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Table of contents

Executive summary	3
1. Introduction	4
1.1 Work Package 3: Identification of sector qualifications, skill needs and mismatch	4
1.2 Task 3.1 Identification and validation of skills demand for mobile apps creation.....	4
2. Collection of data	6
2.1 Collection of existing Papers, Analysis, Sector Studies addressing mobile App development skills and mobile App creation process.....	6
2.2 Open interviews.....	7
2.3 APP development procedures	8
3. Analysis of data	8
3.1 Mobile Platform.....	8
3.2 Skills Importance.....	9
3.3 Critical Skills	10
4. The results	12
4.1 Definitions: Competence, Knowledge, Skills, Attitudes	13
4.2 Knowledge	13
4.3 Skills	14
4.4 Attitudes	17
4.5 Mindmap files	18
Appendix 1: Open interview	19
AGORIA open interview	19
AICA open interview	20
ATI open interview	21
Agoria: Grids on Apps procedures	22
AICA: Grids on Apps procedures.....	24
ATI: Apps development phases	30
ATI Grids on Apps procedures	45
NAACE: Grids on Apps procedures	60



Executive summary

This report is deliverable **D3.1.1 “Results of the analysis phase”**, which is the first deliverable of **Work Package 3 (WP3) “Identification of sector qualifications, skill needs and mismatch”** as described in the AppSkil Application Form. The main purpose of this report is to identify the required skills set that mobile apps creators need in order to effectively develop and commercialise mobile apps: technical, design, user understanding and business skills.

The report has been prepared taking into account:

- **existing Papers, Analysis, Sector Studies** addressing mobile App development skills and mobile App creation process,
- **open interviews** (storytelling mode) on selected Case Studies focusing on skills and processes and mostly on future evolutions,
- grids on **mobile App procedures**, filled-in by App developer in the partners' countries.

The core of the report is a Mind Map representing a syllabus of Mobile App competences.

The Map has been developed taking into account the e-CF definition of Competence:

*«**Competence** is a demonstrated ability to apply knowledge, skills and attitudes to achieving observable results.»*

To explain better this main concept these definitions are used:

- *«**Skill** is defined as "ability to carry out managerial or technical tasks.»*
- *«**Knowledge** represents the "set of know-what.»*
- *«**Attitude** means in this context the "cognitive and relational capacity".»*

Following this definitions, the Mind Map is organised in the 3 Areas (Knowledge, Skills and Attitudes); in each Area items are grouped in families based on their application field:

- Managerial,
- Technical,
- Marketing.



1. Introduction

The main purpose of this report is to identify the required skills set that mobile apps creators need in order to effectively develop and commercialise mobile apps: technical, design, user understanding and business skills.

This report has been developed in WP3, “Identification of sector qualifications, skill needs and mismatch”, Task T3.1, Identification and validation of skills demand for mobile apps creation”.

1.1 Work Package 3: Identification of sector qualifications, skill needs and mismatch

The **aim** of WP3 is to identify qualifications and skills shortages in the ICT sector related to mobile Apps creation.

Its **operational objectives** are:

1. Determine and validate skills demand.
2. Identify existing qualifications and their link with EU qualifications frameworks and tools.
3. Identify the relevant skills supply.
4. Determine skills mismatch to be addressed by the AppSkil curriculum and VET program.

Four are the **tasks** related to WP 3:

- T3.1 Identification and validation of skills demand for mobile apps creation (February 2015 – August 2015).
- T3.2 Identification of existing qualifications and their link with EU frameworks (February 2015 – May 2015).
- T3.3 Identification of existing skills supply (February 2015 – June 2015).
- T3.4 Identification of skill mismatches (February 2015 – October 2015).

1.2 Task 3.1 Identification and validation of skills demand for mobile apps creation

T3.1 will aim to identify and analyse the required skills sets required for mobile Apps creators to develop and commercialise mobile Apps products. The task will aim to identify the necessary technical and non-technical skills (technical & commercialisation) as well as identification of any potential risks, technological innovation and market risks for this industry sector. Therefore in this task a qualitative



and quantitative approach to the sector will be required (*from the kick-off meeting minutes*).

