eCultSkills

eCult Skills Training Guidelines

Lifelong Learning Programme

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http://www.e-jobs-observatory.eu/focus_areas/e-culture

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1. How to use this document

The Training Guidelines offer guidance for European training institutions and for all people involved in drafting curricula in this area, as it describes, in detail, which knowledge, skills and competences need to be acquired in order to qualify for job positions in the digital cultural field. Moreover, these guidelines make reference to the main European frameworks that facilitate the transparent and comparable description of qualifications: the European Qualification Framework (EQF) and the e-Competences Framework (e-CF).

The manual has the following structure:
The chapters provide background information to the reader that is considered important for the full understanding of the document. The chapters contain indicators about the target groups and highlight a very important aspect that should be taken into account, namely the difference between role profiles and job profiles. Finally it gives a very brief introduction of the reference levels (EQF and eCF)[1].
It is given a brief introduction about the chapters and subchapters analyzed in the Training Guidelines:

Chapter 1: Introduction or How to use the manual

At the beginning of the Training Guidelines is the introductory section where is provided all the necessary information on the way that this manual can be used in order to train the e – professionals in the cultural area.

Chapter 2: Basic Principles to facilitate learning events

The subchapters from Training attitude to Checklist give some tips for designing, implementing, evaluating and adapting the learning process for e-Culture functions and professions. They also contain a brief introduction of the assessment process.

Chapter 3: Role Profiles

In this chapter are described the 5 Role Profiles along with the reference levels and all the learning outcomes of the different e-Competences[2].

Chapter 4: Methodology of the Training

There are some general suggestions regarding teaching and learning methodologies that are included here. The methodology applied here is described step by step in order to achieve the required results and the desired learning outcomes.

Chapter 5: Assessment of the Training

This section provides a very detailed explanation about different assessment techniques that can be applied by trainers.

Chapter 6: Case Study

The job profile of the Training Guidelines selected here is the Digital Cultural Asset Manager. In the Pilot Training Course prepared for this profile will be described the Course Information, the Five steps

[1] Concerning these reference levels, please read Annex 8.3. and Annex 8.4.
[2] Concerning the learning outcomes, please read Annex 8.1.1. and Annex 8.2.

to prepare a DAM ecosystem, the Training Sessions according to the e-competences of the DCAM along with the learning outcomes for each competence and the methods for assessment. The provided bibliography and useful links to procedure manuals, standards, papers and articles are a great source for the pilot training course.

Chapter 7: References

This chapter contains a list of the relevant literature, referred to this manual.

Chapter 8: Annexes

They contain useful background documentation including the Methodology of defining the learning outcomes for each role profile, the method of writing the Learning Outcomes, the European Frameworks used here (EQF and e-CF), the methodology of training the 14 competences of the profile chosen as case study and General References and Resources for the training module.

The chapter headings have been chosen to provide a first orientation in using the document. It is not necessary to work through the document from beginning to end, rather, different target groups will have different interests and will be more interested in some chapters than in others.
The aim of the Training Guidelines is to provide a comprehensive set of learning units that should be developed by vocational education and training (VET) organizations in the cultural organizations (hereinafter referred to museums) and which are based on learning outcomes.
For each profile, a description of the specific role in an organization context is provided. A description of the suggested learning units structured from an output-oriented perspective is presented, which means that learning outcomes are related to the EQF.

1.1 Background

According to the European Statistical System Network on Culture (2012 October) cultural jobs over Europe represent around 3% of the total employment. Investments in culture show spectaculars results in terms of economic benefits. One Euro invested sometimes results ten times more.

Over the past 20 years due to the widespread of Internet, the intense use of numeric tools and devices, the habits of European citizens have completely changed. This behavioral change had also repercussions in cultural heritage institutions such as museums or archaeological sites. Museums are, by their mission, guardians of the past with a vision towards the future. They convey a picture on arts, culture, history and sociology. They preserve an intrinsic conglomerate of artifacts united in – most often – an unrelated environment. Visitors may simply enjoy the beauty of the objects, or they want to learn about them. But, increasingly with the new digital technologies, they also want to interact with the objects, engage in digital collections (e.g. Pinterest) or become co-curators (e.g. Rijks-Studio). Despite of these developments, only few professionals of the culture sector have been provided training in digital media, even though nowadays it has become indispensible for their day-to-day activities.

The eCult Skills project addresses e-Competences needed in cultural heritage jobs. E-Culture can be defined as digital technologies that help accessing and experiencing cultural heritage content. For example those skills and competences that bring digital technologies to museum collections.

The e-Cult Skills is a project developed within the Leonardo da Vinci Transfer of Innovation Framework. Results are based on analyses performed by the e-Cult Skills Observatory, the e-Jobs Observatory, and the partners involved in the project. The project was brought to life and has been funded by the Leonardo da Vinci Programme of the European Commission. It has been carried out by organizations from six European countries (Greece, Germany, Slovenia, France, Portugal, EU). In the framework of the project, the partnership has conducted extensive research in order to define the key *knowledge, skills* and *competences* that will be demanded in the near future in the Museum and ICT job market.

The consortium collaborated closely with museums, training institutions as well as policy makers and experts in the field of digital jobs in the cultural sector so to determine a consensus on the training needs in this field at the European level. On this basis, a compendium of five (5) European Specialist Profiles has been defined, which are included and described in the present training guidelines.

Five (5) e-Culture role profiles[3] have been identified as future essential roles bridging the gap between Culture and digital technologies:

- Cultural ICT Consultant
- Cultural ICT Guide
- Digital Cultural Asset Manager
- Interactive Cultural Experience Developer
- Online Cultural Community Manager

The objective of this document is to point out the most important knowledge, skills and competences to fulfill the professional roles described by the eCult Skills project.

The essential point is how the learner/apprentice/professional is able to apply those qualifications in terms of knowledge, skills and competences in his/her daily tasks to support the development of the organization.

These abilities can be learning outcomes from trainings, work experiences in similar jobs or tasks, or outside working life.
For this reason this document does not provide a step – by - step method for learning. In other words:

- It is not a collection of recipes
- It is not a “fill in the blank” type of guide
- It presents some approaches and examples to arrive to a determined learning outcome

All outcomes provided by this document are the results of market analyses, based on desk and field research which means interviews and surveys with professionals, recruiters, museum employees, trainers that allowed us to have a clear vision of the skills, knowledge, competences needed in the museums field. Through the research we would be able to identify and fathom how those tasks are fulfilled in companies and organizations in Europe. This lead us to define accurate role profiles in

[3] We always speak about e-jobs role profiles and not e-jobs professional profiles.

accordance with job market needs and to issue, with those Training Guidelines, an example of approach on how to train the knowledge, skills and competences needed.
This document is usable not only for initial training but also for long life training. Each learning unit suggests what are the learning outcomes that should be achieved by a professional in order to be qualified for these 5 e-culture job roles in the European labour market. And the question here is who can really benefit from this document. In the following section we will learn about the groups targeted for using this manual.

1.2 The Target Groups

The Training Guidelines are geared at the following persons or institutions in the area of cultural heritage:

- Training organizations that train professionals in the field of Culture.
- Cultural organizations
- Companies active in the creative sector and their employees
- Students and professionals in the cultural sector

The guidelines help the Training organizations to identify the levels required by the job market, in accordance to European reference levels, derived from the e-Competence Framework, issued by the European Committee for Normalization. The e-Competence Framework is based directly on the European Qualification Framework. The Vocational Educational Training organizations (VET) are interested in adapting their training offering to the emerging market needs for new fields at European level and which, at the same time, desire to be more competitive in the market. This manual will support the VET institutions in tailoring their training courses.

Cultural organizations such as museums or creative institutions can identify and compare the competences required in their organization, and define the level reached (by training or experience) by their employees. Furthermore, the Training Guidelines help the museums to define the training needs for their employees. Also, support the cultural organizations in hiring or dealing with trainers who will upgrade the skills of the employees. These guidelines also help them to identify and to define external competences need the museum professionals so to recruit new skilled staff.

Students or professionals in the cultural sector have the ability to compare their competences to the ones required at the job market. They can identify their training needs to reach the levels required and identify the training organizations able to upgrade their skills so to be able to answer to the needs of cultural organizations and thus be sufficiently qualified for job positions in the sector.

In general, the Training Guidelines present relevant information for all the stakeholders interested in finding out which knowledge, skills and competences are required to succeed in the labour market in the field of ambient assisted living across the European Union (EU).

2 Basic principles to facilitate learning events

2.1. Purpose

This chapter aims to raise awareness about designing, implementing, evaluating and adapting learning processes for e-Culture functions and professions in accordance to European Quality Assurance in Vocational Education and Training *(*EQAVET) recommendations[4]. The purpose is to be able to answer the following questions:

- How can you determine the level of your participants before the learning process?
- How can you plan and manage the learning process?
- How can you evaluate and restructure the training process?

2.2. Introduction

Ed Mahood (Dekra Akademie 2011) defines the training process as *"all activities that are undertaken to enable a person to know tasks well".* By essence, the trainer or the facilitator has a basic understanding of the process and is able to assess and to select the most effective approach for a given situation, in order to reach the targeted outcomes in line with each trainee's situation, and the working position the trainee will have at the end of the learning process.

The training process is successful when:

- Participants have been involved in defining and refining their own learning objectives.
- The content is coherent with real problems faced by participants in real working situations.
- Meaningful evaluation and feedback are provided to participants and to training team.

The training process could not be designed effectively if we did not take into consideration the prior knowledge or experience of the trainee, the so - called "training behavior".

2.2.1. Training attitude

In many cases little attention is paid to the relevant experience and attitude or behavior of participants in order to select a learning program. It is important to bear in mind the following points:

- Which are the required skills to enter into the training program to maximize chances to benefit from the training?
- Which personal characteristics can impact the success of the training process?

[4] The recommendations can be found at the website of the EQAVET: http://www.eqavet.eu/gns/home.aspx

*"*Entry behavior includes the prerequisite knowledge, attitudes or skills which the learner already possesses that are relevant to the learning task or subject matter and that you may require learners to demonstrate **before** beginning your module. This includes previous education and experience that the student brings to the new learning context. The ultimate goal of the module being to advance the learner from where he is (entry behavior) to where you would like him to be (having mastered the learning objectives or terminal behavior)."*

(Russell, 1974, p. 65)

2.2.2. Key questions

Exept for the basic questions, there are some key questions addressing to the profile and the background of the participant and facilitating the designing of the learning process :

- Which are the specific skills that the participant must be able to do in order to benefit successfully from the training?
- Which are the characteristics of the participants of the training session?
- In what are they interested?
- What are their motivations?
- Do they have specific concerns or specific problems?
- In what language can they follow the training?
- How much time can they dedicate to this training session?
- Which practical organization do they have to manage to participate in the training?
- Will the participants use/practice the learned skills/competences right after the session?

2.2.3. Warning

There are also important notes to give attention at when design the learning process! First, the pre-requested knowledge, skills and competences are essential to be communicated to students. And, it is important to check if their abilities correspond to their needs. If you do not precise what is needed to succeed, students can assume that they are able to participate successfully, when in reality they cannot. This may lead to fail to reach the aims of the training for them. Also for the others, they can be delayed, in their progression, and a bad atmosphere is also often the consequence.

A diversity of experiences and backgrounds is an advantage, and can foster critical thinking and creative problem solving. One of the critical issues can be to overregulate entry requirements, but at the same time, admitting students who cannot succeed leads to frustration and failure.

Asking trainees to express some special moments from their working life where the situation corresponds to the learning outcomes, is an advantage to increase motivation and interest in the training. This can be the subject of the first training session. Asking them what they lack in the topic, and what they know. Support from other trainees is a good way to integrate everyone and to start to reach your goals.

2.2.4. Learning sessions

A learning session is any planned and organized event, aiming to the fact that at the end of learning procedure, the trainees will be able to implement the learning outcomes in their daily environment.

During the session the trainees learn necessary knowledge, skills, attitudes and behavior so to improve their abilities and fulfill designed tasks. The designing of a learning session is followed by specific rules and principles.

2.2.5. Principles and practices

When designing a session you have to start by identifying the learning outcomes that you are targeting. These learning outcomes are in line with participants' needs and expectations and are related to the individual's and the organization's roles and objectives.
Objectives must be achievable, realistic, measurable, encouraging and a realistic timeframe so to reach these objectives.

Important principles concern: involving the learners actively in the learning process, adjusting participative learning methods that allow interaction, integrating knowledge, skills and competences developed by the other learners, supporting the sharing of experiences through discussions, group sessions, real-life situation examples, cases studies, role plays, problem solving individually or in groups.

Take into consideration on how the learners will be able to put into practice what they learnt. If it will not put into practice, and if the learners will not encouraged doing so, the learning session at the end will be a waste of time and money for the trainer.

2.2.6. Reminder

There are some essential subjects when applying a training method. Here are six important points for selecting the proper training method:

1. Consider which the learning outcomes you target. Are they new skills, new technology, novice techniques for old skills, different workplace behavior?
2. Check the method you want to use, and if it is coherent with the learning outcomes you target.
3. Consider the participants' experience and expectations. Who is trained: New employees, short time employees, upper management, etc.?
4. Consider your personal skills as trainer/facilitator.
5. What is your training budget? And which resources, facilities are available? Can you implement that will bring added value to reach your objectives? Your time and the time of your students have to be considered for the budget of the session.
6. Even if you use a variety of methods, do not overload your student.

2.2.7. Assessment

Even though some professionals make a difference between assessment and evaluation, we consider that the difference is very small and is based mainly on cultural differences. So in this document we consider these terms as synonyms.
The assessment process starts with the conception of a training session and involves planning, discussion, consensus building, measuring, analyzing, and improving in accordance with learning objectives.
First of all there are no cookbook recipes for the evaluation of training, in some situations an approach can be valuable whereas in another situation (or person) it does not fit.

Evaluation has to be set up in accordance to:

- Learning justified objectives
- Learning outcomes (including level reached at the end of the training process)
- Participants
- Communication
- Timing
- Framework to be used
- Financial sources

The objective of the assessment is to measure how the trainee is able to apply and to use what s/he has learnt, and to compare it with the targeted level defined before the learning session. This can be done through exercises or through a well prepared discussion.
The most efficient way is to investigate real working situations and analyse how the trainee used what s/he has learnt.

2.2.8. Helpful tips

Six essential points have to be implemented to assess a learning session:

1. Plan the evaluation from the beginning of the preparation of the session.
2. Be clear about what you want to evaluate.
3. Check that all feedbacks from participants are clear and comprehensive.
4. Allow participants to give their complete feedback (positive or negative), including recommendations for future exercises.
5. Select the appropriate form for evaluation: Concept maps, interview, questionnaires, exercises, role plays, focus groups, checklists, etc.
6. Evaluate the whole learning process and not only a single training event.

2.2.9 Checklist

Use this checklist to help evaluate how you have structured your training:

Has the training plan taken into account what the participants need to know and do as a result of this training?	Yes ☐ No ☐
Do you know what 'good performance' is, in other words what a good performer should do according to the Role Profile?	Yes ☐ No ☐
Do you know what gaps exist between of what these providers know and of what they need to know so to carry out their roles successfully?	Yes ☐ No ☐
Will training help fill this gap?	Yes ☐ No ☐
At the outset, does the proposed training method meet the skills, knowledge and attitudes (learning objectives) to be taught?	Yes ☐ No ☐
Do you actively engage participants in their learning experience through discussion and a variety of activities?	Yes ☐ No ☐
Do you encourage participants to share their expertise and experiences with others in the training?	Yes ☐ No ☐
Have you built in adequate evaluation to assess the training process, the participant learning and application?	Yes ☐ No ☐

2.3 Conclusion

No matter if you are an experienced trainer or facilitator, or new to training or lack experience in facilitating learning, there are many issues that need to be carefully considered:

- The participants with the specific five role profiles and their backgrounds,
- The reasons: why are you going to do the training and what do you want to communicate, which learning and assessment methods might be the most appropriate for the workshop that you are planning

3. Role Profiles

The main table of the Role Profiles contains the following information[5]:

- *Name* of the Role Profile with some alternative role names.
- The *Summary Statement* presents shortly what the professional will do in her/his function[6]
- The *Mission* is a resume of the role of the professional in the organization.
- *Deliverables*: are the main issues the professional have to deliver in his role.
- *Main tasks* present what the professional will perform in a cultural organisation.
- *Environment* describes in which context the mission is fulfilled.
- *KPI* describe the Key Performance Indicators of the role in the organisation.
- The table with the e-competences needed in the role profile in detail.

For each Role Profile correspond the proper e-competences, as it derives from the content of the e-competence described in the e-CF. Apart from the generic description (in Dimension 2), there is given the level of demonstrating this competence (Level 1 -5) (in Dimension 3) and the relevant knowledge and skills (in Dimension 4).

