Education in Information and Communication Technologies

Session 8
Modules to develop

Máster Universitario en Formación del Profesorado de Educación Secundaria
Obligatoria, Bachillerato y Formación Profesional

Facultad de Formación del Profesorado y Educación

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Topic 2: Computing Technology in Secondary Education Curricula
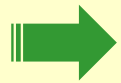
➡ 2.1 Courses and Paths related with Computing in the curriculum

2.2. Analysis of the curricular contents of the Information and Communications Technology subject

2.3. Theoretical foundations and activity design for modules in the curriculum

1. Computational thinking
2. Publishing and dissemination of contents
3. Developing of multimedia contents
4. Internet and social networks
5. Collaborative work tools
6. Security, ethics, and aesthetics in the use of technology

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2.1 Paths in the LOMCE Spanish National Curriculum

Vocational Training (basic degree)
Office Computing

Vocational Training (medium degree)
Microcomputing Sytems and Networks

Vocational Training (advanced degree)
Administration of Networked Computing Systems
Web Applications Development
Multiplatform Applications Development

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2.2 Curriculum Contents: Secondary Education (LOMCE)

Contents for Secondary Education *(ESO) (annex to decreet 43/2015)*

Information and Communications Technology Course

1. Ethics and aesthetics of network interaction
2. Operating Systems
3. Organising, designing, and producing digital information
4. Computing security
5. Publishing and dissemination of contents
6. Internet and Social Networks, hyperconnection

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2.2 Curriculum Contents: Secondary Education (LOMCE)

1. **Ethics and aesthetics of network interaction**
   - *Safe habits*
   - *Responsible use of information exchange*
   - *Property rights of resources*
2. **Operating Systems**
   - *Using and configuring equipment, identifying elements*
   - *Managing the installation of general purpose equipment*
   - *Using communications SW*
3. **Organising, designing, and producing digital information**
   - *Using desktop applications to create documents*
   - *Developing and integrating image and video materials.*
4. **Computing security**
   - *Adopting active and passive security behaviour to protect data and information exchange*
   - *Knowledge of risks, and using protection habits*
5. **Publishing and dissemination of contents**
   - *Developing and publishing contents integrating text and video*
   - *Knowledge of publishing standards, and using them in production of webs, blogs, wikis*
6. **Internet and Social Networks, hyperconnection**
   - *Developing tool use habits that allow accessibility*
   - *Using critical thinking, and developing habits in the use and exchange of information in social networks and platforms*
   - *Publishing and linking information with hyperlinks in multimedia , presentations, images, audio, and video content channels*

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2.2 Curriculum Contents: Baccaulerate - LOMCE

Baccaulerate Contents (LOMCE)

Information and Communications Technology I

1. Information society and the computer
2. Computer architecture
3. SW for computing systems
4. Computer networks
5. Programming

Information and Communications Technology II

1. Programming
2. Publishing and dissemination of contents
3. Security

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Topic 2: Computing Technology in Secondary Education Curricula

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Selection of Contents

1. Computational thinking
2. Publishing and dissemination of contents
3. Developing of multimedia contents
4. Internet and social networks
5. Collaborative work tools
6. Security, ethics, and aesthetics in the use of technology

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2.3 Theoretical Foundations and Activities

Assignment of topic blocks to groups

TOPIC BLOCK	GROUP
1. Computational thinking	Marián
2. Publishing and dissemination of contents	
3. Developing of multimedia contents	
4. Internet and social networks	
5. Collaborative work tools	
6. Security, ethics, and aesthetics in the use of technology	

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Computational Thinking

1. Theoretical Foundation
    - Definition. Benefits of early age development of computational thinking
    - Common tools
2. Activity Design
    - Guide for Scratch first steps
    - Developing an interactive game
    - Describing activities to include in the game, and other independent activities

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Publishing and dissemination of contents

1. Theoretical Foundations
    - What is behind the scenes of a web page (HTML markup language)
    - Classification and description of **technical means for Internet publishing**
      Examples: Web, blog, wiki, content management systems, specific containers (youtube, flickr, slideshare…)
    - Description of one of them.
2. Activity design
    - Description and common tools
    - Design of a personal blog. (Blogger, Wordpress…) (in-class activity)
      - How to make a blog guide (main aspects)
    - Another content publishing activity (out-of-class activity)
3. Ethics and aesthetics of content dissemination

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Developing of multimedia contents

1. Theoretical Foundations
   - Classification and description of **types of content creation tools**
     - Video, audio, and photo editing. Typographical illustrations, mind maps, etc.
     - Word processors, spread sheets, presentations
2. Activity Design
   - Creation of a videotutorial
   - Editing of video (Windows Movie Maker), and publication in YouTube
   - Creation of audio, and publication

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Internet and social networks

1. Theoretical Foundations
   - Information search on the Internet. General and specialised search engines (google images, etc.). Advanced search options.
   - Specialized repositories (images, educational resources, sounds, etc.)
   - Social networks. Classification and description of popular social networks.
2. Activity Design
   - Advanced search activity.
   - Accessing a specialized repository activity (f.i. object educational resources)
   - Using Edmodo to support teaching activity.