1. **AICA** will collect existing Papers, Analysis, Sector Studies addressing mobile App **development skills** and mobile App **creation process**.
All the partners are invited to contribute to the collection sending to AICA documents and links that might help to complete the initial analysis.
2. **AICA, ATI, NAACE, AGORIA** will lead **open interviews** (storytelling mode) on selected Case Studies focusing mostly on future evolution (at least 1 for each country: IT, BE, SP, UK). The interviews will focus both the skills and the processes (and their possible evolutions).
AICA, ATI, NAACE, AGORIA will lead also an analysis of about **50 mobile apps procedures** to determine skills needs (about 12 each).
3. **AICA** will analyse the documents (described at point 1) and the interviews and analyzes (point 2) and prepare a **Report: “Results of the analysis phase”**.
This report will identify the required skills set that mobile apps creators need in order to effectively develop and commercialise mobile apps: technical, design, user understanding and business skills (using ESCO classification, where relevant).
The App skills needed will be mapped referring to the e-Competence Framework (e-CF).
The report will contain also references to potential obstacles, market risks and technological innovation in the sector.
This report will be submitted to the validation process.
4. **ATI** will plan the **validation process** defining the relevant methodologies and actions, such as surveys, interviews addressed to social partners and labour market representatives, field experts, trainers on mobile apps development and business related topics, learners, etc.
5. **NAACE, AICA, AGORIA, ATI** will validate the “Results of the analysis phase” following the validation process suggested by ATI.
The partners will involve also **other European professional associations**, such as associations of employers and employees, social partners and individual developers.
About 100 sector representatives from at least 4 different EU countries have to be involved at this stage.
6. **ATI** will use all the surveys to produce a **Report: “Skills demand validation report”**.



7. Revision of the ATI report (**by all the partners**) and production of the final version (ATI).

2. Collection of data

The first step has been to collect the data to be analysed.

2.1 Collection of existing Papers, Analysis, Sector Studies addressing mobile App development skills and mobile App creation process

The materials suggested by the partners are the following.

- **AELP**
 - MOBILE APPLICATION DESIGN & DEVELOPMENT TRENDS 2013 – *my first mobile app* (Apps_design_trends_2013.pdf)
 - Reply Applications Factory – *Reply living network* (Apps_Factory_ENG.pdf)
 - Profile Sheet WSP-G3-017 - “Mobile Application Developer” - G3 Web Skills Profiles - version 1.0 - Generation 3 European ICT Professional Profiles – *SkillsProfile.eu* (Developer_profile.pdf)
 - E-BUSINESS AND ICT SKILLS IN EUROPE - BENCHMARKING MEMBER STATE POLICY INITIATIVES - *ICT SKILLS MONITORING GROUP* (eSkills_in_Europe.pdf)
 - IMPLICATIONS OF THE ICT SKILLS GAP FOR THE MOBILE INDUSTRY - *MacLeod Consulting* (ICT-Skills-Gap-Research.pdf)
 - The European App Economy – Creating jobs and driving growth – *Vision mobile Plum* (The European App Economy.pdf)
- **DEL**
 - DARD Mobile Apps – *Department of Agriculture and Rural Development (DARD), UK* (<http://www.dardni.gov.uk/index/farming/managing-your-business/information-technology/bs-mobile-apps.htm>)
 - Mobile apps that support learning any time, any place – *Northern Ireland Social care Council* (http://www.niscc.info/files/News/2010801_Flyerfor4Apps_hyperlinksPDF.pdf)
 - Citizen Maths: It's all about proportion – *Ufi Charitable Trust* (<http://www.ufi.co.uk/news/citizen-maths-its-all-about-proportion>)
 - Ufi are commissioning a blended learning MOOC for FE – *Ufi Charitable Trust* (<http://www.ufi.co.uk/news/ufi-are-commissioning-blended-learning-mooc-fe>)
 - Make or Break: The UK's Digital Future - *House of Lords* (<http://www.publications.parliament.uk/pa/ld201415/ldselect/lddigital/111/111.pdf>)
 - Where young people learn to create apps that change their world - *Apps for good* (<http://www.appsforgood.org/>)



- THE TRANSFORMATIVE POWER OF MULTI-PLATFORM MOBILE APP DEVELOPMENT- *Black berry*
(BlackBerry_MADP_Whitepaper_1_270514_LR_view.pdf0.pdf)
- Computing Science Mobile App Development - Advice for Practitioners – *Education Scotland Foghlam Alba* (Computing Science Mobile App Development - Advice for Practitioners (National 4).pdf)
- ICT Action plan – *Department for Employment and Learning* - (ict-action-plan.pdf)
- **Florida**
 - Mobile World Congress, Barcelona 2-5 March 2015
(<http://www.mobileworldcongress.com/>)
 - Study on security in mobile devices and smartphones (2012Q1) – INCIBE
(https://www.incibe.es/CERT_en/publications/Studies/Estudio_moviles_1C2012_en)
- **BT**
 - Mobile Application Development - TSTC Forecasting
(<http://forecasting.tstc.edu/techbriefs/mobile-application-development/>)
- **CRF**
 - Métiers d’avenir – Etats des lieux du secteur des technologies de l'information et de la communication (TIC) – Le Forem (etat lieu forem secteur des TIC)

2.2 Open interviews

The following open interview have been produced:

- **AGORIA**

They interviewed people from 8 different organizations identifying “Skills & success related remarks”:

 - 3 in the “concept” field,
 - 4 in the “development and maintenance field”,
 - 4 in the “go to market” field.

(See Appendix 1)
- **AICA**

They interviewed the Responsible of Mobile Applications Development Area of a Primary Multinational IT Company. B2B2B and B2B2C market experiences are analysed highlighting critical skills in Concept, Development and Testing Phases.
(See Appendix 1)



- **ATI**

They interviewed people from Torrysoft, Chaotic Kingdoms and Bluibon collecting skills & success related remarks in three large domains: “Concept”, “Development and maintenance” and “Go to market” (see Appendix 1).