The main table is followed by the learning outcomes of each learning module. In order to prepare training sessions, we need to define first the learning outcomes of the training and the appropriate assessment methods.

Each training course is specific to role profile and aims at enabling the trainees to the knowledge and skills described in that role.

3.1 Role Profiles ⇔ Job Profiles

We noticed that each job profile in an organization, company, public service, museum, cultural organization, etc. is a mixture of different roles. For example: the Community Manager of a museum is often also a marketer, a manager of the organization, a guide, etc. An employee in an organisation can have different roles even if the job is named differently. For example, in the same way a cultural guide can also be curator and can have different tasks in the organization.

When we analyze a role profile we concentrate on the role itself, on the mission, which is the heart of the task devoted for this role. Of course the professional can have other tasks and roles in his/her job profile as well.

We found out from the analysis that in most cases, especially in small structures, the job profile is a mixture of different roles profiles and each organization mixes the roles differently. Each organization has its own mix depending on the internal organization, on the experience of the organization and on

[5] For the table for each of the 5 Role Profiles, please read the Annex 8.1.
[6] Warning: Role profiles are not jobs profiles, an employee in an organisation can have different roles, even if the job is named differently

the employees, on the experience and the training of the professionals available in the organization, and on the professionals available on the job market. In the next subsection will be analyzed the levels of EQF and e-CF applied within the project.

3.2 Reference levels

Each EU Member State has its own reference level to define trainings at both, academic and lifelong learning levels. This document does not refer to a national training or educational framework that rarely can be compared to another one. At European level, the European Qualification Framework (EQF) is a common reference and each national education framework is related to EQF.

Also, some of the European frameworks are related to the duration of the studies, while the European Qualification Framework is based on the learning outcomes and not on the learning content. At the end of the learning process, the outcomes can be described with specific Knowledge, Skills and Competences. The European Qualification Framework has 8 levels starting from level 1 (basic) to 8 (high level expertise).[7]

Since 2003, the European Committee for Standardization[8] (European Committee for Normalization - CEN) has been working with professionals and trainers to issue a common reference for ICT related skills, since companies and organizations need benchmarks to assess the ICT-related skills of their (current and potential) employees. Standardized definitions of skill levels are useful for various stakeholders such as: managers and Human Resource departments in companies and other organizations (in both the public and private sectors), training providers and educational institutions (including higher education), as well as for researchers and policy-makers.

The e-Competence Framework – eCF is directly derived from the EQF and its descriptors are directly adapted to ICT related skills. To describe the e-Culture role profiles, we adapted the e-Competences Framework to the specific field of e-Culture. The e-CF has 5 levels directly related to the 8 levels of the EQF. The levels 1 and 2 of the EQF are not appropriated in the ICT field as they represent very basic Knowledge Skills and Competences, also EQF level 4 and 5 are implemented in the same eCF level 2.[9]

e-Competence Level	EQF Level
5	8
4	7
3	6
2	5 and 4
1	3

Figure 1. The 5 e-CF levels related to the 8 levels of EQF

[7] For more information about the EQF see in Annex 8.3.

[8] Comité Européen de Normalisation CEN (in French). The website of CEN : http://www.cen.eu/Pages/default.aspx

[9] For more information about the e-Competence Framework issued by CEN see in Annex 8.4.

A brief description of the tools used here, the EQF and e-CF is given below.

3.2.1 The European Qualification Framework (EQF)

The European Qualification Framework has been issued at the beginning of the century to allow comparability of qualifications at European level. The traditional way of training was based on content and at the end of the training session, the level fo knowledge was evaluated. The employability and the identification of training needs are done in companies, in a mix between Knowledge, Skills and Competences.
The EQF has set up 8 levels to be used to evaluate the level of knowledge, skills and competencies. The descriptors for these levels are quite simple and allow to evaluate autonomy and the ability to integrate all the missions of the organisation, and his long term objectives. EQF is not specific to any activity in the labour field but is adaptable to all fields.

3.2.2 The e-Competence Framework (e-CF)

This European Framework has been issued as an application of the EQF specialised for the IT field.
Several essential abilities and learning outcomes have been identified by the CEN/ISSS (European Committee for Normalisation to issue a Information Society Standardisation System) and defined more specially with IT and ICTC jobs and trainings.

The European e-Competence Framework (e-CF) provides a reference of 40 competences as required and applied at the Information and Communication Technology (ICT) workplace, using a common language for competences, skills and proficiency levels that can be understood across Europe.

The definitions of competences and levels are mainly generic, and for example do not deal with technical tools, but the ability to perform working issues. It does not matter which software is used. Fit is important or example for a graphist, to design an outcome, e.g. to develop an image for the organization which supports sales, company's reputation etc.

In the e-CF, the terms are quite generic to be used by all professions.

The aim of the eCult Skills project is to adapt descriptions of outcomes, and levels to the more specific role functions in the cultural field. Of course the results of the eCult Skills project have to be in line with the EQF and e-CF. They need to be generic for all functions needed in the cultural field.

The role profiles are presented with several items in 4 dimensions according to the e-Competence Framework structure.

- Dimension 1: is the e-Competence area, Plan, Build, Run, Enable, Manage.
- Dimension 2: is a generic explanation of the competence
- Dimension 3: explains the proficiency level through a descriptor, which is different for each level reached by the professional.
- Dimension 4: contains some examples to understand better the role profile in this item.

4. Methodology of training

From the job market needs analysis, we comprehend that for each Role Profile are requested specific e-competences and e-skills so to accomplish the demanding tasks and be competitive in a European level. The Training Guidelines provide a significant manual to show the way on how to adapt the European Frameworks and the related levels during the training of the future cultural professionals. It is an essential handbook to use in order to attain the characteristics of those five Role Profiles along with the required skills and competences.

Here, is described the methodology followed so to plan and manage a training programme for the Role Profiles. In order to prepare the training sessions, we need to define first the **learning outcomes** of the training and the appropriate **assessment methods**. In other words, we need to define what we want the trainee to learn in order to achieve the qualifications (knowledge, skills, competences) described for each role and how we evaluate this training procedure.
Each training course is specific to a job role profile and aims at enabling the trainees acquire the knowledge and skills of that role[10].

Based on the above, the methodology for preparing training sessions for a job role consists of the following:

1. Create a table showing the occurrence of each competence across job roles
2. Define the respective learning unit/ outcome for each competence in the job role
3. Compose training guidelines by collecting the definitions of the learning units
4. Adapt the resulting training guidelines to the scope of the job role
5. Assess the whole training procedure

The proposed methodology is based on the consecutive assumptions:

1. Learning units are modular;
2. Training modules (input oriented – considering training material, methods, approaches, tools) can be based on one or several learning units (output oriented – describing the core outcomes to be achieved by the training)
3. A separate learning unit will be described for each competence that is part of the definition of a job role targeted
4. The learning unit will take into account all core learning outcomes in the corresponding competence area, as they appear in every job role related to this competence
5. A set of assessment techniques shall be defined for each competence area (and thus each learning unit)
6. The training process can be synthesized by selecting the learning units for the competence areas. It contains the corresponding assessment techniques and adapts them to the scope of the job role.

[10] Job role descriptions are based on the notion of e-competences and the proper level each time (the higher level 4 and 5 is for expertise/ for the more specialized professionals).

In the following chapter[11] of this manual is given a more analytical description and even the precise steps of the recommended methodology that you will be able to understand and apply in any case. As case study of the methodology of training a job profile, is presented the paradigm of Digital Cultural Asset Manager.

[11] See in chapter 6.

5. Assessment of training

The role profiles designed within the eCult Skills project have been elaborated starting from analysis of the job market and corresponding to the companies needs which are suitable for the majority of the organisations. Nevertheless, according to the market, the history and culture the role profiles may vary from one organization to another.
Defining an assessment method adaptable to all organizations and to different role profiles is pivotal. The proposed methodology is a global approach for assessment, suitable for the selected core learning outcomes for the roles profiles. They can be adapted to other roles profiles and other learning outcomes that the organization may consider essential too.

5.1 Objectives of the assessment

The assesing part is the most essential and crucial part of the learning porcess. Therefore, it should be assesed the level reached eventually by the learner at the end of the learning session. The assesment prosess is important for these reasons:

- ✓ knowing if the knowledge, skills and competences trained during the educative sessions have been well adopted by the learners and if the learners are able to use or adjust them in their working life. This helps the training team to identify the points that should improve when designing the training process
- ✓ is in accordance with the EQAVET recommendations
- ✓ in case of a certification, a diploma or a success evaluation at the end of the training issued by the training organization, the objective is that the recognition of competences is clear, understandable, and corresponds to the recruiters needs
- ✓ recruiters cannot know all training organizations that deliver trainings programs
- ✓ the evaluation is credible for the recruiters
- ✓ is an essential tool to allow learners to know at which point they need to improve to the required level so to enter successfully to the job market.
- ✓ for human resources management,, assessment of employees is essential to manage the company, to make valuable teams, where competencies are well organized.

Regular evaluations and training updates are essential to maintain accurate knowledge, skills and competences on the long term inside organizations.

5.2 Bases of the assessment

The objective is to define the level that the learner has reached at the end of the training session and at which level he is able to implement it in his working life, in the context of a cultural organization, in accordance with organization objectives, in the market context.

At the end of the training session, the level reached by the learners has to be evaluated with the following sentence: if the learner is able to fulfill the tasks described in Dimension 2 of the role profile and at the level described by the descriptor of Dimension 3[12].
The aim of the EQF is to evaluate how the learner is able to implement his knowledge, skills and competences in the daily work, not matter in which learning environemnt (formal, informal/ training by experience) it has been acquired. It is necessary to define if the learner is able to implement his abilities at level 2, at level 3, 4 or 5, or if he is above or under the descriptors provided.

The ideal is that the trainer(s) and the learner agree on the level reached. If they do not find an agreement the level attributed is the lower of the ones proposed by the trainer and by the learner. On this level there is an agreement where the learner and the trainers agree that the learner is able to implement this in his working life. The assessment is based mainly on the descriptor of the dimension 3[13]. The dimension 3 descriptor has different formulations according to the level targeted. There are degrees in the descriptors, to pass from one level to the next one, there is more knowledge, more autonomy in the exercise of the proficiency, more agility, more ability to drive other teammates and this is what has to be assessed during the process.

5.3 How to evaluate the levels?

The most efficient way is to arrive to an agreement on a level for a learning outcome between trainer and a learner is to follow specific techniques. Since we are dealing with competences in the working field, we need to place the assessment in the working context.

For this reason there are different possible tecniques such as:

1. <u>The Case study</u>

Define a case study in the context of a cultural organization. Define which style of organization, the market, the team, what was done before, which are the constraints, the competitive advantages, the brakes.
When the whole context is well described, the learner has to explain what s/he will do, how s/he will do it, using which tools, using which resources in the organization or external resources.
This can be a written exercise or an oral explanation.

At the end of the exercise the learner and the trainer make a level proposal, and explain why they chose this level. They discuss for a few minutes the evaluation. If they arrive at an agreement this level can be certified. If they do not agree the certified one is the lower one as the common denominator. (A third party, another trainer, or an experienced professional can be involved to determine the final level, the process has to be clearly defined before the beginning of the training)

[12] We take into account the highest level that the learner can perform effectively. Dimension 4 consists of non-exhaustive examples of knowledge and skills for this e-Competence (Dimension 2).
[13] We remind that Dimension 3 explains the proficiency level through a descriptor, which is different for each level reached by the professional.

2. The continuous evaluation

During the training session, different situations were used as exercise, there were also group sessions, collaborative reflexions etc. We can consider these examples as case studies as well.
For the evaluation the process is the same as with the case study mentioned before. Both learner and trainer set up a level, they discuss why they selected this level. If they agree on a level, they can both certify it, if they do not agree the lower is taken the common denominator. (A third party, another trainer, or an experienced professional can be involved to determine the final level, the process has to be clearly defined before the beginning of the training)

3. Multiple choices evaluation

Taking into account a contextual situation, different actions are proposed and the learner selects the appropriate one(s).
Then the learner and the trainer evaluate the good decisions and the bad ones and determine to which level they refer.

4. Questions/ Answers

Especially for knowledge purposes it is possible to set up some questions asking the trainee to give an oral or a written answer. Then the answers are evaluated and discussed between trainer and learner. The process is the same with agreement on a level, or the lower is selected, always with explanations.

5.4 Resume

This methodology is suitable to evaluate all learning outcomes, no matter if they are part of the selected core learning outcomes or not. They can be used according to the context and the constraints of the organization selected. All learning outcomes that are important for the recruiter can be adapted.

It is essential to set up well the context to allow learners to choose the appropriate decisions.
Explaining why a level is chosen by the trainee or the trainer is important tin order to allow a good understanding of the trainee and to allow him/her to progress in efficiently implementing his/her knowledge into the working environment.

If the context is well defined and the process is well designed it is possible to evaluate different learning outcomes at the same time. This is why we do not propose a different assessment method for each learning outcome or each role profile.

This methodology is suitable for all learning outcomes in each role profile. Even additional learning outcomes which might appear to be essential, not yet listed in the core generic learning outcomes, can be evaluated with this methodology.

5.5 Example of evaluation

For a better understanding of this document, we will set up a case study and show for the role profile, the related learning outcomes and the results of the training session on how to be analysed and evaluated.

For this reason, every time during the training process, the evaluator, as well the trainee, has to answer the quiestion: is the learner able to ….. (using learning outcome descriptor)?

If the learner is not in a familiar situation, we try to place him/her in a context where the learner has enough references (local museum, a museum he/she knows better). We take the example of a museum, in the region or the city that s/he knows well. We set up the case by defining the context and giving him useful data such as:

- The size and history of the museum, the organisation, the amount of the employees working in the museum, the subcontractors, the partners, the way the services are organised and we define the employees with whom s/he is in contact.
- The objectives of the museum, the long term objectives defined by the director, management board, funding organisations (city, region)
- The visitors, structure of the audience, any problems or weaknesses of the museum, competitive advantages
- The mission of the museum, any stategy supported by the director and the tools, budget, supports/ funds

We ask from the trainee to design and a management plan for the museum, taking into account on the information given and make his own best suggestion based on a SWOT analysis, and the lesson taughted. Then we analyse the learner's proposals and we evaluate them if they are in line with the learning outcomes of the role profile.
In the evaluation process, it is essential to evaluate not only what has been trained but also other (previous) experience of the trainee. Non formal and informal training as well results of working experience that has to bear in mind. What is important is the learning outcome level reached by the trainee at the end of the training.
For a better understanding and application of the methodology described here, we selected a profile from the 5 e-culture job profiles developed within the eCult Skills project.

6. Case Study of the Digital Cultural Asset Manager: the pilot training course

Here, is selected the profile of the Digital Cultural Asset Manager as case study for the Training Guidelines. It will be an analysis of the profile and the qualifications needed, focusing on how we can apply the methodology described, during the training of this profile and how training course would be deployed from design to implementation.

6.1. Course information (Aims, Course Type, Target Group, Content Summary)

- Aims

The digital cultural asset manager or digital curator pilot training course aim is to give an introduction on how to plan, build, run, manage an enable a DAM ecosystem in the cultural sector.

- Course type

  This pilot training course is an online self-training course that will include the monitoring of a tutor. The materials and resources were gathered from leading research centres and industry tools providers.

- Target group

The learners interested in this course should have some experience dealing with collections from cultural institutions like museums, archives or libraries. They should easily recognize and interpret a collections management policy and know the basic procedures about physical collections management and documentation. Knowing the essential documentation standards published by ICOM, ICA and IFLA is also important.

They also need to have some basic skills to deal with technology issues like file formats or digital preservation and to deal with tools like metadata editing applications or digitalization hardware and software.

- Content summary

This pilot training course, was built according to the Digital Cultural Asset Manager profile specifications developed by the eCult Skills project (http://ecultskills.eu), and available at http://www.e-jobs-observatory.eu/role-profiles/digital-cultural-asset-manager, will focus on the different e-competence areas described at the detailed profile specifications. These e-competence areas are:

1. Planning;
2. Building;
3. Enabling;
4. Running;
5. Managing.

In the course we will introduce this areas first and then we will learn about the specific competences included in these main areas, identifying each competence with the correspondent area (in brackets after the title). The competences that we'll work in this course are:

- Digital Asset Management Plan Development (PLAN)
- Product/Service Planning (PLAN)
- Technology Trend Monitoring (PLAN)

- Innovating (PLAN)
- Documentation Production (BUILD)
- Purchasing (ENABLE)
- Information and Knowledge Management (ENABLE)
- Needs Identification (ENABLE)
- Service Delivery (RUN)
- Problem Management (RUN)
- Forecast Development (MANAGE)
- Risk Management (MANAGE)
- Relationship Management (MANAGE)
- Digital Asset Management Quality Management (MANAGE)

For each competence the learners will have a introduction about the competence and its needs and then the more important topics on the competence subject will be presented as guidance for learning. For each competence we'll have specific learning outcomes and assessment methods and a list of resources helpful to the subject in hand.

