	S2P	Extra activity T1.L1.1. Research tour (activity factsheet in pdf)	Explore a museum or a natural park and collect information and data, especially regarding visual communication, to improve the delivered User Experience	4h	in the street	

Table 2. Materials provided for Lesson 1. User-Centered Design of Topic 1. Design process and visual design basics in UX.

Lesson	Type	Materials	Description	Student workload	Where the student work?	What to do in class
2 Visual language and principles	T2L/T2T	Video T1.L2. Visual language and principles (lesson content in pdf, video, video content in pdf)	Explanation about the main features and principles constructing graphic elements and images, in order to improve the knowledge and skills about the development of visual contents	20'	at home (flip-teaching) or in the classroom	Solve doubts about previous Activities T1.L1.1 and T1.L1.2

Explain Video T1.L2 or solve doubts (if flip-teaching)

Explain Activities T1.L2.1 and T1.L2.2 (for students to do at home), and optionally propose the Extra activity T1.L2.1 |
	T2L/T2T	Pill. Some examples of Gestalt principles in UX (video)		5'	at home	
	T2T	Activity T1.L2.1. Gestalt principles analysis (video, video content in pdf, activity factsheet in pdf)	Analyze the Gestalt principles followed or broken by the visual elements of a website or infographic about a natural or cultural heritage and compare the analyzed item with a similar one from the O-City platform (e.g., a museum with a museum) by evaluating the adequacy of choices made in the visual design	4h	at home	
	T2T	Activity T1.L2.2. Create icons for user interfaces and information visualizations (video, video content in pdf, activity factsheet in pdf)	Create a new set of icons that represent the main contents and functions of one of the websites or infographics analysed in Activity T1.L2.1	4h	at home	
	S2P	Extra activity T1.L2.1. Evaluate the requirements with the rest of the class (activity factsheet in pdf)	Based on Activity T1.L1.2, each student carries out a short interview with the other students to understand if the requirements have been defined correctly	3h	in the classroom	

Table 3. Materials provided for Lesson 2. Visual language and principles of Topic 1. Design process and visual design basics in UX.

Lesson	Type	Materials	Description	Student workload	Where the student work?	What to do in class
3 Basic visual elements in UX	T2L/T2T	Video T1.L3. Basic visual elements in UX ([lesson content in pdf](), [video](), [video content in pdf]())	Explanation about how basic visual elements, such as layout, colour, and typography, can facilitate the creation of infographics, including in the field of cultural and natural heritage	30'	at home (flip-teaching) or in the classroom	Solve doubts about previous Activities T1.L2.1 and T1.L2.2

Explain Video T1.L3 or solve doubts (if flip-teaching)

Explain Activities T1.L3.1 and T1.L3.2 (for students to do in the classroom or at home), and optionally propose the Extra activity T1.L3.1 |
	T2L/T2T	Pill. Practical examples of good and bad layouts in visual design ([video]())		5'	at home	
	T2L/T2T	Pill. Practical examples of good and bad use of colour in visual design ([video]())		5'	at home	
	T2L/T2T	Pill. Practical examples of good and bad use of typography in visual design ([video]())		5'	at home	
	T2T	Activity T1.L3.1. Evaluate the icons with the rest of the class ([video](), [video content in pdf](), [activity factsheet in pdf]())	Each student carries out a short test with the other students to evaluate the usability of the icons created in Activity T1.L2.2	3h	in the classroom	
	T2T	Activity T1.L3.2. Layout, colour, and typography analysis ([video](), [video content in pdf](), [activity factsheet in pdf]())	After analysing a UI (e.g., a website or an application) or infographic, compare it with different alternatives in layout, colour, and typography, defining what are the bad and the good practices implemented	4h	at home	

	S2P	Extra activity T1.L3.1. Suggesting improvements ([activity factsheet in pdf](#))	Suggest some changes to be made for improving the visual design and the UX of one case analyzed in the previous activities of Topic 1 (Lesson 1 and 2), according to the User-Centered Design approach and the Visual Design basics	3h	in the classroom	

Table 4. Materials provided for Lesson 3. Basic visual elements in UX of Topic 1. Design process and visual design basics in UX.