2.3 APP development procedures

According to the original proposal, AGORIA, AICA, ATI and NAACE have led structured interviews with Apps developers and responsible of Apps development of many companies:

- Agoria: 1 grid.
- AICA: 7 grids.
- ATI: 11 grids.
- NAACE: 9 grids

The grids are available in Appendix 2.

ATI produced also 7 grids on the skills related to the following development phase: Acceptance testing, Card sorting, Frameworks, Product backlog, Prototyping, Unit testing, User stories (see Appendix 2).

3. Analysis of data

At this stage data about 27 Apps were collected.

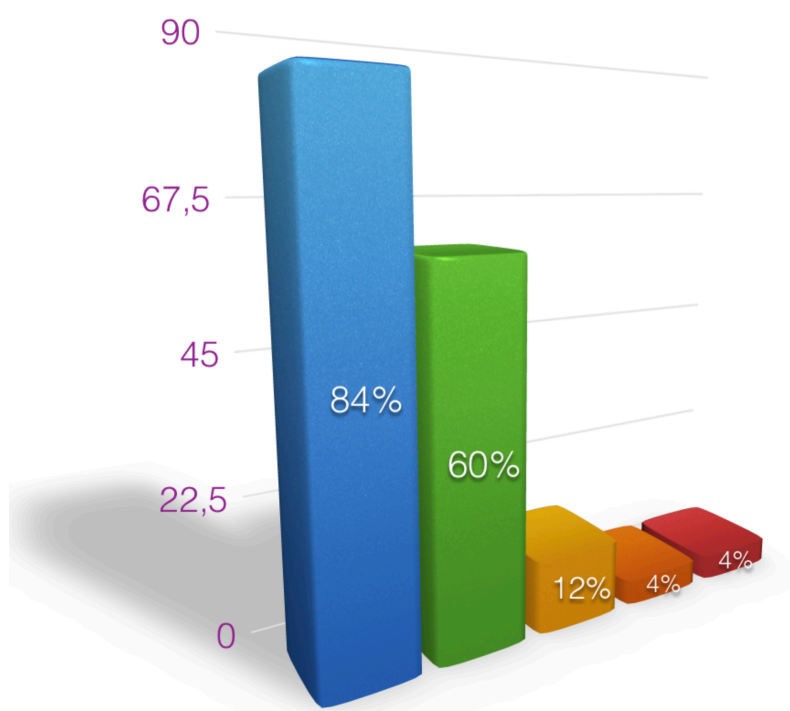
Following some views which summarize some data.

3.1 Mobile Platform

The graph shows the App availability on the Mobile Platform.

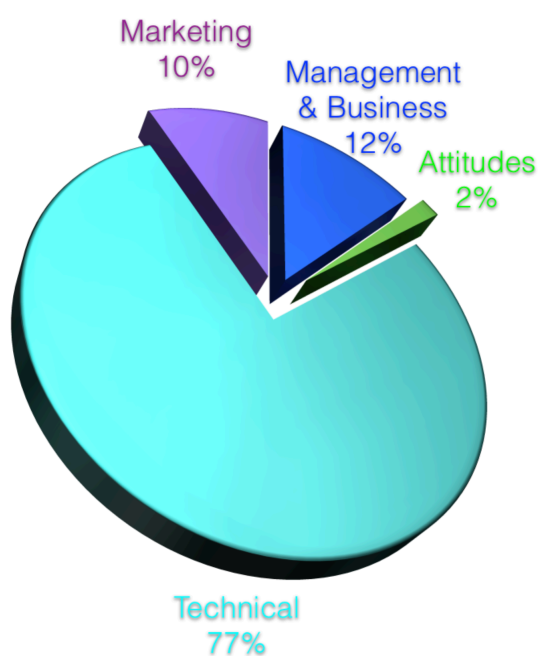


■ iOS ■ Android ■ Windows Phone ■ Blackberry ■ Web



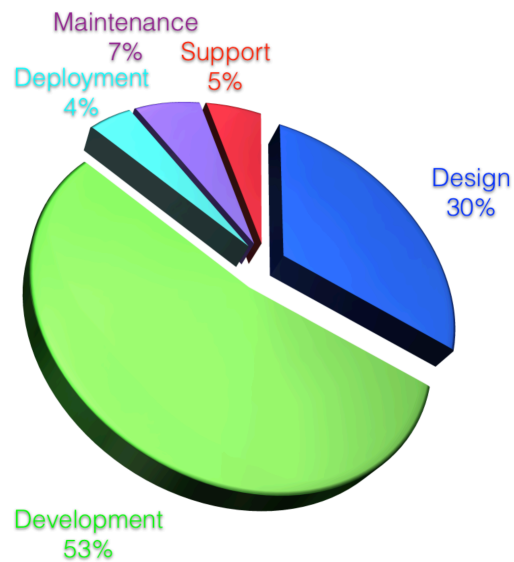
3.2 Skills Importance

The following Graph shows Skills which are considered important for Mobile App Development grouped by Application Field.