Each competence will have, as well, a list of keywords that allow learners to search and organize the course according with his/her expectations, preferences and needs.

6.2. Introduction

Digital Asset Management is, as defined at the DAM Glossary[14], "a collective term applied to the process of storing, cataloguing, searching and delivering computer files (or digital assets)." These assets may be presented in different forms such as audio, text, images, fonts, 3D models, software, code, etc. and they represent a vital part in the information society that we live in.
Nowadays the production of information is massive. As Eric Schmidt (former Google CEO) said at the Techonomy conference, in 2010, "Every two days now we create as much information as we did from the dawn of civilization up until 2003. That's something like five exabytes of data". Although these impressive number can (and should) be minimized by the amount of information that isn't useful or that represents the information that is deliberately deleted by their authors, just to cite two possible examples of non reusable information, we must prepare (ourselves and the institutions that we work in) to this new scenario. To do so we need to plan and create digital strategies that can cope with the amount of information created, providing us the tools to capitalize the efforts and investment made. In the cultural sector, these digital assets, or cultural digital assets, often are digital representations of the physical collections, but in many cases they are digital born content such as computer programs, digital art, interactive media and many other kind of digital information delivered by museums, archives and libraries to their audiences. These digital collections have their own rules, organization, legal context and specifications that must be addressed in a specific way by the (Cultural) Digital Asset Manager, or Digital Curator.

[14] See http://damglossary.org for more information.

At the end of this course you should be able to plan, build, run, enable and manage a cultural institution's digital asset collection using the most suitable tools to deliver your audience (external and internal) the appropriate deliverables.
To accomplish that objective this course will guide you through the basic topics at the cultural sector concerning digital assets management. Along with many other topics, we'll cover digital strategy definition and development, standards, DAM systems specifications at the cultural sector, information reuse (see more about COPE – Create Once, Publish Everywhere NPR concept at:http://www.programmableweb.com/news/cope-create-once-publisheverywhere/2009/10/13) or legal context concerns in Europe.

What is a Digital Cultural Asset Manager according to the profile developed in the eCultSkills project?
Also known as Digital Asset Manager or Digital Curator he "deals with the preservation, management and exploitation (incl. monetization) of the born-digital or digitized cultural content in a museum or other cultural institution (hereinafter referred to only as museums), whether in a physical or virtual space". His mission, according once again with the role profile, is to undertake the design, administration, and exploitation of a digital museum collection as defined in the museum mission and strategic plan.
Although this specific function doesn't exist yet in the majority of European museums, we think that the technological development and massification of new technologies, along with the public awareness about our cultural heritage, will provide the "perfect storm" within medium and small size cultural institutions to change this situation and create or include in their organization chart this job profile.
Nevertheless, many museums and cultural institutions, facing the needs of the actual information society, have already developed and created new strategies and approaches to this subject with the participation of professionals having the competences described in this profile. For example you can see the (most acclaimed) work of Amsterdam Rijskmuseum at the Museum Online Collection (https://www.rijksmuseum.nl/en) and read more about at the museum work in a text entitled "Democratising the Rijksmuseum" by Joris Pekel for the Europeana Foundation available at:http://pro.europeana.eu/files/Europeana_Professional/Publications/Democratising%20the%20Rijksmuseum.pdf.

What is expected of a Digital Cultural Asset Manager according to the profile developed in the eCultSkills project?
The fast and continuous technological advances that are taking place since the last decade have radically changed the way that museums and their professionals deal with the digital information created in these institutions, i.e. the digital assets which now can be seen as a museum collection. A digital collection that needs, as the physical one, a structured and detailed collection policy and that can be used by the museum for its purpose.

Thus, the competences for a Digital Curator described in this job profile define the tools that will allow him to accomplish the following tasks:

1. organize of the digital cultural collections, after selection and classification, to facilitate the collections' discovery, access and use;

2. preserve the digital cultural asset according to international standards (format transformation, hardware/ software emulation);
3. explore, use (incl. monetization) and provide access to the digital content/objects in terms of functionality, technical feasibility and reliability (methods of access, authentication, compatibility) and monetization;
4. protect and safeguard the museum digital collection (copyright, watermarked content, cryptography).

He is also responsible for:

1. the sustainability and operability of the digital product assets – operational maintenance of the digital assets;
2. advice the museum management on improvements in all aspects regarding the digital asset collection.

And should be an active contributor for:

1. Usability analysis (DAM System, website, social networks, etc.)
2. search engine optimization;
3. Competitor benchmarking.

The course will guide you through some documents, manuals, resources available online (other courses, webinars, etc.) that explain the fundamentals of the described competences.

6.3. Five steps to prepare a DAM ecosystem (Plan – Build – Enable – Run – Manage)

This training course, as referred above, is organised according with the Digital Cultural Asset Manager profile specifications developed by the eCult Skills project.
In this profile there are 5 different e-competence areas that encompass the specific competences needed in the Digital Cultural Asset Manager profile. These areas represent the five essential steps to prepare your museum to adopt and embrace a DAM system as a vital tool for managing the digital collections helping to fulfil the institution mission.
In this course chapter we'll introduce these steps as guidance for the learners to acknowledge the major implications of a DAM system implementation in a cultural institution. These five steps can be used, according with the learners needs, globally as a starting point to learn about DAM or one by one if the learner is interested in a specific issue, like for instance, purchasing a DAM system.
In every case these steps must be used in this course as references for each competence and as guidance for the DAM ecosystem organization.

Plan

The first thing to do, since your institution wants to manage the digital asset collection, is to prepare your organization for the needs and specifications of that combination and the new tasks. Each sector has its specific needs and the Cultural sector makes no difference.
Therefore, in order prepare yourself to develop an appropriated plan to manage a digital asset collection in this sector you need to know the challenges and outcomes necessary for this

accomplishment. To do so, you can read the "Digital Asset Management Systems for the Cultural and Scientific Heritage Sector" published by the DigiCULT Consortium. This thematic issue is available at : http://www.digicult.info/downloads/thematic_issue_2_021204_low_resolution.pdf(PDF)
and it will give you the basics about the importance of digital asset management in the sector. The articles entitled **"How Do Cultural Artefacts Become Digital Assets?**" Michael Moon and **"DAMS versus CMS"** by Norbert Kanter are essential for the work that you'll implement.
You will find, in this resource, a helpful bibliography (cf. **"Selected Literature"** at page 38). We recommend for further reading the book **"Defining the DAM Thing: How Digital Asset Management Works"** by David Doering.
At the DigiCULT Consortium website is also available some helpful resources (http://www.digicult.info)

Another essential resource is the text **"Digital Asset Management and Museums - An Introduction"** available at the Canadian Heritage Information Network (CHIN) resources repository : (http://www.rcip-chin.gc.ca/contenu_numeriquedigital_content/fiches_techniques-tip_sheets/gestion_contenus_numeriques-digital_assets_management-eng.jsp).
In this short article you'll find a short introduction to the DAM in the museum sector and some references to other documents.

Knowing the specific details and needs of the Cultural sector concerning DAM is a primary subject in this course, but you also need to acknowledge some important basics about museum management. Although this course does not intend to address museum or cultural institutions management issues we think that is essential for a digital assets manager to know how DAM can be implemented in this kind of organizations.
The cultural sector has a significant and old tradition regarding the documentation and management of collections. This tradition implies a significant (and continuous) effort in research and development of new tools, standards and procedures with the introduction of new technologies. An UK institution, the Museum Documentation Association (MDA), now known as Collections Trust (CT), made a significant effort developing SPECTRUM, a UK based Collections Management Standard that is used by more than 20.000 institutions in more than 40 countries.

Within the standard CT has been developed a framework that is based on the museum mission statement and the collection management policy as the basic documents to be implemented in an appropriate collection management system that assure the right procedures for:

1. Collections development;
2. Collections information;
3. Collections preservation (physical and digital);
4. Collections accessibility.

The SPECTRUM standard is available for download at the Collections Trust website. The direct URL is: http://www.collectionstrust.org.uk/collections-link/collections-management/spectrum.
Alongside with this standard CT, has been published recently the SPECTRUM DAM. It is a companion document created as the best practice guideline to integrate digital asset management into an existing Collections Management practice based on (or compatible with) that standard. This document is also available online at :

http://www.collectionstrust.org.uk/collections-link/collections-management/spectrum/item/1688-spectrum-digital-asset-management.

Taking into consideration the specific needs of the cultural sector is time to prepare and develop a plan to implement DAM in your institution.

For specific competences in this step please see:
Digital Asset Management Plan Development
Product/Service Planning
Technology Trend Monitoring
Innovating

Build
Although every single institution on a DAM implementation process has to follow the same rules, standards and legal issues, there are specific issues and needs that must be addressed in a different manner, according to the institution singularities.
To accomplish that objective the digital asset manager should, according with DAM plan, create and establish supporting documentation that enables planning the ecosystem with functions and features defined previously. In the same way the digital asset manager should prepare and maintain specific manuals that enable the museum personnel to be productive with the tools at its disposal.

These documents provide a useful tool for the organisation staff and they are normally an requisite for museum accreditation schemas, like the one implemented in the UK (Cf. more information about UK Museum Accreditation Scheme managed by Arts Council at: http://www.artscouncil.org.uk/what-we-do/supporting-museums/accreditation-scheme/).

For specific competences in this step please see:
Documentation Production

Enable
After all the preparation in the previous steps of this course, in this one we'll go through the phases needed to enable a DAM System (DAMS) in a museum.
A good way to prepare you, as a digital asset manager, to be a DAM champion in your institution implementation process is described in an interesting article by James Rourke, published by the DAM Foundation, entitled **"The Role of the DAM manager pre and post implementation"** and available at: http://damfoundation.org/?p=31235.
You can read it and take it in consideration in this step and in the following ones (Run and Manage). Some of the issues explored here are also important and they also should be implicit in the documentation produced by digital curators in the previous phase (Build).

Despite this, we'll also go through the necessary administrative tasks of the procurement process according to the applied legal context and the rules and policies of the museum.

As aforementioned, digital asset management consists of management tasks and decisions concerning the ingestion, annotation, cataloguing, storage, retrieval and distribution of digital assets (Cf. Wikipedia: https://en.wikipedia.org/wiki/Digital_asset_management).
These tasks and decisions are accomplished according to standards, processes and procedures that allow raw data to be transformed into knowledge and therefore accessible cultural information.
In this area we'll detail how to enable the **"Needs identification"** competence. Although the digital assets management tasks are based on standards and specifications common to every institution or digital collection, there are always specific (user, collection or museum) needs that must be recognized and addressed in a DAM system implementation.

For this training course is essential to acknowledge the core characteristics of a DAM system. They will be our guidance through the acquisition and implementation process.
To establish the list of core characteristics to use as a reference, read the list published by the DAM Foundation: **Ten Core Characteristics of a DAM** –
http://damfoundation.org/?page_id=31752.

These 10 core characteristics should be used as the basic criteria for choosing and evaluating the different systems available in the market.

For specific competences in this step please see:

Purchasing
Information and Knowledge Management
Needs Identification

Run
Now that we've established the first steps to implement a DAM system in a cultural institution, it's time to start working with it and we can certify that the system is running and we can preserve it with no (or small) effort. Running a DAM system after planning and enabling a DAM implementation is somehow like a test to the previous phases of your project. If something is poorly planned or if your needs identification is inaccurate, you'll find it out when your system start to manage the digital collection.

Using again the article by James Rourke, on how to be a DAM champion (available at http://damfoundation.org/?p=31235, as a reference) we can say that now, after the procurement and implementation, the digital asset manager is responsible for "a number of additional roles […] which would mainly revolve around evangelism, maintenance and governance."

These roles, added to the prior ones, imply that the digital asset manager needs to address all the maintenance of internal and external relations of the system, certify the use of standards (terminology could turn out to be a chaotic situation if not controlled), verify the workflows against the final results, keep the infrastructure working, manage staff or, among other tasks, act as a central contact point between all the stakeholders (institution, departments, staff, vendor, etc.).

At this point the digital asset manager must be like a beacon for everyone involved. He must be a strong advocate of the strategy defined ensuring that the goals defined have been achieved. To do so it needs to monitor every single aspect of the DAM ecosystem (infrastructure, software, standards, workflows, metadata, search system and deliverables) and settle any rising problems.

A very good resource to use regarding this session topics is the second part of Extensis DAM Best Practices Guide, entitled **"Making the most of your DAM"**, available at: http://doc.extensis.com/DAM-Best-PracticesGuide-EN.pdf.

For specific competences in this step please see:
Service Delivery
Problem Management

Manage

This final step will go through the tasks needed to maintain the DAM ecosystem working and achieving the goals purposed at the strategy, but also to prepare the future digital asset manager in the museum.

One of the biggest problems that museums (and other institutions) face, in this time of constant changes, is system's obsolescence. It's quite common, mainly in small and medium museums, depending on low budgets and unstable financial support or with small and non-permanent teams to implement different kinds of systems, defend the most important ones, and after a few years they became obsolete and need a upgrade. In same cases, quite common as well, the entire system needs to be replaced with a new one, more recent and technologically more evolved. This type of situation might raise issues about loss or damage that will take a great effort and financial resources to be minimised.
In order to prevent it the digital asset manager or digital curator should act as a "prophet" or a person that can anticipate the future based on facts and information concerning different aspects of the DAM ecosystem. In other words, he has to present good research, organisation and analytical skills so to identify potential problems, needs, benefits or trends that can help to maintain or improve the system up and running.

In the cultural sector this means that a digital curator needs to stay focused on, the internal stakeholders' needs and provide them with the right products or services. For instance, the appropriate service or product given to archive users when the microfilm technology became obsolete and expensive, was the digitisation and online availability of that media. Another example is when smartphones and apps became massively used and thus the audio guide systems usually available in museum and galleries where replaced by low budget and rich media interactive apps.
Now some museums can "predict" the future, like the Cooper Hewitt – Smithsonian Design Museum did it with **"The New Cooper Hewitt Experience"**. You can get the information about this interesting project at: http://www.cooperhewitt.org/new-experience/.

You can see how it was possible at this article:
http://www.cooperhewitt.org/new-experience/designing-pen/.

For specific competences in this step please see:

Forecast Development
Risk Management
Relationship Management
Digital Asset Management Quality Management

6.4. Training Sessions

A Digital Cultural Asset Manager is a very specific and important new job profile that was sparked by the massive use of technology and by the context of the information age that we live in. As a matter of fact, the cultural sector nowadays is confronted with audiences needs on information that promote different interpretation and allow the creation of knowledge outside the usual authority institutions like museums, libraries and archives.

This situation is new for museums and cultural institutions, because until just few years ago, they were used to communicate the result of collections research to their audiences, and today, with the actual digital scenario, their audiences require to establish a conversation where their opinion and contribution is welcome. The digital collection (the result of digitalisations processes or the reunion of born digital material) represents a very important part of the museum mission and is essential to ensure compliance with one of the basic museum functions: communication.

To be prepared for this responsibility the digital curator should acquire some competences and skills necessary for plan, implement and manage a DAM ecosystem with the specific needs of a museum or other cultural institutions.

In this area of the course we'll go through all the competences included in the Digital Cultural Asset Manager job profile. The learner can use the different competences to build a specific learning structure according to his/her needs, or follow the suggested five steps that we've presented in the last chapter.

For each competence we'll present a introductory text about the context and skills needed. Within this text we'll give some basic references and resources that should be read / heard / seen to learn about that specific competence work.

These resources will be completed with a list of mandatory references that should be read / heard / seen to complete the training session. Each reference or resource should be discussed with the tutor and colleagues through the learning platform.

After each competence description it will be available the learning outcomes for each competence or session of the course, as long with the specific assessment methods to evaluate the training session success. The assessment methodologies proposed should be discussed, as defined by in the eCultSkills

project, by the course participants (tutor and learners) to define the levels to assess in each training session.

A list of keywords representing the contents of each training session/competence will facilitate the user/learner choice for the most appropriate course module for his/her needs. The Profile of Digital Cultural Asset Manager presents specific fourteen (14) e-competences that will be analyzed in the Annex[15].