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Topic 2. Realization of an infographic

This topic is dedicated to explaining the effectiveness of infographics and data visualizations, and to deliver practical knowledge that will allow students to create infographics. The main objectives of the topic are described in a [video](#).
 In detail, it is divided into four lessons:

1. **Effectiveness of infographics and data visualizations**: This lesson better defines infographics and data visualizations and explains their usefulness, based on their effectiveness in presenting data and information. Moreover, it provides practical tips on usability and reliability. Lastly, some examples are shown, with particular regard to natural and cultural heritage;

2. **Visual representation of data and information**: In this second lesson different ways to graphically represent data and information are presented, highlighting the characteristics that make them best suited to certain contents and aims. Based on this lesson, student can improve their skills regarding the correct encoding of data in a picture to make them clearly understandable and even suitable to specific user needs;

3. **Different applications of information visualization**: This lesson briefly present different practical application of information visualization, showing the wide versatility of this instrument. In addition, some online tools for quickly and effectively creating infographics and data visualizations are introduced to highlight the availability of different resources according to the type of infographic or data visualization to create;

4. **Creating an infographic:** This last lesson describes some key steps for creating an infographic. A free graphics software is used as an example to explain some functions that can be found in many tools used for creating infographics. In addition, some free online repositories with useful resources are suggested. After this lesson, students can realize an infographic that can be uploaded on the O-City World platform.

Tables 5, 6, 7 and 8 describe the materials provided to the teacher for each lesson, using the same nomenclature (T2T, T2L, STP) and the same kinds of recommendations about lessons and activities of the tables of Topic 1.

Lesson	Type	Materials	Description	Student workload	Where the student work?	What to do in class
1 Effectiveness of infographics and data visualizations	T2L/T2T	Video T2.L1. Effectiveness of infographics and data visualizations (lesson content in pdf, video, video content in pdf)	Introduction to the usefulness of information visualizations based on their effectiveness in presenting data and information	15'	at home (flip-teaching) or in the classroom	Solve doubts about previous Activities T1.L3.1 and T1.L3.2

Explain Video T2.L1 or solve doubts (if flip-teaching)

Explain Activities T2.L1.1 and T2.L1.2 (for students to do at home)

Explain requirements of the infographic to be part of the O-City World platform

Optionally propose the Extra activity T2.L1.1 |
	T2L/T2T	Pill. Different typologies of data sources about heritage (video)		5'	at home	
	T2L/T2T	Pill. Practical examples of good infographics and data visualizations (video)		5'	at home	
	T2T	Activity T2.L1.1. Case study analysis (video, video content in pdf, activity factsheet in pdf)	Analyze an infographic or a data visualization about a natural or cultural heritage. Define if it is reliable and usable and explain on which elements you ground your choice	2h	at home	
	T2T	Activity T2.L1.2. Gather data and information to use in an infographic (video, video content in pdf, activity factsheet in pdf)	Pick a natural or cultural heritage and collect different types of related materials that can be useful in creating an infographic promoting that heritage. Include information about possible users, context, and goals of the infographic	3h	at home	

| | S2P | Extra activity T2.L1.1. Evaluation tour ([activity factsheet in pdf](#)) | Visit a museum or a natural park and evaluate its visual system of communication in the view of using information visualization to improve the User Experience and promote the analyzed natural and cultural heritage | 4h | in the street | |

Table 5. Materials provided for Lesson 1. Effectiveness of infographics and data visualizations of Topic 2. Realization of an infographic

Lesson	Type	Materials	Description	Student workload	Where the student work?	What to do in class
2 Visual representation of data and information	T2L/T2T	Video T2.L2. Visual representation of data and information (lesson content in pdf, video, video content in pdf)	Presentation of different types of graphical representations of data and information, in order to understand how to suitably encode data in a picture	30'	at home (flip-teaching) or in the classroom	Solve doubts about previous Activities T2.L1.1 and T2.L1.2

Explain Video T2.L2 or solve doubts (if flip-teaching)