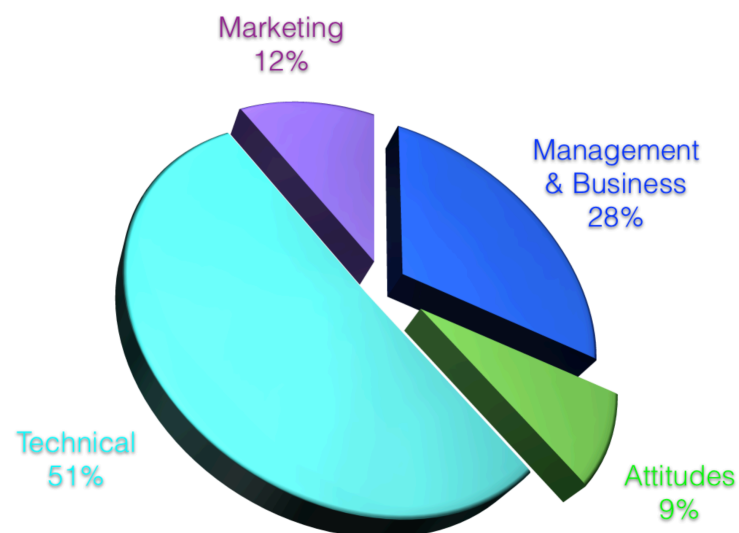


Development skills are analyzed using Software Lifecycle Phases as shown in the next graph:



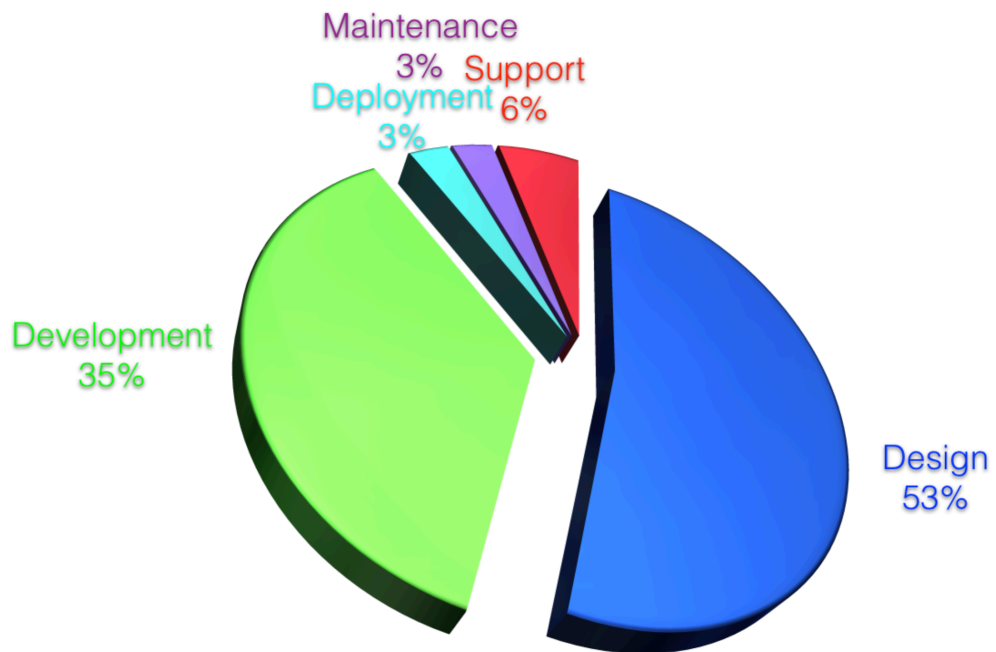
3.3 Critical Skills

Next Graphs shows Skills which they have proved **critical** in the App Mobile Development projects:





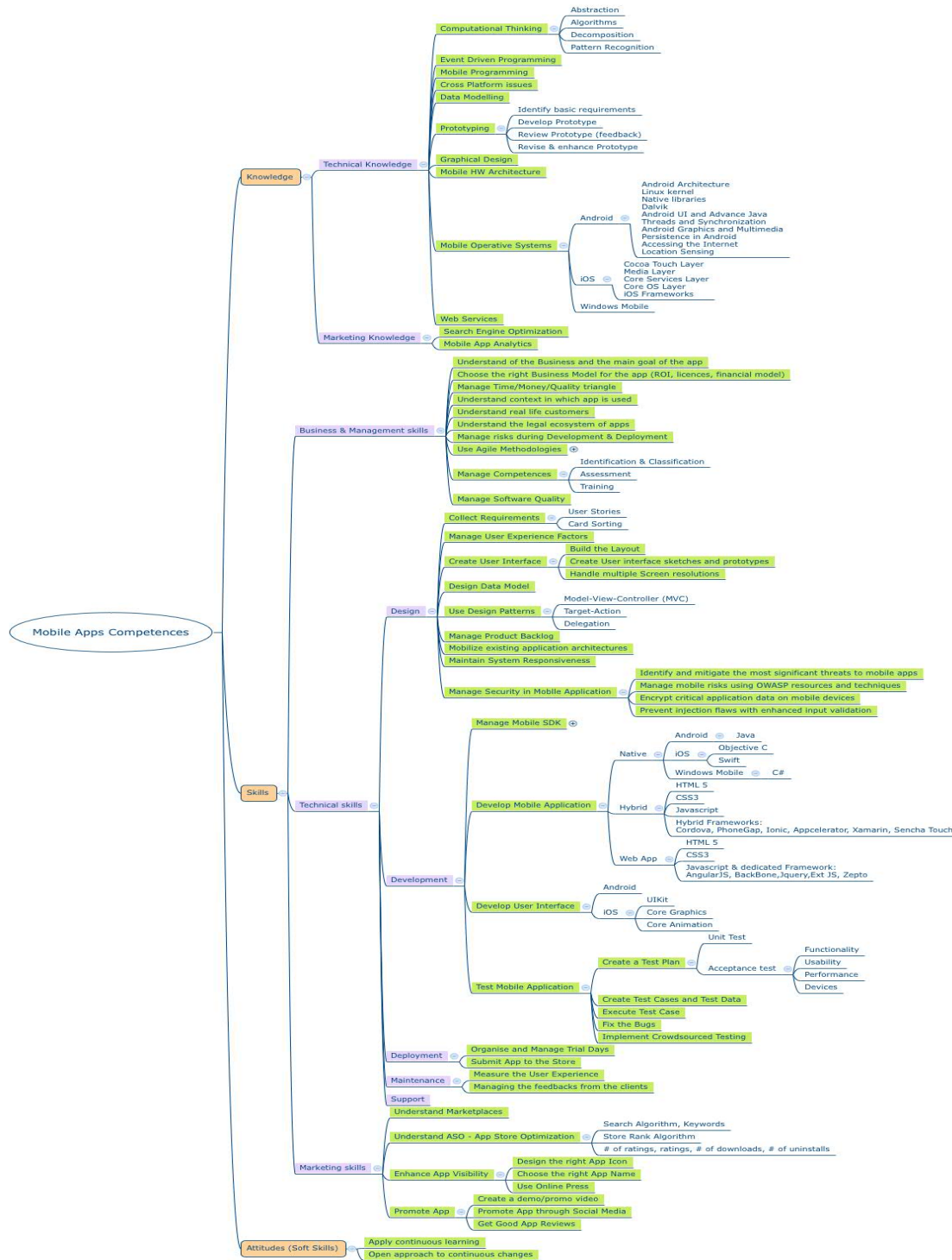
As for Skill Importance, Critical Technical Skills are detailed in the following Graph:





4. The results

The result as the form of a mindmap.





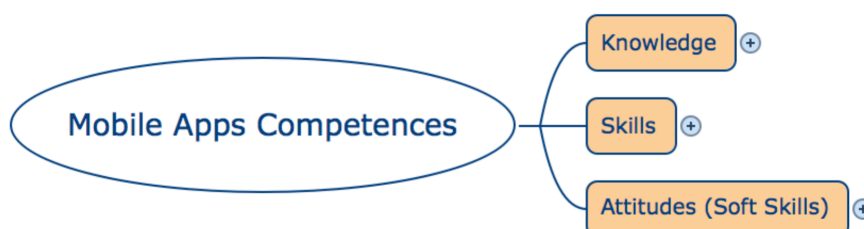
4.1 Definitions: Competence, Knowledge, Skills, Attitudes

The e-Competence Framework (e-CF) gives the following definitions:

Competence is a demonstrated ability to apply knowledge, skills and attitudes for achieving observable results”.

- **Knowledge represents the “set of know-what”** (e.g. programming languages, design tools...) and can be described by operational descriptions.
- **Skill is the ability to carry out managerial or technical tasks.** Managerial and technical skills are the components of competences and specify some core abilities which form a competence.
- **Attitude is the cognitive and relational capacity** (e.g. analysis capacity, synthesis capacity, flexibility, pragmatism...). If skills and knowledge are the components, attitudes are the glue, which keeps them together.