[15] See in Annex 8.5. Case study: The 14 e-competences of Digital Cultural Asset Manager developed and evaluated in the training sessions

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8. Annexes

Annex 8.1. The 5 Role Profiles

Cultural ICT Consultant

Role title	**Cultural ICT Consultant**		
Also known as	Cultural ICT Ambassador / Cultural ICT Advisor/ Cultural ICT Specialist		
Relevant professions			
Summary statement	Analyses museums' (or other cultural institutions') and their audiences' needs, defines and specifies solution requirements and evaluates installed solutions.		
Mission	To identify the best-suited solutions, according to the museums' and audiences' needs, requirements and financial resources and deliver advice on how new technologies can enhance collections and make them more attractive to all types of audiences on- and off-line, but also attract new audiences and ensure their return.		
Deliverables	**Accountable for**	**Responsible for**	**Contributor to**

	Evaluation of customer needs. Provision of advice on the development of an ICT strategy, which will benefit both the museum and its audiences. Development of guidelines for the implementation of this strategy in the most effective and efficient manner. Advice on selection of adequate products and services.	Solution specifications. Liaising between ICT providers and museum staff.	Market analysis. User requirements definition. Suggestion of relevant ICT products/services. Quality control. Assessment of ethical issues.
Main task/s	**Related to museums' and audiences' needs:** • To evaluate museums' and audiences' needs and formulate options. • To interface technology and museum needs. • To understand the expectations of museums and audiences.		

	• To foresee the impact of technological solutions responding to the museums and its audiences' needs. **Related to the provision of advice on the ICT strategy and solutions:** • To advise on the elaboration of the institution's ICT strategy. • To plan time, cost and quality of the designed and specified solution including a return on investment analysis of the deployment of ICT solutions. • To raise awareness on information technology innovations and their potential value to the museum. • To engage museums in the adoption of new technologies for improved access to cultural heritage. • To remain informed of the state-of-the art as well as new and emerging technologies and systems and to share this information with museums • To provide advice on the selection of products and solutions. • To advise on the preparation and negotiation of contracts with suppliers. • To advise on compliance with standards and regulations on ICT. • To provide advice on how to optimize the use of existing tools and systems. • To act as a relay between ICT providers/commercial service providers and museums.
Environment	Works as an external consultant or internally within (larger) museums. Is at the crossroad of the museum management team, permanent or temporary exhibitions curators, communication and marketing teams (incl. web services) and audience services teams.

KPI's	• Percentage of recommendations accepted by management. • Spread of recommendations on strategic, tactical and operational level. • Percentage of projects delivered on time, within budget, within scope and according to quality requirements. • Increased interest shown by audiences in the museum on- and off-line. • Promotion of museums as a showcase of effective use of new technologies.

Cultural ICT Guide

Role title	**Cultural (ICT-enabled) Guide**
Also known as	ICT-enabled interdisciplinary interpreter of Cultural Heritage
Relevant professions	- Art historian * - Curator * - Cultural Heritage Interpreter * - Tour guide * - Cultural experience developer - Multimedia content developer** - Pedagogical professions related to art, culture, history and multimedia* - Museum staff (guards) that are trained by a specialist to act as intermediary between the museum collections, the technologies used and the audience. *with additional relevant knowledge of ICT ** with additional relevant knowledge of museology

Summary statement	Has a flawless knowledge of content which s/he interprets to the audience/visitors and high-level familiarity with technology (ICT) used as new / innovative way of presenting art work, exhibitions or any other form of cultural heritage.		
Mission	The Cultural ICT Guide's fundamental mission is the presentation of cultural heritage content through ICT tools to improve audience experience. A specific quality of the ICT Cultural Guide is to understand the interactivity of ICT devices or solutions favourable to attracting audiences in terms of transforming them from passive to active participants, using ICT in her/his investigative process.		
Deliverables	**Accountable for**	**Responsible for**	**Contributor to**
	Audience satisfaction in terms of use of the technology and experience of the cultural collection. Documenting user feedback. Encouraging users / audience to use ICT for a better interdisciplinary experience in understanding and learning about cultural heritage.	Effective and competent interpretation with use of technology. Comprehensive use of technology. Understandable instructions for users /audience. Correct and safe use of technology.	Proposal for upgrading technology.

Main task/s	• To promote knowledge and understanding of cultural heritage through ICT. • To promote improved understanding of cultural diversity and cross-cultural dialogue through ICT. • To define target groups (children, local visitors, tourists, educational institution representatives, Cultural Heritage professionals, VIPs, etc.) for different types of interaction. • To identify target visitors based on their knowledge level of ICT. • To explain / present an ICT-enabled supportive environment in museums.
Environment	The Cultural ICT Guide works in museums and other cultural heritage institutions. Usually s/he works in a team alongside ICT specialists and experts of cultural heritage, museologists, curators, art historians, education experts. The Cultural ICT Guide can be a specially trained, museum staff member who has been up-skilled to understand the technologies used and the opportunities they offer in interacting with the audience.
KPI's	• Number of new audience willing to undergo a new experience and time spent on the tools (quantitative measurement). • Level of interest/excitement (qualitative measurement). • Positive impact for cultural heritage stakeholders obtained by innovative experience and/or edutainment concepts for visitors.

Digital Cultural Asset Manager

Role title	**Digital Cultural Asset Manager**		
Also known as	Digital Asset Manager, Digital Curator		
Relevant professions	Cultural Informatics / Cultural ICT Manager		
Summary statement	Deals with the preservation, management and exploitation (incl. monetization) of the born-digital or digitized cultural content in a museum or other cultural institution (hereinafter referred to only as museums), whether in a physical or virtual space.		
Mission	To undertake the design, administration, and exploitation (incl. monetization) of a digital museum collection, according to the management plan.		
Deliverables	**Accountable for**	**Responsible for**	**Contributor to**

	Organization of the digital cultural collections, after selection and classification, to facilitate the collections' discovery, access and use. Preservation of the digital cultural asset according to international standards (format transformation, hardware/ software emulation).	Evaluation of the final format of the digital asset. Documentation of the management of the digital asset. Form of metadata selected (descriptive, administrative, structural or technical) – semantic management of the digital assets.	Usability analysis (website, application). Search engine optimization. Competitor benchmarking.
	Exploitation (incl. monetization) and provision of access to the digital content/objects in terms of functionality, technical feasibility and reliability (methods of access, authentication, compatibility) and	Sustainability and operability of the digital assets – operational maintenance of the digital assets Advice the museum management on improvements.	

	monetization. Protection and safeguarding of the museum digital collection (copyright, watermarked content, cryptography).		
Main task/s	• To develop, administer and improve on an ongoing basis the museum's digital preservation, management and exploitation plan for all born-digital or digitized cultural content/objects (aka digital assets). • To develop, manage and optimize the museum's digital collection. • To be aware of the national/international conventions or/and legal frameworks for the protection of digital cultural property. • To collaborate with museum staff in facilitating their work with digital cultural assets. • To develop a robust grounding within the museum in theories, methods and concepts of digital cultural asset management. • To remain informed about new technologies and developments in ICT.		

Environment	Collaborates with technology suppliers and, within the museum, with the: • Management • Physical curation departments • Communication department

Interactive Cultural Experience Developer

Role title	**Interactive Cultural Experience Developer**
Also known as	Exhibit interactive designer
Relevant professions	Cultural informatics developer, Designer in digital cultural products, Digital exhibition planner
Summary statement	Designs, develops and implements innovative and interactive experiences involving digital content through physical and virtual interfaces and channels.

Mission	To contribute to an exhibition, by designing, developing and implementing interactive and multimedia installations that result in a meaningful experience for all types of audiences, and serve the transmission of the message of the exhibition.		
Deliverables	**Accountable for**	**Responsible for**	**Contributor to**
	Development of interactive and multimedia experience and their ICT requirements that are relevant to the exhibition's content. Design of the scripts for the interactive experience in the exhibitions.	Description of the ICT requirements for each application. Assuring links between on-site installations and online tools. Development of accessibility tools for all types of visitors including those with special needs. Development of interactive guidelines by evaluation and impact analysis.	Design of the exhibition together with the curators and the educational department. Audience research.

Main task/s	• To develop interactive installations and tools that are relevant to the content of the museum/exhibitions and that result in a meaningful experience to all types of audiences. • To facilitate the relation between the different museum teams: curators, ICT, education, marketing, communication. • To remain informed of new technological solutions. • To guarantee that the interactive installations and tools fit well to the needs of all types of the audiences
Environment	Works with the exhibition curators and the educational service, with the goal of detecting interactive potential in the exhibition design. Works with the ICT team, acting as intermediary between exhibition design, ICT, education, marketing and communication.
KPI's	• Diversity of relevant means/supports/installations used to connect the audiences with the exhibition content • Size and frequency of museum audience (traffic) • Evaluation of the museum experience (qualitative and quantitative analysis)

Online Cultural Community Manager

Role title	**Online Cultural Community Manager**
Also known as	New Media Manager, Digital Communication Manager

Relevant professions			
Summary statement	Being aware of the needs of the online community, the Online Cultural Community Manager creates and manages an engaging, attractive, accessible and collaborative online community for all stakeholders (audiences, colleagues, educational institution representatives, Cultural Heritage professionals, donors, decision makers, etc.). S/He designs and implements guidelines for the museum's or other cultural institution's (hereinafter referred to only as museums) online communication strategy.		
Mission	To create and manage a sense of community between the museum and its online stakeholders through a strategic communication plan that meets the objectives of the first and the needs of the latter.		
Deliverables	**Accountable for**	**Responsible for**	**Contributor to**
	Management of content of all online channels (website, newsletter, social media, forums, blogs, Pinterest...) of the museum. Online communication strategy and plan.	Research of the online community (background, motivation, etc.). Online interaction with all stakeholders of the museum, according to the	Organisation of events and other PR activities. (in order to create physical community); Loyalty/maintenance of user community. Overall communication strategy and plan of the museum.

	Quick and effective resolution of issues and reply to inquiries (feedback mechanism for the museum).	museum's protocol. Promotion of community engagement online activities. Analysis of user feedback.	
Main task/s	• To design guidelines for the museum's online communication strategy. • To research the characteristics of the online community. • To create and add relevant curated content in all online channels of communication of the museum that meets its objectives and the needs of its stakeholders. • To respond to and follow-up all online incoming inquiries. • To moderate forums. • To conduct web analytics and analyse them in order to assess whether objectives are met.		
Environment	Usually works in tandem with the communication, marketing and PR team. Spends much of her/his time online, validating the effectiveness of the collaboration tools.		
KPI's	• Stakeholder satisfaction and loyalty. • Community engagement. • Statistics/analytics of stakeholders' online activity. • Museum's webpage ranking.		

Cultural ICT Consultant

A1. IS and Organizational Strategy Alignment						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
IS solutions		Recognizes the impact of the two long IS solutions to the museum	Can apply two long term innovative IS solutions in the museum	Can determine the requirements for the proposed processes related to ICT services	Can present at least three long term innovative IS solutions for the museum	Can decide the best suited IS solution for the museum
			Can contribute to the museum's ICT strategy	Can analyze feasibility in terms of costs/ benefits		
Organization/ Museum	Knows five museum's aims and organizational objectives	Can identify five museum needs		Can analyse five long term museum needs	Can suggest two strategic IS policy decisions to the museum	Can optimize the organizational/ museum processes through ICT apps
		Understands the museum benefits in deploying the new technologies				
		Understands the museum benefits in deploying the new technologies				
Stakeholders/audience	Knows five audience needs	Can identify five audience needs		Can analyse five long term audience needs	Can suggest two strategic IS policy decisions to the stakeholders	
ICT strategy			Can provide IS strategic leadership	Can analyse feasibility of cost/ benefit	Can develop an ICT strategy suitable for the museum	
			Can demonstrate high degree of interpersonal skills			
Impact of ICT		Understands the impact of deploying new technologies in the museum	Can interpret five advantages of implementing ICT	Can analyse the effects of implementing ICT		Can review the effects of ICT implementations

A2. Service Level Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**

Service Level Agreement	Knows the definition of the Service Level Management	Can use three quality management techniques	Can establish three contracts for service performance levels	Can analyse the service provision records	Can formulate the SLAs based on an ICT strategy	Can select the appropriate quality management techniques
	Knows the SLA documentation		Can apply the Service Level Agreements upon the museum ICT strategy			Can predict and measure the potential service disruptions
	Presents three elements forming the metrics of SLA					
Organization/ museum	Defines five needs of the museum	Recognizes the museum's service performance levels			Can revise the SLAs according to the museum objectives	
Stakeholders/ audience/ decision makers	Defines five needs of stakeholders					
ICT Standards	Knows three ICT security standards		Can operate the three ICT security standards			
	Knows three ICT quality standards		Can operate three ICT quality standards			
Impact analysis	Knows the impact of service level non – compliance on museum's performance			Can analyse the impact of service level non – compliance on museum's performance		Can evaluate the impact of service level non – compliance on museum's performance

A3. Business Plan Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
ICT and management	Knows three emerging technologies (interactive/ multimedia installation/tool/ application)	Can report three present market needs	Can demonstrate three emerging technologies (interactive/ multimedia installation/tool/ application)	Provides analysis of the present market environment	Addresses the design and structure of a business plan	Evaluates the product features based on the business plan
	Knows three present market needs	Can identify four main milestones in a management				

		plan				
Organization/ museum		Can identify five museum needs and goals	Can use the web technology for the museum's benefit	Can analyse the museum's environment	Can make a SWOT analysis based on the museum's strategy	
Stakeholders/ audience/ users		Can identify five stakeholders needs and goals	Can record five requirements of stakeholders and users			
Strategy (IS/ Online Communication/ Digital Asset Management)		Can conduct an IS/ online communication/ digital asset management strategy	Applies strategic thinking in exploitation of ICT		Can manage the creation of the best suited IS strategy	Can recommend the best online communication plan
			Can apply three risk and opportunity assessment techniques		Can explain how the online communication plan complement the overall communication strategy	Can evaluate the best digital asset management strategy
Impact analysis		Can identify the risks and the opportunities of the plan		Can analyse the impact of two business management plans on stakeholders		
				Can analyze the impact of functional/ technical changes on users		

A4. Product/ Service Planning						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Planning	Can label four basic decision – making methods	Can describe four basic decision – making methods	Can apply four basic decision – making methods	Can produce quality plans	Can generate optimization methods in the product/ service planning	Can evaluate basic decision – making methods
	Can define the different plans		Can use optimization methods			
Management Methodologies	Knows two structured project management methodologies		Can operate two project management methodologies	Can analyze two project management methodologies	Can formalize two project management methodologies	Can assess two project management methodologies
Organization/ museum		Can identify five museum needs				

		and goals				
Decision makers/users	Knows five organization need analysis techniques	Can identify five decision makers/users needs and goals Can identify the key users			Can manage adequate information for the decision makers	
Documentation	Knows how to document a plan	Can classify complex documents	Can predict three documentation requirements for the digital asset management plan	Can identify three additional documentation requirements for the digital asset management plan	Can develop two digital asset management plans and the related documentation	
Impact analysis		Can identify ten museum advantages and improvements of managing the change request process				

A7. Technology Trend Monitoring						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology	Can name three emerging technologies and their relevant applications			Can investigate three latest ICT technological developments Can investigate three ICT technological developments in managing digital assets	Can propose three latest ICT technological developments	Can recommend three latest ICT technological developments
Market		Can identify three vendors and providers of the ICT solutions	Can select two vendors/ providers of the most promising ICT solutions			Can evaluate and justify the proposed vendors/ providers of ICT solutions

Information	Knows the relevant sources of information (magazines, conferences, events, newsletters, opinion- leaders, on-line – forum etc.)	Can discriminate the two most promising sources of information			Can propose the two most promising sources of information	Can assess the two most promising sources of information in the strategic decision - making
Museum	Knows five museum goals and needs	Identifies five museum advantages and improvements of adopting ICT	Can relate the existing products with the museum's needs	Can illustrate expert guidance and advice to the museum teams	Can propose three options for strategic decisions	Can decide the best ICT for the museum
Audience	Knows five audience goals and needs					Can take strategic decisions predicting ICT solutions for audience- oriented processes

A8. Sustainable Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
ICT energy consumption	Knows the term "ICT energy consumption"	Can clarify the meaning of "ICT energy consumption"	Can manipulate "ICT energy consumption"			Can relate the ICT energy consumption with the ICT purchasing/ sales policy
Sustainable IS Development	Can name three eco responsibilities	Can predict two constraints to sustainability	Can apply two latest sustainable development strategies	Can examine the two sustainable development strategies		
Museum	Knows five museum's goals	Can report two sustainable solutions for the museum		Can connect the sustainable development strategies with the museum's goals	Can explain to the museum staff the deployment of sustainable development	
Impact	Knows the impact of ICT solution in the museum's strategy					

A9. Innovating						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**

Thinking	Can present novel and open thinking		Applies innovative thinking Can demonstrate revolutionary concepts	Can identify four appropriate resources	Can generate two innovation processes techniques in the provision of solutions Can devise two creative solutions for supporting the digital asset management plan	Can assess the two innovation processes techniques in the provision of solutions
Technology	Knows three latest technological applications		Applies technological awareness	Can identify five advantages of adopting new technologies		Can recommend innovative changes to the ICT strategy
Business/ Market	Knows three business and market trends					
Museum	Knows five museum's goals and needs		Applies the technological solutions to the museum needs			Evaluates the technological solutions to the museum needs
Audience/users	Knows five audience goals and needs		Applies the technological solutions to the audience needs	Can analyse different target groups of audience (needs/ characteristics)		Evaluates the technological solutions to the audience needs
Impact				Analyze the impact of functional/ technical changes on audience/ users		