Explain Activities T2.L2.1 and T2.L2.2 (for students to do at home), and optionally propose the Extra activity T2.L2.1 |
	T2L/T2T	Pill. TEDEd Animation by Lea Gaslowitz about How to spot a misleading graph (video)		10'	at home	
	T2L/T2T	Pill. TEDEd Animation by Mark Liddell about How statistics can be misleading (video)		10'	at home	
	T2T	Activity T2.L2.1. Organize gathered information and data (video, video content in pdf, activity factsheet in pdf)	Based on Activity T2.L1.2, sort the gathered information and data in categories according to correlations. Then define what you want to represent (i.e., the topic) and imagine the type of infographic you want to create	4h	at home	
	T2T	Activity T2.L2.2. Visualization of data and information (video, video content in pdf, activity factsheet in pdf)	Based on Activity T2.L2.1, choose which visual representation best suits the selected data and information with the aim of facilitating understanding. Also define the type of contents to include in your infographic	2h	at home	

| | S2P | Extra activity T2.L2.1. Collect and check data ([activity factsheet in pdf](#)) | Working in groups, students select one natural and cultural heritage from Activity T2.L1.2 and try to find different types of data about it. Then they check data for assure their reliability | 3h | in the classroom | |

Table 6. Materials provided for Lesson 2. Visual representation of data and information of Topic 2. Realization of an infographic.

Lesson	Type	Materials	Description	Student workload	Where the student work?	What to do in class
3 Different applications of information visualization	T2L/T2T	Video T2.L3. Different applications of information visualization (lesson content in pdf, video, video content in pdf)	Some of the main practical applications of information visualization are illustrated, along with some tools to create the type of infographic or data visualization that best suits a certain type of practical application	15'	at home (flip-teaching) or in the classroom	Solve doubts about previous Activities T2.L2.1 and T2.L2.2

Explain Video T2.L3 or solve doubts (if flip-teaching)

Explain Activity T2.L3.1 (for students to do at home), and optionally propose the Extra activity T2.L3.1 |
	T2L/T2T	Pill. TEDx Talk by Dominic Bohan about Turning Bad Charts into Compelling Data Stories (video)		20'	at home	
	T2T	Activity T2.L3.1. Infographic prototype (video, video content in pdf, activity factsheet in pdf)	After synthesizing the outcomes from previous activities of Topic 2 (T2.L1.2, T2.L2.1, and T2.L2.2) in a clear proposal, create a sketch of your infographic that defines its main visual characteristics and shows how it might look	6h	at home	
	S2P	Extra activity T2.L3.1. Comparison of the infographic projects (activity factsheet in pdf)	Based on the previous activities of Topic 2 (T2.L1.2, T2.L2.1, and T2.L2.2), students compare their projects for the infographic. Then they form groups to develop common solutions	3h	in the classroom	

Table 7. Materials provided for Lesson 3. Different applications of information visualization of Topic 2. Realization of an infographic.

Lesson	Type	Materials	Description	Student workload	Where the student work?	What to do in class
4 Creating an infographic	T2L/T2T	Video T2.L4. Creating an infographic (lesson content in pdf, video, video content in pdf)	Explanation of some key steps for creating an infographic using, as an example, a free graphics software (that shows some functions that can be found in many tools used for creating infographics), and suggesting some free online repositories, in order to make students able to realize an infographic that can be uploaded on the O-City World platform	45'	at home (flip-teaching) or in the classroom	Solve doubts about previous Activity T2.L3.1

Explain Video T2.L4 or solve doubts (if flip-teaching)

Explain Activities T2.L4.1 and T2.L4.2 (for students to do in the classroom or at home), and optionally propose the Extra activity T2.L4.1 |
	T2L/T2T	Pill. Some examples of infographics made with online tools (video)		5'	at home	
	T2T	Activity T2.L4.1. Infographic prototype evaluation (video, video content in pdf, activity factsheet in pdf)	Each student carries out a short test on his/her infographic prototype (with at least 5 students), collecting and analysing feedback and suggestions useful to improve it	3h	in the classroom	
	T2T	Activity T2.L4.2. Realization of the infographic (video, video content in pdf, activity factsheet in pdf)	Based on the outcomes from Activities T2.L3.1 and T2.L4.1, choose a graphics tool and realize the final version of your infographic in order to upload it on the O-City World platform	5h	at home	

| | S2P | Extra activity T2.L4.1. Make your infographic interactive ([activity factsheet in pdf](#)) | Design an interactive version of the infographic defining the interactions occurring between the users and the interactive elements of the infographic. Highlight the changes that occurred in the visualization. | 3h | in the classroom | |

Table 8. Materials provided for Lesson 4. Creating an infographic of Topic 2. Realization of an infographic.