We mapped the requests - coming from already existing papers, analysis, sector studies and from the open and structured interviews realized by the AppSkill partners – in the view of such definitions. Thus the items are organised in 3 Areas:



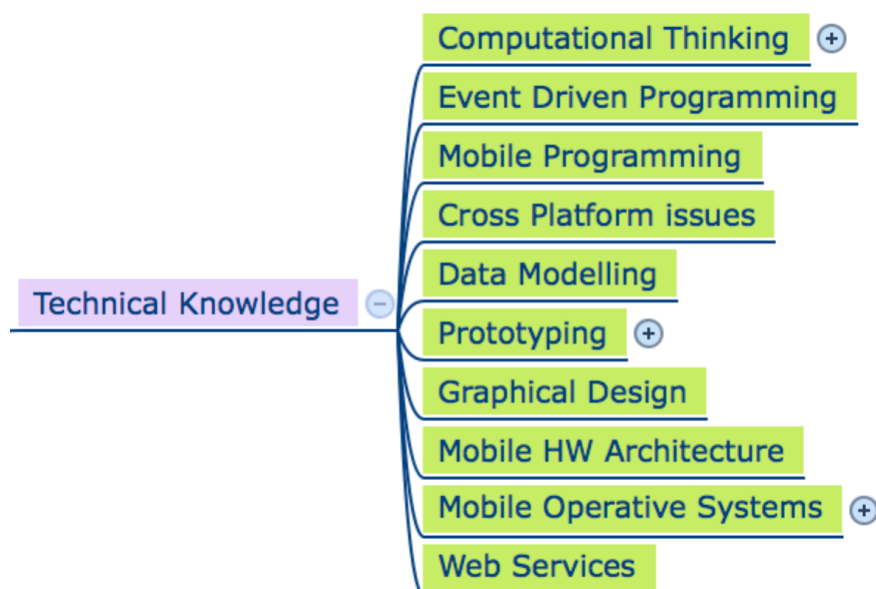
4.2 Knowledge

We organised the required knowledge in two Application fields:





Technical Knowledge

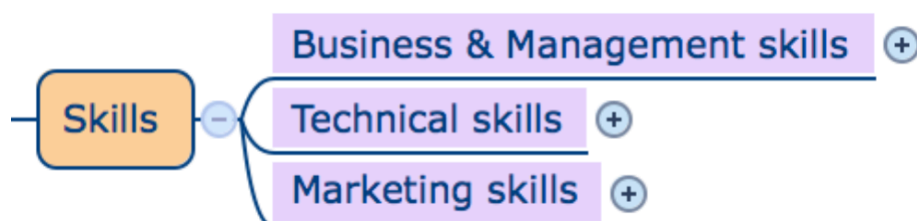


Marketing Knowledge



4.3 Skills

We organised the required skills in three application fields:



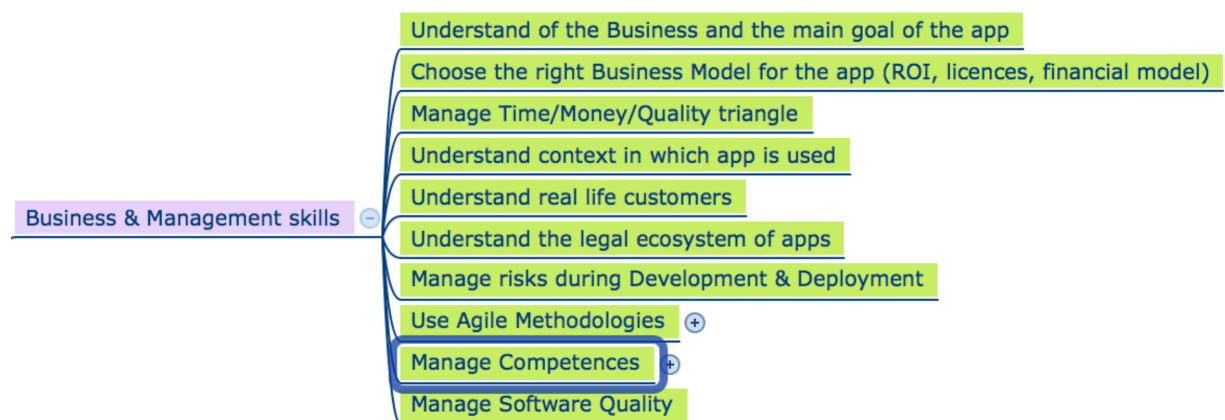


Business & Management Skills

Management Skills are focused on some key issues of Mobile App like:

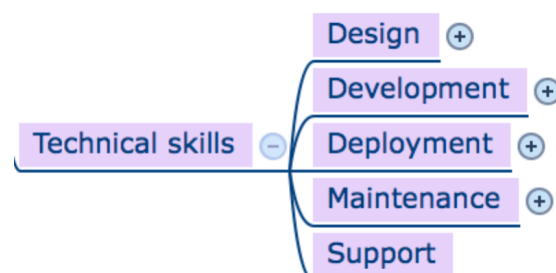
- Business Context.
- Economic & Financial.
- Customer Context.
- App Business Model .
- Legal.
- Development Process.

They are particularly important in the Concept Phase and often models used in traditional software management is not still valid in Mobile App world.



Technical Skills

Technical Skills are grouped following typical Software Lifecycle starting from Design and ending with Support; this Lifecycle is still valid in Mobile App environment.