C2 . Change Support						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Knows existing ICT application technical architecture Knows at least three ICT solutions	Can identify functional specifications of the information system Can identify the advantages of at least three information security management		Can analyse how business processes are integrated and their dependency upon ICT applications		

Organisation			Can transfer information to ICT team	Can connect museum needs and ICT solutions		
Communicatio	Know at least three communication techniques		Can apply at least three communication techniques with ICT staff members			
	Recognises the importance of preciseness		Demonstrates a high degree of interpersonal skills			
Impact Analysis	Knows at least three management tools and technique	Can estimate actions to mitigate the impact of changes (training, documentation, new processes…)		Can analyse the impact of functional/technical changes on users	Can manage change management tools and technique	
					Can plan evaluation, design and implementation methodologies	

D1. Information Security Strategy Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Strategy	Knows the definition of information security strategy		Can develop a formal information security strategy		Can design the best information security strategy	Decide the best information security strategy
Museum	Knows the Information strategy of the museum			Analyses critically the museum's information security strategy	Makes the required changes in museum's information security strategy	Recommends the best information security strategy for the museum
Standards/ best practices	Knows the potentials and opportunities of standards		Uses two standards and best practices for information security		Can create through standards/ best practices, objectives for information, integrity, availability and data privacy	
Mobile Technology	Knows four threats in mobile security		Can use different service models and operational translations			Can predict all external and internal threats

D2. ICT Quality Strategy Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**

Museum	Knows four museum needs Can define three museum objectives	Can decode the museum's culture			Can establish ICT quality in museum culture Can establish online communication applications quality in museum culture	Can match museum needs with the existing products
Audience	Knows four audience needs			Can identify four audience expectations	Can manage to satisfy four audience expectations	Can match audience needs with the existing products
Standards/ best practices	Knows the potentials and opportunities of standards for ICT quality	Can indicate three ICT quality standards Can identify two standards for online community applications/ tools/solutions	Uses two standards and best practices for ICT quality Applies two standards for online community applications/ tools/solutions		Can create through standards/ best practices, objectives for service management, product and process quality	
Communication	Can list three online communication applications (existing & emerging)			Can identify the best online communication applications (existing & emerging)		
Impact analysis				Can analyse the impact of functional/ technical changes on museum and audience needs		

D3. Education and Training Provision						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
ICT training programs	Defines two ICT training programs	Identifies five training needs	Can organize two ICT training programs		Can propose two ICT training programs Can develop alternative training programs	Can assess the ICT training programs so to address change demand Assesses the alternative training programs
Skills	Can enumerate five existing learning skills	Can identify learning skills gaps		Can analyse systematically the skills gaps	Can formulate means to address the skills gaps	Can decide which skills are in-house and which out-sourced
Museum staff	Knows four museum needs		Can organize training/ education schedules to meet		Can design curricula and training programs to meet the	Can match museum needs with the existing products

	Can identify three museum staff ICT education needs		museum staff ICT education needs		museum staff ICT education needs	
Audience	Knows four audience needs		Can organize training/ education schedules to meet audience ICT education needs		Can design curricula and training programs to meet the audience ICT education needs	Can match audience needs with the existing products
	Can identify three audience ICT education needs					
Methodologies	Can record two training needs analysis methodologies					
	Can name two competence and skill analysis methodologies					

D4. Purchasing						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Market	Knows the current market for relevant products/services	Can select two suppliers/ products/services	Can select two products/ services that improve digital asset management	Can investigate the best suppliers/ products/services for the museum		Can decide on the ultimate procurement policy
			Can select two products/ services that improve museum ICT strategy	Can examine the evaluation of process/ timeliness/cost/quality for products/ services		
			Can use two benchmarking methods to find best tools/ systems	Can analyses received proposals/ offers		
Museum	Knows four museum needs				Can make recommendations on the best purchasing policy for the museum	Can match museum needs with the existing products
	Knows the museum purchasing policy/ budget				Can manage museum purchasing budget	

Audience	Knows four audience needs					Can match audience needs with the existing products

D10. Information and Knowledge Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Process	Knows two digital asset management processes	Can select the appropriate ICT devices/ tools for management of the digital assets (organization, discovery, preservation, access and use)	Can apply the appropriate ICT devices/ tools for management of the digital assets (organization, discovery, preservation, access and use)	Can analyse two digital asset management processes	Makes available the digital assets	Can justify the most suitable digital asset management process
	Knows two data mining methods		Correlates digital assets and knowledge	Can apply two data mining methods	Can set up the most appropriate digital asset structures	
Museum	Knows four museum needs					Can recommend the most appropriate digital asset structure for the museum
Audience	Knows four audience needs/ requirements				Can formalize the audience requirements	
Information	Knows two information distribution policies	Translate museum behavior into structured information	Can create the appropriate information structure	Applies two innovative solutions according to appropriate the information structure	Makes information available	
			Correlates information and knowledge			

D11. Needs Identification						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Can look for and enumerate three ICT suitable for museums	Can describe three ICT and their application in museums	Can operate or apply three ICT in museums	Can analyze cost / benefit of three ICT in museums	Can present ICT solution cost / benefit	Can assess emerging ICT and their possible application in museum context

					Can present digital asset management solution cost / benefit	Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis
Organization		Can identify museum needs and goals, organizational chart, information, communication and control processes		Can analyze three digital asset management processes.	Can formalize three digital asset management processes.	
				Can analyze three online communication processes	Can formalize three online communication processes	
Stakeholders and users	Knows five stakeholder and user need analysis techniques	Can identify ten museum key stakeholders and users.	Can demonstrate the application of three needs analysis techniques	Can analyze twenty requirements of museum key stakeholders and users		Can select the appropriate needs analysis technique based on criteria
			Can record twenty requirements of museum key stakeholders and users			Can match user key stakeholder and user needs with existing ICT applications and products
Communication	Knows five communication techniques		Can demonstrate the application of three communication techniques	Can analyze online communication processes	Can formalize online communication processes	Can select the appropriate communication technique based on criteria
			Can present ICT solution cost / benefit			
			Can present digital asset management solution cost / benefit			

E.1 Forecast Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Knows the market size and relevant fluctuations	Can identify at least two methods to generate sales	Can apply at least three large scale data analysis techniques (data mining)	Can connect museum and audience needs with products in the market	Can combine museum and audience needs with interactive and multimedia installations/tools/application	

		forecasts in relation to current market share			s developed	
	Knows accessibility of the market according to current conditions (e.g. government policies, emerging technologies, social and cultural trends, etc.)	Can interpret external research data and analyse information	Can apply new emerging technologies (e.g. distributed systems, virtualisation, mobility, data sets) Can apply at least three methods to analyze information and business processes			
Organisation	Can interpret the extended supply chain operation			Can identify organisational processes and the way they are integrated and their dependency upon ICT applications	Can combine museum and audience needs with interactive and multimedia installations/tools/applications developed	
	Knows museum's budget dedicated to ICT development			Can compare sales and production forecasts of forthcoming/newly launched ICT tools and solutions and analyse potential mismatches Can connect museum and audience needs with products in the market		
Stakeholders and Users	Knows museum and audience needs			Can connect museum and audience needs with products in the market		
	Knows at least three museum and audience need analysis techniques					

Communication				Can analyze in at least three different ways information and online communication processes		
Impact Analysis			Can apply at least three what-if techniques to produce realistic outlooks	Can identify organisational processes and the way they are integrated and their dependency upon ICT applications Can identify four business advantages and improvements of adopting emerging technologies for the museum Can analyze three future developments in business process and technology application Can analyse feasibility in terms of costs and benefits		

E.3 Risk Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Knows at least three evaluation, design and implementation methodologies					
Organisation	Can identify at least four corporate values and interests		Can solve at least three conflicts			
Communication			Can interpret museum's risk analysis outcomes and risk management processes			

			Can interpret museum's risk analysis outcomes and risk management processes applicable to interactive and multimedia installations/tools/applications			
			Can interpret museum's risk analysis outcomes and risk management processes to digital asset management			
Risk Management	Knows at least three good practices (methodologies) and standards in risk analysis		Can apply at least three risk and opportunity assessment techniques	Can develop risk management plan to identify required preventative actions		
			Can apply risk analysis taking into account corporate values and interests	Can design and document the processes for risk analysis and management		
			Can calculate the return on investment compared to risk avoidance	Can design and document the processes for risk analysis and management applicable to interactive and multimedia installations/tools/applications		

E.4 Relationship Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Organisation/Museum	Knows at least four museum processes including, decision making, budgets and management structure	Can identify at least four objectives of the museum	Can demonstrate empathy towards museum staff needs	Can determine museum's challenges and risks as long as they are relevant to digital asset management	Can establish realistic expectations to support development of mutual trust	
		Can identify museums, staff and technology		Can examine ongoing commitments to ensure fulfillment	Can propose at least three solutions to meet museums, staff and technology providers	

		providers needs			needs	
		Can identify at least three challenges and risks of the museum				
Stakeholders /audience/users		Can identify at least three objectives of stakeholders		Can determine stakeholders' objectives as long as they are relevant to digital asset management	Can examine and arrange resources to meet stakeholder requirements	
		Can identify at least three potential win-win opportunities for user/audience and museum			Can propose at least three techniques to respond to audience needs and their motivation	
Communication	Can present good and bad news to avoid surprises	Can express him/herself also at least in one foreign language	Can demonstrate good interpersonal skills			

E.5 Process Improvement						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Process	Can show a high level of innovation and creativity	Can identify at least three research methods, benchmarks and measurements methods		Can identify how museum's organisational processes are integrated and their dependency upon ICT applications	Can design (compose, decument and catalogue) essential processes and procedures	
	Know at least two techniques to resource optimisation and waste reduction	Can identify three evaluation, design and implementation methodologies			Can propose three process changes to facilitate and rationalise improvements	
		Can explain existing internal processes			Can manage to implement two process changes	

		Can identify at least three relevant developments in ICT and their potential impact on processes				
Organisation/Museum				Can identify at least three organisational advantages and improvements of adopting emerging technologies for the museum		
Communication					Can explain (defend, argue, justify)	

E.6 ICT Quality Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Standards/Best practices/Quality	Knows which methods, tools and procedure are applied within the museum and where they should be applied	Understands regulations and standards in energy efficiency and e-waste	Can apply the IS internal quality audit approach	Can determine technologies and standards to be used during the deployment	Can manage quality audits	
	Knows three ICT quality standards	Understands the museum's enterprise architecture and internal standards	Can operate three ICT quality standards	Can analyse (monitor, understand and act upon) quality indicators		
		Can recognize the potential and opportunities of relevant standards and best practices	Can apply digital asset management quality standards			
		Understands the importance of being ethical				

Technology			Can apply all the required technologies (web/ cloud/mobile) and environmental requirements	Can determine at least three technologies and standards to be used during the deployment		
Museum		Understands the museum's enterprise architecture and internal standards	Can illustrate how methods, tools and procedures can be applied to implement the museum's quality policy			
Process			Can select at least three measures to evaluate effectiveness and efficiency of the overall process	Can analyse process steps to identify at least three strengths and weaknesses		

E.7 Business Change Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Business Process			Can apply at least three evaluation, design and implementation methodologies	Can analyse information and online communication processes in at least three different ways	Can construct and document a plan for implementation of process enhancements	Can optimize museum business strategy and processes
			Can apply at least four project management standards and tools	Can connect how business processes are integrated and their dependency upon ICT applications		Can interpret information and business processes in at least three different ways
				Can connect how museum's online communication processes are integrated into the online marketing mix and dependent upon ICT applications		Can evaluate costs and benefits of business changes
						Can predict future developments in organisational process and technology application

ICT strategy	Knows at least three digital strategies		Can apply digital strategies		Can propose at least two appropriate ICT solutions based upon benefit, risks and overall impact	
					Can propose at least three organisational advantages and improvements of adopting emerging technologies	
Communication					Can explain (defend, argue, justify)	
Impact				Can analyse costs and benefits of museum's organisational changes	Can propose at least three appropriate ICT solutions based upon benefit, risks and overall impact	Can predict the impact of business changes on the museum and human resources
					Can revise and explain effects of implementations	Can predict the impact of business changes on legal issues
						Can predict the impact of business changes related to online communication on the museum and human resources
						Can predict organisatonal advantages and improvements of adopting emerging technologies

Cultural (ICT-enabled) Guide

C1. User Support						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and Market	Know two software distribution methods	Can identify tree relevant ICT user application in museums	Can solve at least two online incidents following prescribed procedures	Can analyse at least three symptoms of user error or technical failure	Can combine software distribution methods to software fixes	
	Knows at least two sources of information for identifying potential solutions	Can deploy at least three support tools to systematically trace source of error or technical failure				
	Knows two techniques to structure database and to organize content					
	Knows at least two ICT users applications					
Organisation	Knows at least two sources of information for identifying potential solutions					
Stakeholders and Users	Knows at least two techniques to interrogate users	Can identify user's errors	Can apply at least two techniques to solve minor incidents			
	Knows at least three techniques to record users feedback					
Communication	Knows communication techniques (such as defend, argue, justify)	Recognizes the importance of clear communication in at least two incidents of mis-communication with users	Can demonstrate the application of three communication techniques			
	Knows at least one foreign language		Can provide clear instructions on how to progress in three different cases			

Impact Analysis		Can deploy at least three support tools to systematically trace source of error or technical failure		Can analyse at least three symptoms of user error or technical failure	Can manage to code issues to support growth and integrity of online support tools	

D11. Needs Identification						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Can look for and enumerate three ICT suitable for museums	Can describe three ICT and their application in museums	Can operate or apply three ICT in museums	Can analyze cost / benefit of three ICT in museums	Can present ICT solution cost / benefit	Can assess emerging ICT and their possible application in museum context
					Can present digital asset management solution cost / benefit	Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis
Organization		Can identify museum needs and goals, organizational chart, information, communication and control processes		Can analyze three digital asset management processes	Can formalize three digital asset management processes	
				Can analyze three online communication processes	Can formalize three online communication processes	
Stakeholders and users	Knows five stakeholder and user need analysis techniques	Can identify ten museum key stakeholders and users	Can demonstrate the application of three needs analysis techniques	Can analyze twenty requirements of museum key stakeholders and users		Can select the appropriate needs analysis technique based on criteria
			Can record twenty requirements of museum key stakeholders and users			Can match user key stakeholder and user needs with existing ICT applications and products
Communication	Knows five communication techniques		Can demonstrate the application of three communication techniques	Can analyze online communication processes	Can formalize online communication processes	Can select the appropriate communication technique based on criteria
			Can present ICT solution cost / benefit			

			Can present digital asset management solution cost / benefit			

Digital Cultural Asset Manager						
A3. Business Plan Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
ICT and management	Knows three emerging technologies (interactive/ multimedia installation/tool/ application)	Can report three present market needs	Can demonstrate three emerging technologies (interactive/ multimedia installation/tool/ application	Provides analysis of the present market environment	Addresses the design and structure of a business plan	Evaluates the product features based on the business plan
	Knows three present market needs	Can identify four main milestones in a management plan				
Organization/ museum		Can identify five museum needs and goals	Can use the web technology for the museum's benefit	Can analyse the museum's environment	Can make a SWOT analysis based on the museum's strategy	
Stakeholders/ audience/ users		Can identify five stakeholders needs and goals	Can record five requirements of stakeholders and users			
Strategy (IS/ Online Communication/ Digital Asset Management)		Can conduct an IS/ online communication/ digital asset management strategy	Applies strategic thinking in exploitation of ICT		Can manage the creation of the best suited IS strategy	Can recommend the best online communication plan
			Can apply three risk and opportunity assessment techniques		Can explain how the online communication plan complement the overall communication strategy	Can evaluate the best digital asset management strategy
Impact analysis		Can identify the risks and the opportunities of the plan		Can analyse the impact of two business management plans on stakeholders		
				Can analyze the impact of functional/ technical changes on users		
A4. Product/ Service Planning						

Module	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Planning	Can label four basic decision – making methods	Can describe four basic decision – making methods	Can apply four basic decision – making methods	Can produce quality plans	Can generate optimization methods in the product/ service planning	Can evaluate basic decision – making methods
	Can define the different plans		Can use optimization methods		Can develop and maintain plans	
					Can manage the change request processes	
Management Methodologies	Knows two structured project management methodologies		Can operate two project management methodologies	Can analyze two project management methodologies	Can formalize two project management methodologies	Can assess two project management methodologies
Organization/ museum		Can identify five museum needs and goals				
Decision makers/users	Knows five organization need analysis techniques	Can identify five decision makers/users needs and goals			Can manage adequate information for the decision makers	
		Can identify the key users				
Documentation	Knows how to document a plan	Can classify complex documents	Can predict three documentation	Can identify three additional documentation	Can develop two digital asset management plans and the related documentation	
			requirements for the digital asset management plan	requirements for the digital asset management plan		
Impact analysis		Can identify ten museum advantages and improvements of managing the change request process				