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Collaborative work tools

1. Theoretical Foundations

   - Classification and description of collaborative work tools
   - Document editing and sharing (Drive, Dropbox, etc.), wikis, social networks for education, shared calendars, communication groups, project management, leaning environments (moodle), videoconferencing, brainstorming, shared digital blackboards, online questionnaires, etc.

2. Activity Design
   - Using a shared digital blackboard activity
   - Using a shared calendar activity
   - Using a project management tool activity

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Security, ethics, and aesthetics in the use of technology

1. Theoretical Foundations
   - Security habits and ethics in the use of software and data
     – Risks in the access to the machine, and protection measures against malware and social engineering
     – Software licenses, and free software licenses.
   - Security habits and ethics in the sharing and exchange of information
     – Ethical aspects of file sharing
     – Creative Commons licenses
   - Security habits and ethics in network communications
     – Risks in publication of images, and measures to adopt
     – Fraud, theft, bullying, addiction, etc.

2. Activity Design
   - Using Creative Commons repositories (license search) activity
   - Creating a license for own materials activity
   - Awareness about the importance of good habits activity

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Contents of the document
1. *Cover*
2. *Table of Contents*
3. *Introduction*
4. *Theoretical Foundations*
5. *Activity Design*
6. *Bibliography and references to other resources*
7. *Appendix I. Concept Map*
8. *Appendix II. Glossary of terms*

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Theoretical Foundations

- Develop a "Theoretical Foundations" section, with the subsections you deem necessary. The sections should develop the module bearing into mind:

*1- Include **conceptual and procedimental aspects** as well, and **relevant tools** for the module*
2- Develop a section listing (without elaboration) the primarily attitudinal aspects for the module

This is a group work. It is important to perform a joint review of the document in order to homogenize the writing style.

Phases for the Theoretical foundations part:
- Search and analysis of information
- Content selection
- Section development
- Global review
- Concept maps developing
- Compilation of bibliography and other resources
- Compilation of the glossary of terms

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Activities

Include here a set of activities developed to help achieve the needed abilities to use the related technologies
Suggest different types of activities

> 1. ***Guide to follow the "theory" class.*** *Set of questions that are being discovered in the presentation, and should be answered by following the presentation. This helps the student attention to be focused on the presentation.*
> 2. ***Questionnaire*** *with short questions, fill-in-the-gaps concept map, etc. that spans the contents of the topic, in order to strengthen the knowledge (to be done as an out-of-class activity).*
> 3. ***Practical Activities*** *using a relevant tool (in-class and out-of-class). Include here a script or guidelines for the task.*

Using the activities proposed, select some of them for:

In-class work (50 minutes):

The rest of your class mates will play the role of students of your class. You should develop a detailed **work script** for the activities you consider appropriate.

Out-of-class work (2 hours)

- Select some **practical activity** for he rest of your classmates (to be done out-of-class)

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Bibliography and other resources

Include here all the resources used. If they are web pages include a title and a short description of the contents

Appendix 1. Concept map

Develop some (one or more) concept maps summarising the main aspects of the topic

Appendix 2. Glossary of terms

Glossary of relevant terms for the module. This includes concepts, tools, and computing technologies. Use some ordering criteria, such as alphabetical, subject matter, etc.

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Presenting the work

Each group will have 2 hours

1. *First part (30-45 minutes) for the oral presentation about the Theoretical foundations*
   - *Every group member should present some part of the module*
2. *Second part (60-75 minutes) for a practical workshop of activities for the module*
   - *The other groups will play the role of students and will develop the in-class activities.*
   - *Every group member should take active part in the activity.*

Assessing the activities and grading

Each group should manage the delivery of activities, and perform the assessment according to the developed criteria. Results should be notified to the teacher (with a breakdown explanation if possible)

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DATE	ACTIVITY
	Presentation of Posters, Introduction to Topic 2
	Module Computational thinking
	Module Publishing and dissemination of contents
	Module Developing of multimedia contents
	Module Internet and social networks
	Module Collaborative work tools
	Module Security, ethics, and aesthetics in the use of technology

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