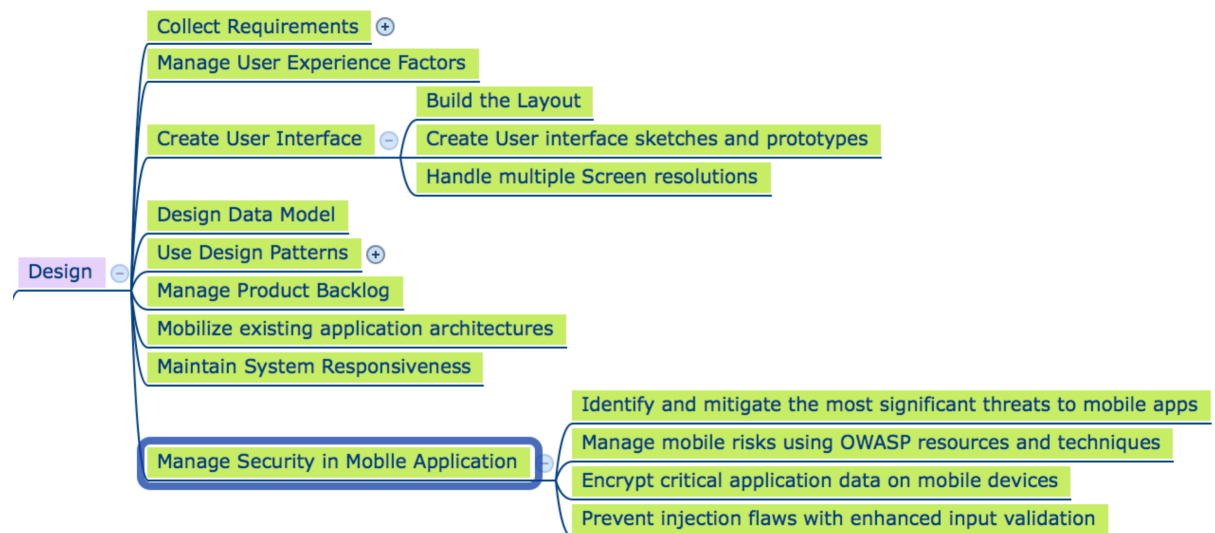
Design: Design Skills address the main components of a Mobile App Design, specifically addressing key points emerged in the Interviews and App Analysis phase (see Appendix 1 & 2): Requirements, User Experience, System Responsiveness.



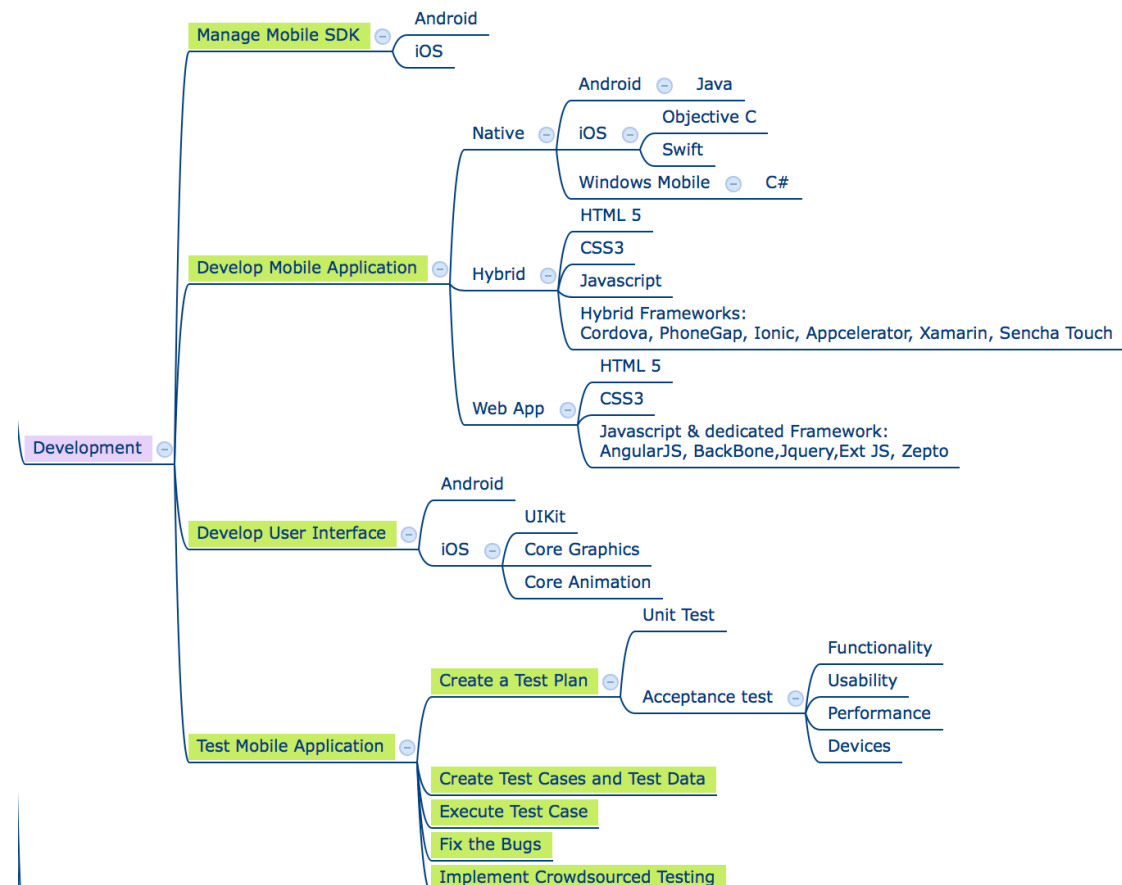
D3.1.1 “Results of the analysis phase”