A7. Technology Trend Monitoring						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**

Technology	Can name three emerging technologies and their relevant applications			Can investigate three latest ICT technological developments Can investigate three ICT technological developments in managing digital assets	Can propose three latest ICT technological developments	Can recommend three latest ICT technological developments
Market		Can identify three vendors and providers of the ICT solutions	Can select two vendors/ providers of the most promising ICT solutions			Can evaluate and justify the proposed vendors/ providers of ICT solutions
Information	Knows the relevant sources of information (magazines, conferences, events, newsletters, opinion- leaders, on-line – forum etc.)	Can discriminate the two most promising sources of information			Can propose the two most promising sources of information	Can assess the two most promising sources of information in the strategic decision - making
Museum	Knows five museum goals and needs	Identifies five museum advantages and improvements of adopting ICT	Can relate the existing products with the museum's needs	Can illustrate expert guidance and advice to the museum teams	Can propose three options for strategic decisions	Can decide the best ICT for the museum
Audience	Knows five audience goals and needs					Can take strategic decisions predicting ICT solutions for audience- oriented processes

A9. Innovating						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Thinking	Can present novel and open thinking		Applies innovative thinking	Can identify four appropriate resources	Can generate two innovation processes techniques in the provision of solutions	Can assess the two innovation processes techniques in the provision of solutions

			Can demonstrate revolutionary concepts		Can devise two creative solutions for supporting the digital asset management plan	
Technology	Knows three latest technological applications		Applies technological awareness	Can identify five advantages of adopting new technologies		Can recommend innovative changes to the ICT strategy
Business/ Market	Knows three business and market trends					
Museum	Knows five museum's goals and needs		Applies the technological solutions to the museum needs			Evaluates the technological solutions to the museum needs
Audience/users	Knows five audience goals and needs		Applies the technological solutions to the audience needs	Can analyse different target groups of audience (needs/ characteristics)		Evaluates the technological solutions to the audience needs
Impact				Analyze the impact of functional/ technical changes on audience/ users		

B5. Documentation Production						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Documentation	Knows two standards in documentation	Can clarify the requirements of documentation	Applies standards to define document structure			
	Knows four objectives of documentation		Can produce documents describing interactive products/ tools/ applications			
			Can produce documents describing products/ tools/ applications for online communication			

			Can produce documents describing products/ tools/ applications used for digital asset management			
Technical documents	Knows different documents for designing/ developing and deploying products/ applications/ services					
Tools	Knows three tools for production/ editing and distribution of professional documents					
	Knows two tools for multimedia presentation tools					
Technology	Knows two museum ICT technologies					

C3. Service Delivery						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Knows how to interpret digital asset management application requirements	Can identify at least three digital asset management applications delivery actions	Can examine digital asset management applications	Can analyze three practices and stardards in digital asset management applications		
	Knows how to complete documentation used in digital asset management applications delivery	Can identify failures in digital asset management applications delivery actions	Can examine digital asset management infrastructure management	Can analyse at least three web, cloud and mobile technologies		
				Can examine digital asset management applications delivery provision		

Organisation		Can interpret the organisation's digital asset management strategy		Can identify at least three processes which comprise the organisation's digital asset management strategy		
Stakeholders and Users				Can determine manpower workload / requirements for efficient and cost effective service provision		
Communication		Can report digital asset management applications delivery provision to superiors				

C4. Change Support						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market		Can identify at least three evaluation, design and implementation methodologies Can identify at least two applications and availability of diagnostic tools				
Organisation	Knows the museum's overall ICT infrastructure and key components Knows the museum's critical situation escalation procedures		Can select digital asset management solution that fits the budget of the museum	Can critically analyse at lease three digital asset management solutions		

Communication		Recognises the importance of preciseness	Can demonstrate the application of three communication techniques	Can identify the appropriate resources to deployed internally or externally to minimise outages		
Impact Analysis	Knows at least three rist management techniques	Can identify the link between system infrastructure elements and impact of failure on related business processes	Can identify progress of issues throughout lifecycle		Can propose solutions to at least two critical component failure	
					Can manage risk management audits	
					Can propose appropriate resources to maintenance activities, balancing cost and risk	

D4. Purchasing						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Market	Knows the current market for relevant products/services	Can select two suppliers/ products/services	Can select two products/ services that improve digital asset management	Can investigate the best suppliers/ products/services for the museum		Can decide on the ultimate procurement policy
			Can select two products/ services that improve museum ICT strategy	Can examine the evaluation of process/ timeliness/cost/quality for products/ services		
			Can use two benchmarking methods to find best tools/ systems	Can analyse received proposals/ offers		
Museum	Knows four museum needs				Can make recommendations on the best purchasing policy for the museum	Can match museum needs with the existing products

	Knows the museum purchasing policy/ budget				Can manage museum purchasing budget	
Audience	Knows four audience needs					Can match audience needs with the existing products

D10. Information and Knowledge Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Process	Knows two digital asset management processes	Can select the appropriate ICT devices/ tools for management of the digital assets (organization, discovery, preservation, access and use	Can apply the appropriate ICT devices/ tools for management of the digital assets (organization, discovery, preservation, access and use)	Can analyse two digital asset management processes	Makes available the digital assets	Can justify the most suitable digital asset management process
	Knows two data mining methods		Correlates digital assets and knowledge	Can apply two data mining methods	Can set up the most appropriate digital asset structures	
Museum	Knows four museum needs					Can recommend the most appropriate digital asset structure for the museum
Audience	Knows four audience needs/ requirements				Can formalize the audience requirements	
Information	Knows two information distribution policies	Translate museum behavior into structured information	Can create the appropriate information structure	Applies two innovative solutions according to appropriate the information structure	Makes information available	
			Correlates information and knowledge			

D11. Needs Identification						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Can look for and enumerate three ICT suitable for museums	Can describe three ICT and their application in museums	Can operate or apply three ICT in museums	Can analyze cost / benefit of three ICT in museums	Can present ICT solution cost / benefit	Can assess emerging ICT and their possible application in museum context

					Can present digital asset management solution cost / benefit	Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis
Organization		Can identify museum needs and goals, organizational chart, information, communication and control processes		Can analyze three digital asset management processes	Can formalize three digital asset management processes	
				Can analyze three online communication processes	Can formalize three online communication processes	
Stakeholders and users	Knows five stakeholder and user need analysis techniques	Can identify ten museum key stakeholders and users.	Can demonstrate the application of three needs analysis techniques	Can analyze twenty requirements of museum key stakeholders and users		Can select the appropriate needs analysis technique based on criteria
			Can record twenty requirements of museum key stakeholders and users			Can match user key stakeholder and user needs with existing ICT applications and products
Communication	Knows five communication techniques		Can demonstrate the application of three communication techniques	Can analyze online communication processes	Can formalize online communication processes	Can select the appropriate communication technique based on criteria
			Can present ICT solution cost / benefit			
			Can present digital asset management solution cost / benefit			
Impact analysis		Can identify ten museum advantages and improvements of adopting new technologies based		Analyse the impact of functional/technical changes on key stakeholders and users		Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis

		on user experience				Can evaluate the impact of functional/technical changes on key stakeholders and users

E.3 Risk Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Knows at least three evaluation, design and implementation methodologies					
Organisation	Can identify at least four corporate values and interests		Can solve at least three conflicts			
Communication			Can interpret museum's risk analysis outcomes and risk management processes Can interpret museum's risk analysis outcomes and risk management processes applicable to interactive and multimedia installations/tools/applications Can interpret museum's risk analysis outcomes and risk management processes to digital asset management			
Risk Management	Knows at least three good practices (methodologies)		Can apply at least three risk and opportunity assessment techniques	Can develop risk management plan to identify required preventative actions		

	and standards in risk analysis		Can apply risk analysis taking into account corporate values and interests	Can design and document the processes for risk analysis and management		
			Can calculate the return on investment compared to risk avoidance	Can design and document the processes for risk analysis and management applicable to interactive and multimedia installations/tools/applications		

E.4 Relationship Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Organisation/Museum	Knows at least four museum processes including, decision making, budgets and management structure	Can identify at least four objectives of the museum	Can demonstrate empathy towards museum staff needs	Can determine museum's challenges and risks as long as they are relevant to digital asset management	Can establish realistic expectations to support development of mutual trust	
		Can identify museums, staff and technology providers needs		Can examine ongoing commitments to ensure fulfillment	Can propose at least three solutions to meet museums, staff and technology providers needs	
		Can identify at least three challenges and risks of the museum				
Stakeholders/audience/users		Can identify at least three objectives of stakeholders		Can determine stakeholders' objectives as long as they are relevant to digital asset management	Can examine and arrange resources to meet stakeholder requirements	
		Can identify at least three potential win-win opportunities for user/audience and museum			Can propose at least three techniques to respond to audience needs and their motivation	
Communication	Can present good and bad news to avoid surprises	Can express him/herself also at least in one foreign	Can demonstrate good interpersonal skills		Can explain (defend, argue, justify)	

		language				

E.6 ICT Quality Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Standards/Best practices/Quality	Knows which methods, tools and procedure are applied within the museum and where they should be applied	Understands regulations and standards in energy efficiency and e-waste	Can apply the IS internal quality audit approach	Can determine technologies and standards to be used during the deployment	Can manage quality audits	
	Knows three ICT quality standards	Understands the museum's enterprise architecture and internal standards	Can operate three ICT quality standards	Can analyse (monitor, understand and act upon) quality indicators		
		Can recognize the potential and opportunities of relevant standards and best practices	Can apply digital asset management quality standards			
		Understands the importance of being ethical				
Technology			Can apply all the required technologies (web/ cloud/mobile) and environmental requirements	Can determine at least three technologies and standards to be used during the deployment		
Museum		Understands the museum's enterprise architecture and internal standards	Can illustrate how methods, tools and procedures can be applied to implement the museum's quality policy			

Process			Can select at least three measures to evaluate effectiveness and efficiency of the overall process	Can analyse process steps to identify at least three strengths and weaknesses		

Interactive Cultural Experience Developer						
A3. Business Plan Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
ICT and management	Knows three emerging technologies (interactive/ multimedia installation/tool/ application)	Can report three present market needs	Can demonstrate three emerging technologies (interactive/ multimedia installation/tool/ application)	Provides analysis of the present market environment	Addresses the design and structure of a business plan	Evaluates the product features based on the business plan
	Knows three present market needs	Can identify four main milestones in a management plan				
Organization/ museum		Can identify five museum needs and goals	Can use the web technology for the museum's benefit	Can analyse the museum's environment	Can make a SWOT analysis based on the museum's strategy	
Stakeholders/ audience/ users		Can identify five stakeholders needs and goals	Can record five requirements of stakeholders and users			
Strategy (IS/ Online Communication/ Digital Asset Management)		Can conduct an IS/ online communication/ digital asset management strategy	Applies strategic thinking in exploitation of ICT		Can manage the creation of the best suited IS strategy	Can recommend the best online communication plan
			Can apply three risk and opportunity assessment techniques		Can explain how the online communication plan complement the overall communication	Can evaluate the best digital asset management strategy

					strategy	
Impact analysis		Can identify the risks and the opportunities of the plan		Can analyse the impact of two business management plans on stakeholders Can analyze the impact of functional/ technical changes on users		

A4. Product/ Service Planning						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Planning	Can label four basic decision – making methods Can define the different plans	Can describe four basic decision – making methods	Can apply four basic decision – making methods Can use optimization methods	Can produce quality plans	Can generate optimization methods in the product/ service planning Can develop and maintain plans Can manage the change request processes	Can evaluate basic decision – making methods
Management Methodologies	Knows two structured project management methodologies		Can operate two project management methodologies	Can analyze two project management methodologies	Can formalize two project management methodologies	Can assess two project management methodologies
Organization/ museum		Can identify five museum needs and goals				
Decision makers/users	Knows five organization need analysis techniques	Can identify five decision makers/users needs and goals Can identify the key users			Can manage adequate information for the decision makers	

Documentation	Knows how to document a plan	Can classify complex documents	Can predict three documentation requirements for the digital asset management plan	Can identify three additional documentation requirements for the digital asset management plan	Can develop two digital asset management plans and the related documentation	
Impact analysis		Can identify ten museum advantages and improvements of managing the change request process				

A6. Application Design						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
ICT and Designing	Knows how to design data structures	Defines four requirements for designing	Organizes the overall planning of the design		Integrates all aspects needed in designing (interoperability, usability, security)	Assesses the models designed based on a common framework
	Knows the general functional specifications in design					
	Can outline three software developments methods and their rationale					
	Can name two mobile technologies					
Museum	Knows five museum needs	Associates the application with the museum needs				
Audience	Knows five audience needs	Associates the application with the museum needs				
Techniques	Knows two need analysis techniques	Can recognize threat modeling techniques	Applies three different application development methods			Evaluates the suitability of the three application methods
			Selects appropriate technical options for optimization			

Communication					Establishes systematic communication with the users	
Impact				Can analyze the impact of functional/ technical changes on audience		

A7. Technology Trend Monitoring						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology	Can name three emerging technologies and their relevant applications			Can investigate three latest ICT technological developments Can investigate three ICT technological developments in managing digital assets	Can propose three latest ICT technological developments	Can recommend three latest ICT technological developments
Market		Can identify three vendors and providers of the ICT solutions	Can select two vendors/ providers of the most promising ICT solutions			Can evaluate and justify the proposed vendors/ providers of ICT solutions
Information	Knows the relevant sources of information (magazines, conferences, events, newsletters, opinion-leaders, on-line – forum etc.)	Can discriminate the two most promising sources of information			Can propose the two most promising sources of information	Can assess the two most promising sources of information in the strategic decision - making
Museum	Knows five museum goals and needs	Identifies five museum advantages and improvements of adopting ICT	Can relate the existing products with the museum's needs	Can illustrate expert guidance and advice to the museum teams	Can propose three options for strategic decisions	Can decide the best ICT for the museum
Audience	Knows five audience goals and needs					Can take strategic decisions predicting ICT solutions for audience- oriented processes

A9. Innovating

Module	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Thinking	Can present novel and open thinking		Applies innovative thinking	Can identify four appropriate resources	Can generate two innovation processes techniques in the provision of solutions	Can assess the two innovation processes techniques in the provision of solutions
			Can demonstrate revolutionary concepts		Can devise two creative solutions for supporting the digital asset management plan	
Technology	Knows three latest technological applications		Applies technological awareness	Can identify five advantages of adopting new technologies		Can recommend innovative changes to the ICT strategy
Business/ Market	Knows three business and market trends					
Museum	Knows five museum's goals and needs		Applies the technological solutions to the museum needs			Evaluates the technological solutions to the museum needs
Audience/users	Knows five audience goals and needs		Applies the technological solutions to the audience needs	Can analyse different target groups of audience (needs/ characteristics)		Evaluates the technological solutions to the audience needs
Impact				Analyze the impact of functional/ technical changes on audience/ users		

B1. Application Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Applications	Can name three applications	Can develop systemically three applications	Can operate three applications	Can optimize application development, maintenance, performance		
	Can design applications					
Software	Knows the appropriate software programs		Applies software architectures			
	Knows two power consumption models		Can operate systems & software platforms			
Hardware	Knows hardware tools/components/architectures		Can apply hardware tools/components/architectures			

Museum	Knows five needs of the museum staff					
Audience	Knows all types of audiences		Can develop documentation applications according to audience needs			
	Knows five audience needs		Can operate validation tests with the audience representatives			
Documentation	Can document applications					

B2. Component Integration						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
System	Knows the hardware/ software/ sub system components		Can employ integration of hardware/ software/ sub system components into an existing/new system			
			Can examine the system's capacity and performance			
Documentation			Can employ documentation on all activities			
Integration	Knows four integration testing techniques		Operates integration techniques		Can create an integration process for the entire integration cycle	
Audience	Knows five audience needs		Can match the audience needs with existing products			
Impact	Knows the impact of the system integration on the organization					

B3. Testing						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**

Test programs	Knows how to organize test programs		Can design tests of interactive and multimedia installations/ tools/applications			
			Can prepare and conduct tests of interactive and multimedia installations/ tools/applications			
Documentation		Can report tests and results	Can demonstrate documentation of tests and results to users/ designers/ maintainers			
Test Process	Knows different sorts of tests		Can develop the management & evaluation of test process			

B4. Solution Deployment						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology	Knows four technologies & standards during implementation	Can select a technological solution that will result in a meaningful interactive experience	Can apply all the required technologies (web/cloud/mobile)			
			Can operate implementation of solutions			
System	Can identify the components of a system		Can demonstrate accountability for solution provision			
			Can solve the interoperability of a system			
			Can operate under guidance and in accordance with detailed instructions			

Documentation	Can record all relevant information (equipment addresses, configuration, performance data)		Can operate documentation of all relevant information (equipment addresses, configuration, performance data)			
Communication			Illustrates comprehensive communication with stakeholders			
			Can show the transition of the message of a specific museum exhibition/collection			

B5. Documentation Production						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Documentation	Knows two standards in documentation	Can clarify the requirements of documentation	Applies standards to define document structure			
	Knows four objectives of documentation		Can produce documents describing interactive products/ tools/ applications			
			Can produce documents describing products/ tools/ applications for online communication			
			Can produce documents describing products/ tools/ applications used for digital asset management			
Technical documents	Knows different documents for designing/ developing and deploying products/ applications/ services					

Tools	Knows three tools for production/ editing and distribution of professional documents		Applies tools for production/ editing and distribution of professional documents			
	Knows two tools for multimedia presentation tools					
Technology	Knows two museum ICT technologies					

C1. User Support						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and Market	Know two software distribution methods	Can identify tree relevant ICT user application in museums	Can solve at least two online incidents following prescribed procedures	Can analyse at least three symptoms of user error or technical failure	Can combine software distribution methods to software fixes	
	Knows at least two sources of information for identifying potential solutions	Can deploy at least three support tools to systematically trace source of error or technical failure				
	Knows two techniques to structure database and to organize content					
	Knows at least two ICT users applications					
Organisation	Knows at least two sources of information for identifying potential solutions					
Stakeholders and Users	Knows at least two techniques to interrogate users	Can identify user's errors	Can apply at least two techniques to solve minor incidents			
	Knows at least three techniques to record users feedback					

Communication	Knows communication techniques (such as defend, argue, justify) Knows at least one foreign language	Recognizes the importance of clear communication in at least two incidents of mis-communication with users	Can demonstrate the application of three communication techniques Can provide clear instructions on how to progress in three different cases			
Impact Analysis		Can deploy at least three support tools to systematically trace source of error or technical failure		Can analyse at least three symptoms of user error or technical failure	Can manage to code issues to support growth and integrity of online support tools	

C2. Change Support						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Knows existing ICT application technical architecture Knows at least three ICT solutions	Can identify functional specifications of the information system Can identify the advantages of at least three information security management		Can analyse how business processes are integrated and their dependency upon ICT applications		
Organisation			Can transfer information to ICT team	Can connect museum needs and ICT solutions		
Communication	Know at least three communication techniques Recognises the importance of preciseness		Can apply at least three communication techniques with ICT staff members Demonstrates a high degree of interpersonal skills			

Impact Analysis	Knows at least three management tools and technique	Can estimate actions to mitigate the impact of changes (training, documentation, new processes…)		Can analyse the impact of functional/technical changes on users	Can manage change management tools and technique Can plan evaluation, design and implementation methodologies	

C4. Change Support						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market		Can identify at least three evaluation, design and implementation methodologies Can identify at least two applications and availability of diagnostic tools				
Organisation	Knows the museum's overall ICT infrastructure and key components Knows the museum's reporting procedures Knows the museum's critical situation escalation procedures		Can select digital asset management solution that fits the budget of the museum	Can critically analyse at least three digital asset management solutions		
Communication		Recognises the importance of preciseness	Can demonstrate the application of three communication techniques	Can identify the appropriate resources to deployed internally or externally to minimise outages		
Impact Analysis	Knows at least three rist management techniques	Can identify the link between system infrastructure	Can identify progress of issues throughout lifecycle		Can propose solutions to at least two critical component failure	

		elements and impact of failure on related business processes			Can manage risk management audits	
					Can propose appropriate resources to maintenance activities, balancing cost and risk	

D11. Needs Identification						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Can look for and enumerate three ICT suitable for museums	Can describe three ICT and their application in museums	Can operate or apply three ICT in museums	Can analyze cost / benefit of three ICT in museums	Can present ICT solution cost / benefit	Can assess emerging ICT and their possible application in museum context
					Can present digital asset management solution cost / benefit	Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis
Organization		Can identify museum needs and goals, organizational chart, information, communication and control processes		Can analyze three digital asset management processes.	Can formalize three digital asset management processes.	
				Can analyze three online communication processes	Can formalize three online communication processes	
Stakeholders and users	Knows five stakeholder and user need analysis techniques	Can identify ten museum key stakeholders and users.	Can demonstrate the application of three needs analysis techniques	Can analyze twenty requirements of museum key stakeholders and users		Can select the appropriate needs analysis technique based on criteria
			Can record twenty requirements of museum key stakeholders and users			Can match user key stakeholder and user needs with existing ICT applications and products

Communication	Knows five communication techniques		Can demonstrate the application of three communication techniques	Can analyze online communication processes	Can formalize online communication processes	Can select the appropriate communication technique based on criteria
			Can present ICT solution cost / benefit			
			Can present digital asset management solution cost / benefit			

E.1 Forecast Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Knows the market size and relevant fluctuations	Can identify at least two methods to generate sales forecasts in relation to current market share	Can apply at least three large scale data analysis techniques (data mining)	Can connect museum and audience needs with products in the market	Can combine museum and audience needs with interactive and multimedia installations/tools/applications developed	
	Knows accessibility of the market according to current conditions (e.g. government policies, emerging technologies, social and cultural trends, etc.)	Can interpret external research data and analyse information	Can apply new emerging technologies (e.g. distributed systems, virtualisation, mobility, data sets)			
			Can apply at least three methods to analyze information and business processes			
Organisation	Can interpret the extended supply chain operation			Can identify organisational processes and the way they are integrated and their dependency upon ICT applications	Can combine museum and audience needs with interactive and multimedia installations/tools/a	

	Knows museum's budget dedicated to ICT development			Can compare sales and production forecasts of forthcoming/newly launched ICT tools and solutions and analyse potential mismatches	pplications developed	
				Can connect museum and audience needs with products in the market		
Stakeholders and Users	Knows museum and audience needs			Can connect museum and audience needs with products in the market		
	Knows at least three museum and audience need analysis techniques					
Communication				Can analyze in at least three different ways information and online communication processes		
Impact Analysis			Can apply at least three what-if techniques to produce realistic outlooks	Can identify organisational processes and the way they are integrated and their dependency upon ICT applications		
				Can identify four business advantages and improvements of adopting emerging technologies for the museum		
				Can analyze three future developments in business process and technology application		
				Can analyse feasibility in terms of costs and benefits		

E.3 Risk Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Knows at least three evaluation, design and implementation methodologies					
Organisation	Can identify at least four corporate values and interests		Can solve at least three conflicts			
Communication			Can interpret museum's risk analysis outcomes and risk management processes			
			Can interpret museum's risk analysis outcomes and risk management processes			
			applicable to interactive and multimedia installations/tools/applicatio ns			
			Can interpret museum's risk analysis outcomes and risk management processes to digital asset management			
Risk Management	Knows at least three good practices (methodologies) and standards in risk analysis		Can apply at least three risk and opportunity assessment techniques	Can develop risk management plan to identify required preventative actions		
			Can apply risk analysis taking into account corporate values and interests	Can design and document the processes for risk analysis and management		

			Can calculate the return on investment compared to risk avoidance	Can design and document the processes for risk analysis and management applicable to interactive and multimedia installations/tools/applications		

E.4 Relationship Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Organisation/Museum	Knows at least four museum processes including, decision making, budgets and management structure	Can identify at least four objectives of the museum	Can demonstrate empathy towards museum staff needs	Can determine museum's challenges and risks as long as they are relevant to digital asset management	Can establish realistic expectations to support development of mutual trust	
		Can identify museums, staff and technology providers needs		Can examine ongoing commitments to ensure fulfillment	Can propose at least three solutions to meet museums, staff and technology providers needs	
		Can identify at least three challenges and risks of the museum				
Stakeholders/audience/users		Can identify at least three objectives of stakeholders		Can determine stakeholders' objectives as long as they are relevant to digital asset management	Can examine and arrange resources to meet stakeholder requirements	
		Can identify at least three potential win-win opportunities for user/audience and museum			Can propose at least three techniques to respond to audience needs and their motivation	
Communication	Can present good and bad news to avoid surprises	Can express him/herself also at least in one foreign language	Can demonstrate good interpersonal skills		Can explain (defend, argue, justify)	

E.6 ICT Quality Management

Module	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Standards/Best practices/Quality	Knows which methods, tools and procedure are applied within the museum and where they should be applied	Understands regulations and standards in energy efficiency and e-waste	Can apply the IS internal quality audit approach	Can determine technologies and standards to be used during the deployment	Can manage quality audits	
	Knows three ICT quality standards	Understands the museum's enterprise architecture and internal standards	Can operate three ICT quality standards	Can analyse (monitor, understand and act upon) quality indicators		
		Can recognize the potential and opportunities of relevant standards and best practices	Can apply digital asset management quality standards			
		Understands the importance of being ethical				
Technology			Can apply all the required technologies (web/ cloud/mobile) and environmental requirements	Can determine at least three technologies and standards to be used during the deployment		
Museum		Understands the museum's enterprise architecture and internal standards	Can illustrate how methods, tools and procedures can be applied to implement the museum's quality policy			
Process			Can select at least three measures to evaluate effectiveness and efficiency of the overall process	Can analyse process steps to identify at least three strengths and weaknesses		

Online Cultural Community Manager						

A3. Business Plan Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
ICT and management	Knows three emerging technologies (interactive/ multimedia installation/tool/ application)	Can report three present market needs	Can demonstrate three emerging technologies (interactive/ multimedia installation/tool/ application)	Provides analysis of the present market environment	Addresses the design and structure of a business plan	Evaluates the product features based on the business plan
	Knows three present market needs	Can identify four main milestones in a management plan				
Organization/ museum		Can identify five museum needs and goals	Can use the web technology for the museum's benefit	Can analyse the museum's environment	Can make a SWOT analysis based on the museum's strategy	
Stakeholders/ audience/ users		Can identify five stakeholders needs and goals	Can record five requirements of stakeholders and users			
Strategy (IS/ Online Communication/ Digital Asset Management)		Can conduct an IS/ online communication/ digital asset management strategy	Applies strategic thinking in exploitation of ICT		Can manage the creation of the best suited IS strategy	Can recommend the best online communication plan
			Can apply three risk and opportunity assessment techniques		Can explain how the online communication plan complement the overall communication strategy	Can evaluate the best digital asset management strategy
Impact analysis		Can identify the risks and the opportunities of the plan		Can analyse the impact of two business management plans on stakeholders		
				Can analyze the impact of functional/ technical changes on users		

A4. Product/ Service Planning						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**

Planning	Can label four basic decision – making methods Can define the different plans	Can describe four basic decision – making methods	Can apply four basic decision – making methods Can use optimization methods	Can produce quality plans	Can generate optimization methods in the product/ service planning Can develop and maintain plans Can manage the change request processes	Can evaluate basic decision – making methods
Management Methodologies	Knows two structured project management methodologies		Can operate two project management methodologies	Can analyze two project management methodologies	Can formalize two project management methodologies	Can assess two project management methodologies
Organization/ museum		Can identify five museum needs and goals				
Decision makers/users	Knows five organization need analysis techniques	Can identify five decision makers/users needs and goals Can identify the key users			Can manage adequate information for the decision makers	
Documentation	Knows how to document a plan	Can classify complex documents	Can predict three documentation requirements for the digital asset management plan	Can identify three additional documentation requirements for the digital asset management plan	Can develop two digital asset management plans and the related documentation	
Impact analysis		Can identify ten museum advantages and improvements of managing the change request process				

A7. Technology Trend Monitoring						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology	Can name three emerging technologies and their relevant applications			Can investigate three latest ICT technological developments	Can propose three latest ICT technological developments	Can recommend three latest ICT technological developments

				Can investigate three ICT technological developments in managing digital assets		
Market		Can identify three vendors and providers of the ICT solutions	Can select two vendors/ providers of the most promising ICT solutions			Can evaluate and justify the proposed vendors/ providers of ICT solutions
Information	Knows the relevant sources of information (magazines, conferences, events, newsletters, opinion-leaders, on-line – forum etc.)	Can discriminate the two most promising sources of information			Can propose the two most promising sources of information	Can assess the two most promising sources of information in the strategic decision - making
Museum	Knows five museum goals and needs	Identifies five museum advantages and improvements of adopting ICT	Can relate the existing products with the museum's needs	Can illustrate expert guidance and advice to the museum teams	Can propose three options for strategic decisions	Can decide the best ICT for the museum
Audience	Knows five audience goals and needs					Can take strategic decisions predicting ICT solutions for audience- oriented processes

A9. Innovating						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Thinking	Can present novel and open thinking		Applies innovative thinking	Can identify four appropriate resources	Can generate two innovation processes techniques in the provision of solutions	Can assess the two innovation processes techniques in the provision of solutions
			Can demonstrate revolutionary concepts		Can devise two creative solutions for supporting the digital asset management plan	
Technology	Knows three latest technological applications		Applies technological awareness	Can identify five advantages of adopting new technologies		Can recommend innovative changes to the ICT strategy

Business/ Market	Knows three business and market trends					
Museum	Knows five museum's goals and needs		Applies the technological solutions to the museum needs			Evaluates the technological solutions to the museum needs
Audience/users	Knows five audience goals and needs		Applies the technological solutions to the audience needs	Can analyse different target groups of audience (needs/ characteristics)		Evaluates the technological solutions to the audience needs
Impact				Analyze the impact of functional/ technical changes on audience/ users		

B5. Documentation Production						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Documentation	Knows two standards in documentation	Can clarify the requirements of documentation	Applies standards to define document structure			
	Knows four objectives of documentation		Can produce documents describing interactive products/tools/ applications			
			Can produce documents describing products/tools/ applications for online communication			
			Can produce documents describing products/tools/ applications used for digital asset management			

Technical documents	Knows different documents for designing/ developing and deploying products/ applications/ services					
Tools	Knows three tools for production/ editing and distribution of professional documents Knows two tools for multimedia presentation tools		Applies tools for production/ editing and distribution of professional documents			
Technology	Knows two museum ICT technologies					

C1. User Support						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and Market	Know two software distribution methods Knows at least two sources of information for identifying potential solutions Knows two techniques to structure database and to organize content Knows at least two ICT users applications	Can identify tree relevant ICT user application in museums Can deploy at least three support tools to systematically trace source of error or technical failure	Can solve at least two online incidents following prescribed procedures	Can analyse at least three symptoms of user error or technical failure	Can combine software distribution methods to software fixes	
Organisation	Knows at least two sources of information for identifying potential solutions					
Stakeholders and Users	Knows at least two techniques to interrogate users	Can identify user's errors	Can apply at least two techniques to solve minor			

	Knows at least three techniques to record users feedback		incidents			
Communication	Knows communication techniques (such as defend, argue, justify) Knows at least one foreign language	Recognizes the importance of clear communication in at least two incidents of mis-communication with users	Can demonstrate the application of three communication techniques Can provide clear instructions on how to progress in three different cases			
Impact Analysis		Can deploy at least three support tools to systematically trace source of error or technical failure		Can analyse at least three symptoms of user error or technical failure	Can manage to code issues to support growth and integrity of online support tools	

C4. Problem Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market		Can identify at least three evaluation, design and implementation methodologies Can identify at least two applications and availability of diagnostic tools				
Organisation	Knows the museum's overall ICT infrastructure and key components Knows the museum's reporting procedures Knows the museum's critical situation escalation procedures		Can select digital asset management solution that fits the budget of the museum	Can critically analyse at least three digital asset management solutions		

Communication		Recognises the importance of preciseness	Can demonstrate the application of three communication techniques	Can identify the appropriate resources to deployed internally or externally to minimise outages		
Impact Analysis	Knows at least three rist management techniques	Can identify the link between system infrastructure elements and impact of failure on related business processes	Can identify progress of issues throughout lifecycle		Can propose solutions to at least two critical component failure Can manage risk management audits Can propose appropriate resources to maintenance activities, balancing cost and risk	

D2. ICT Quality Strategy Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Museum	Knows four museum needs Can define three museum objectives	Can decode the museum's culture			Can establish ICT quality in museum culture Can establish online communication applications quality in museum culture	Can match museum needs with the existing products
Audience	Knows four audience needs			Can identify four audience expectations	Can manage to satisfy four audience expectations	Can match audience needs with the existing products
Standards/ best practices	Knows the potentials and opportunities of standards for ICT quality	Can indicate three ICT quality standards Can identify two standards for online community applications/ tools/solutions	Uses two standards and best practices for ICT quality Applies two standards for online community applications/ tools/solutions		Can create through standards/ best practices, objectives for service management, product and process quality	
Communication	Can list three online communication applications (existing & emerging)			Can identify the best online communication applications (existing & emerging)		