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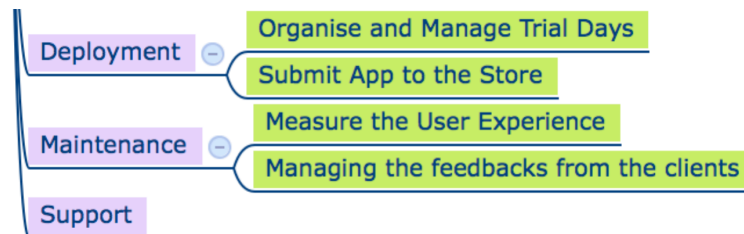


Development: Development Skills describe the Core Technical Skills of Mobile App Development so high detail is used in describing state of the art technologies used (Native, Hybrid, Web App). The fast evolution of this technologies suggests to monitor changes to maintain up to date the Project.



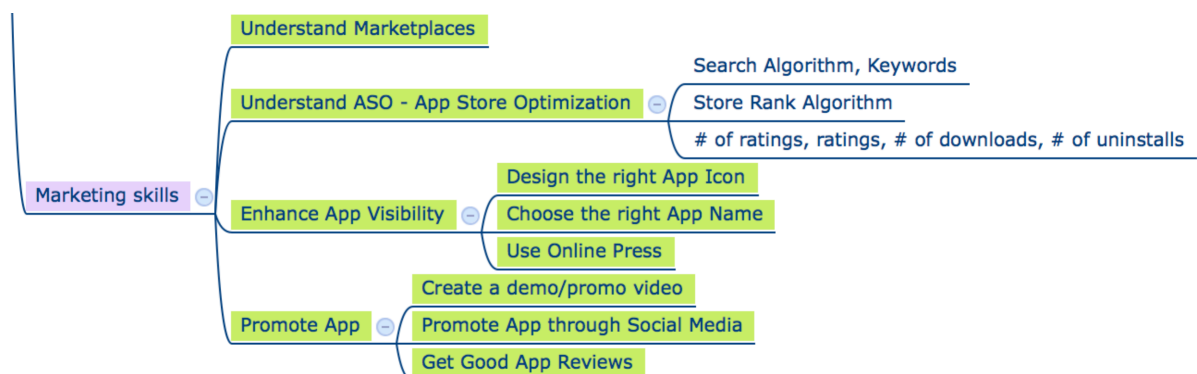


Deployment, Maintenance and Support: these Skills are focused on Users, collecting and measuring their feedbacks and experiences



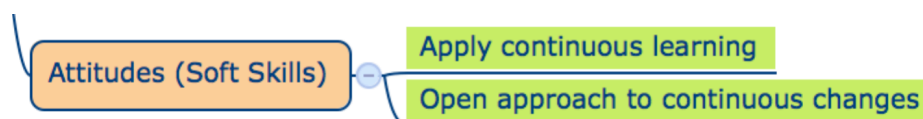
Marketing Skills

In the Interviews and App Analysis Marketing Skills were highlighted as critical for the final Mobile App success. Skills addressing the effective use of App Stores and Communication on Social Media are mandatory and are not easily available in the Market.



4.4 Attitudes

Attitudes are a main component of Competence definition and in our initial survey some of them were highlighted as critical in Mobile App Projects. At this stage of the document is still not clear if we have to address them. We think is important to consider Attitudes in our picture and collect further contributes in the next survey phase.





4.5 Mindmap files

The mind map is available in different formats:

- **MobileAppsCompetences_mindmap.pdf**
The mindmap, as an image in PDF format.
- **MobileAppsCompetences_mindmap.jpeg**
The mindmap, as an image in JPEG format.
- **MobileAppsCompetences_mindmap.svg**
The mindmap, as a web page (visible using a browser).
- **MobileAppsCompetences_mindmap.zip**
The mindmap in an interactive version (visible using a browser). You need to unzip the file obtaining
 - a file **Mobile Apps Competences.html**
 - a folder **Mobile Apps Competences.html_files**

Open the file by a browser or double click on the file: you can expand or close the items.
- **MobileAppsCompetences_mindmap.mm**
The mindmap in an interactive and modifiable version. You need Freemind, a free software that you can download here:
<http://sourceforge.net/projects/freemind/files/freemind/1.0.0/>
- **MobileAppsSyllabus.xls**
It's a spreadsheet file. It allows to modify and to copy and past the selected items in text files.