Impact analysis				Can analyse the impact of functional/ technical changes on museum and audience needs		

D11. Needs Identification						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Can look for and enumerate three ICT suitable for museums	Can describe three ICT and their application in museums	Can operate or apply three ICT in museums	Can analyze cost / benefit of three ICT in museums	Can present ICT solution cost / benefit	Can assess emerging ICT and their possible application in museum context
					Can present digital asset management solution cost / benefit	Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis
Organization		Can identify museum needs and goals, organizational chart, information, communication and control processes		Can analyze three digital asset management processes	Can formalize three digital asset management processes	
				Can analyze three online communication processes	Can formalize three online communication processes	
Stakeholders and users	Knows five stakeholder and user need analysis techniques	Can identify ten museum key stakeholders and users.	Can demonstrate the application of three needs analysis techniques	Can analyze twenty requirements of museum key stakeholders and users		Can select the appropriate needs analysis technique based on criteria
			Can record twenty requirements of museum key stakeholders and users			Can match user key stakeholder and user needs with existing ICT applications and products
Communication	Knows five communication techniques		Can demonstrate the application of three communication techniques	Can analyze online communication processes	Can formalize online communication processes	Can select the appropriate communication technique based on criteria

			Can present ICT solution cost / benefit Can present digital asset management solution cost / benefit			
Impact analysis		Can identify ten museum advantages and improvements of adopting new technologies based on user experience		analyse the impact of functional/technical changes on key stakeholders and users		Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis Can evaluate the impact of functional/technical changes on key stakeholders and users

D12. Digital Marketing						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Strategy	Knows two digital marketing plans	Can identify two digital marketing plans	Can apply two digital marketing tactics		Can develop an effective digital marketing plan	
Technological tools	Can record three analytical tools Can name the digital marketing areas (search/display/email/social media/ mobile marketing)		Can use three analytical tools			
Web technologies	Knows five social media	Can recognize four web technologies Understands the online environment (how it works)	Can assess the effectiveness of websites (technical performance/ speed)	Can inspect the web analytics	Can manage the e-reputation	
User/ audience	Knows four user needs		Can assess the engagement of the user based on analytical reports			

	Knows all user target groups		Uses the web technology to increase user/ audience satisfaction			

E.1 Forecast Development						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Technology and market	Knows the market size and relevant fluctuations	Can identify at least two methods to generate sales forecasts in relation to current market share	Can apply at least three large scale data analysis techniques (data mining)	Can connect museum and audience needs with products in the market	Can combine museum and audience needs with interactive and multimedia installations/tools/applications developed	
	Knows accessibility of the market according to current conditions (e.g. government policies, emerging technologies, social and cultural trends, etc.)	Can interpret external research data and analyse information	Can apply new emerging technologies (e.g. distributed systems, virtualisation, mobility, data sets)			
			Can apply at least three methods to analyze information and business processes			
Organisation	Can interpret the extended supply chain operation			Can identify organisational processes and the way they are integrated and their dependency upon ICT applications	Can combine museum and audience needs with interactive and multimedia installations/tools/applications developed	
	Knows museum's budget dedicated to ICT development			Can compare sales and production forecasts of forthcoming/newly launched ICT tools and solutions and analyse potential mismatches		

				Can connect museum and audience needs with products in the market		
Stakeholders and Users	Knows museum and audience needs Knows at least three museum and audience need analysis techniques			Can connect museum and audience needs with products in the market		
Communication				Can analyze in at least three different ways information and online communication processes		
Impact Analysis			Can apply at least three what-if techniques to produce realistic outlooks	Can identify organisational processes and the way they are integrated and their dependency upon ICT applications Can identify four business advantages and improvements of adopting emerging technologies for the museum Can analyze three future developments in business process and technology application Can analyse feasibility in terms of costs and benefits		

E.4 Relationship Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**

Organisation/Museum	Knows at least four museum processes including, decision making, budgets and management structure	Can identify at least four objectives of the museum	Can demonstrate empathy towards museum staff needs	Can determine museum's challenges and risks as long as they are relevant to digital asset management	Can establish realistic expectations to support development of mutual trust	
		Can identify museums, staff and technology providers needs		Can examine ongoing commitments to ensure fulfillment	Can propose at least three solutions to meet museums, staff and technology providers needs	
		Can identify at least three challenges and risks of the museum				
Stakeholders/audience/users		Can identify at least three objectives of stakeholders		Can determine stakeholders' objectives as long as they are relevant to digital asset management	Can examine and arrange resources to meet stakeholder requirements	
		Can identify at least three potential win-win opportunities for user/audience and museum			Can propose at least three techniques to respond to audience needs and their motivation	
Communication	Can present good and bad news to avoid surprises	Can express him/herself also at least in one foreign language	Can demonstrate good interpersonal skills		Can explain (defend, argue, justify)	

E.6 ICT Quality Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Standards/Best practices/Quality	Knows which methods, tools and procedure are applied within the museum and where they should be applied	Understands regulations and standards in energy efficiency and e-waste	Can apply the IS internal quality audit approach	Can determine technologies and standards to be used during the deployment	Can manage quality audits	
	Knows three ICT quality standards	Understands the museum's enterprise architecture and internal standards	Can operate three ICT quality standards	Can analyse (monitor, understand and act upon) quality indicators		

		Can recognize the potential and opportunities of relevant standards and best practices	Can apply digital asset management quality standards			
		Understands the importance of being ethical				
Technology			Can apply all the required technologies (web/ cloud/mobile) and environmental requirements	Can determine at least three technologies and standards to be used during the deployment		
Museum		Understands the museum's enterprise architecture and internal standards	Can illustrate how methods, tools and procedures can be applied to implement the museum's quality policy			
Process			Can select at least three measures to evaluate effectiveness and efficiency of the overall process	Can analyse process steps to identify at least three strengths and weaknesses		

E.7 Business Change Management						
Module	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Business Process			Can apply at least three evaluation, design and implementation methodologies	Can analyse information and online communication processes in at least three different ways	Can construct and document a plan for implementation of process enhancements	Can optimize museum business strategy and processes
			Can apply at least four project management standards and tools	Can connect how business processes are integrated and their dependency upon ICT applications		Can interpret information and business processes in at least three different ways

				Can connect how museum's online communication processes are integrated into the online marketing mix and dependent upon ICT applications		Can evaluate costs and benefits of business changes
						Can predict future developments in organisational process and technology application
ICT strategy	Knows at least three digital strategies		Can apply digital strategies		Can propose at least two appropriate ICT solutions based upon benefit, risks and overall impact	
					Can propose at least three organisational advantages and improvements of adopting emerging technologies	
Communication					Can explain (defend, argue, justify)	
Impact				Can analyse costs and benefits of museum's organisational changes	Can propose at least three appropriate ICT solutions based upon benefit, risks and overall impact	Can predict the impact of business changes on the museum and human resources
					Can revise and explain effects of implementations	Can predict the impact of business changes on legal issues
						Can predict the impact of business changes related to online communication on the museum and human resources
						Can predict organisatonal advantages and improvements of adopting emerging technologies

Dimension 1 e-Comp. area	D. ENABLE	
Dimension 2 e-Competence: Title + generic description	**D.11. Needs Identification** Actively listens to key stakeholders. e.g. children, local audiences, tourists, decision makers, educational institution representatives, Cultural Heritage professionals, museum employees, to articulate~~s~~ and clarif~~y~~ their needs. Manages the relationship with all stakeholders to ensure that the solution is in line with business requirements. Proposes different solutions (e.g. make-or-buy), by performing contextual analysis in support of user centered system design. Advises the museum on appropriate solution choices. Acts as an advocate engaging in the implementation or configuration process of the chosen solution.	
Dimension 3 e-Competence proficiency levels e-1 to e-5, related to EQF levels 3 to 8	**Level 1**	
	Level 2	
	Level 3	Establishes reliable relationships with key stakeholders, e.g. children, local audiences, tourists, decision makers, educational institution representatives, Cultural Heritage professionals, museum employees, and helps them clarify their needs.
	Level 4	Exploits wide ranging specialist knowledge of the key stakeholders to offer possible solutions to their needs.
	Level 5	Provides leadership in support of the management team's strategic decisions. Helps key stakeholders to envisage new ICT solutions, fosters partnerships and creates value propositions.
Dimension 4 Knowledge examples *Knows/Aware of/Familiar with*	K1 emerging technologies and the relevant market applications K2 museum needs K3 key stakeholders needs K4 organisation processes and structures K5 customer need analysis techniques K6 communication techniques K7 "Story telling" techniques	
Skills examples *Is able to*	S1 analyse and formalise business processes S2 analyse customer requirements S3 present ICT solution cost / benefit S4 match key stakeholders needs with existing products S5 analyse the impact of functional/technical changes on key stakeholders	

Annex 8.1.1. Methodology for defining the learning outcomes for each role profile – the example of e-competence D11.

In figure 1, is shown the description of a sample competence (D.11. Needs identification). In the following, the steps of the proposed methodology will be described in detail. The activities of each step will be analyzed and examples based on the competence D.11. will be provided.

Figure 1. Sample description of an e-CF competence (D.11. Needs identification)

STEP 1: Create a table showing the occurrence of each competence across job roles

Table 1 shows the e-CF competences that are being used in the definition of eCulture job roles. In each cell, the e-CF levels that each competence has to be mastered per profile are shown. Overall, 31 competences are used.

e-CF Competences	Cultural ICT Consultant	Cultural (ICT-enabled) Guide	Digital Cultural Asset Manager	Interactive Cultural Experience Developer	Online Cultural Community Manager
A.1. IS and Museum Strategy Alignment	4, 5				
A.2. Service Level Management	3,4				
A.3. Management Plan Development	4,5		3, 4, 5	3,4	3,4
A.4. Product / Service Planning	2,3, 4		2,3,4	2, 4	2,3,4
A.6. Application Design				1,2,3	
A.7. Technology Trend Monitoring	4,5		4	4	4
A.8. Sustainable Development	3,4				
A.9. Innovating	4,5		4	4,5	4,5
B.1. Application Developing				1,2,3	
B.2. Component Integration				2,3,4	

B.3. Testing				2,3	
B.4. Solution Deployment				1,2,3	
B.5. Documentation Production			1,2,3	1,2,3	1,2,3
C.1. User Support		2		1,2	1,2,3
C.2. Change Support	2, 3			2,3	
C.3. Service Delivery			2		
C.4. Problem Management			2,3	2,3	2,3
D.1. Information Security Strategy Development	4,5				
D.2. ICT Quality Strategy Development	4,5				2
D.3. Education and Training Provision	1,2,3,4				
D.4. Purchasing	2,3,4		2,3		
D.10. Information and Knowledge Management	4,5		3,4,5		
D.11. Needs Identification	3,4,5	3,4	3,4	3,4	3,4
D.12. Digital Marketing					2,3
E.1. Forecast Development	3,4			3,4	3,4
E.3. Risk Management	2,3,4		2,3	2,3	
E.4. Relationship Management	3,4		3	3	4
E.5. Process Improvement	3,4				
E.6. Quality Management	2,3,4		2,3,4	2,3,4	2,3,4
E.7. Change Management	3,4,5				3,4

Table 1. Participation of e-CF competences per job role (with e-CF level)

STEP 2: Define learning unit for each competence

The definition of a learning unit contains the following activities:

a. Write competence transversal description
b. Write learning outcomes

c. Define assessment techniques

STEP 2a. Writing the competences transversal description

Since each competence may take part in several job roles, albeit with slightly different content, in this step, for each competence, a table containing all definitions (Table 2) and level descriptions (Table 3) is compiled.

In Table 2, all definitions of D.11 competence across all job roles are gathered. These correspond to Dimension 2 of e-CF. Similar requirements or sub-competences are marked using the same color. Then, one can see that, a generic description of D.11 competence can be as follows (colors match the ones used in Table 2):

1. Be able to actively listen (to internal / external key stakeholders and users, e.g. children, local audiences, tourists, decision makers, educational institution representatives, Cultural Heritage professionals, museum employees)
2. Be able to articulate and clarify their needs and perform contextual analysis
3. Manage the relationship with all stakeholders (to ensure that the solution is in line with museum and user requirements)
4. Propose different solutions (i.e. make or buy) and advise the museum (on appropriate solution choices)
5. Engage in the implementation or configuration process of the chosen solutions

Cultural ICT consultant	Actively listens to key stakeholders. e.g. children, local audiences, tourists, decision makers, educational institution representatives, Cultural Heritage professionals, museum employees, to articulate and clarify their needs. Manages the relationship with all stakeholders to ensure that the solution is in line with business requirements. Proposes different solutions (e.g. make-or-buy), by performing contextual analysis in support of user centered system design. Advises the museum on appropriate solution choices. Acts as an advocate engaging in the implementation or configuration process of the chosen solution.
Cultural ICT guide	Actively listens to audience, articulates and clarifies their needs. Proposes different solutions customised to the identified audience needs. Advises the museum's management team on appropriate solution choices.
Digital cultural asset manager	Actively listens to internal / external users, articulates and clarifies their needs. Manages the relationship with all stakeholders to ensure that digital asset management is in line with museum requirements. Proposes different solutions (e.g. make-or-buy), by performing contextual analysis in support of user centered system design. Advises the museum's management team on appropriate solution choices. Acts as an advocate engaging in the implementation or configuration process of the chosen solutions.
Interactive cultural experience developer	Actively listens to internal / external key stakeholders, e.g. museum staff and representatives of its audience, articulates and clarifies their needs. Manages the relationship with all stakeholders to ensure that the solution is in line with museum and user requirements. Proposes different solutions (e.g. make-or-buy), by performing contextual analysis in support of user centered system design. Advises the museum's

	management team on appropriate solution choices. Acts as an advocate engaging in the implementation or configuration process of the chosen solution.
Online cultural community manager	Actively listens to internal / external key stakeholders, articulates and clarifies their needs. Manages the relationship with all stakeholders to ensure that the solution is in line with museum requirements. Proposes different solutions, by performing contextual analysis in support of user centered online communication plan. Advises the organisation's management team on appropriate solution choices. Acts as an advocate engaging in the implementation or configuration process of the chosen components of the plan.

Table 2. Definitions of D.11 competence across job roles

In Table 3, the description of the proficiency levels for competence D.11 across all job roles are given. These correspond to Dimension 3 of e-CF (note that e-CF levels map to EQF levels). One can see that D.11 competence in all profiles is required to be demonstrated at e-CF levels 3 and 4, while in one profile, level 5 must be demonstrated as well.

One can see that **in level 3**, the professional should be able to:

1. Establish reliable relationships with key stakeholders and users, and
2. Clarify their needs

Clearly, the ability to actively listen is necessary in order to establish reliable relationships.

In level 4, the professional should be able to:

1. Offer possible solutions to key stakeholders and users, using his/her expert knowledge of their needs (therefore level 4 supersedes level 3), and
2. Provide expert guidance (by proposing solutions and supplier)

In some cases, the professional should also engage in the implementation or configuration process of the chosen solutions.

In level 5, the professional should be able to:

1. Provide leadership in support of the management team's strategic decisions,
2. Help key stakeholders to envisage new ICT solutions,
3. Foster partnerships and
4. Create value propositions

Clearly these call for the competence to be exercised to the highest possible EQF level.

	LEVEL 3	LEVEL 4	LEVEL 5
Cultural ICT consultant	Establishes reliable relationships with key stakeholders, e.g. children, local audiences, tourists, decision makers, educational institution representatives, Cultural Heritage professionals, museum employees, and helps them clarify their needs.	Exploits wide ranging specialist knowledge of the key stakeholders to offer possible solutions to their needs.	Provides leadership in support of the management team's strategic decisions. Helps key stakeholders to envisage new ICT solutions, fosters partnerships and creates value propositions.
Cultural ICT guide	Establishes reliable relationships with audience and helps them clarify their needs.	Uses her/his knowledge on the audience needs to suggest possible solutions, customisations of tools/applications/services.	
Digital cultural asset manager	Establishes reliable relationships with users and helps them clarify their needs.	Exploits wide ranging specialist knowledge of the user needs to offer possible solutions to their–needs. Provides expert guidance to the user by proposing solutions and supplier.	
Interactive cultural experience developer	Establishes reliable relationships with key stakeholders, museum staff and representatives of the audience, and helps them clarify their needs.	Exploits wide ranging specialist knowledge of the key stakeholders, museum staff and representatives of the audience to offer possible solutions their—needs. Provides expert guidance to all by proposing solutions and supplier.	
Online cultural community manager	Establishes reliable relationships with key stakeholders and helps them clarify their needs.	Exploits wide ranging specialist knowledge of the key stakeholders (see summary statement) to offer possible solutions to their needs. Provides expert guidance to the key stakeholders by proposing solutions and supplier.	

Table 3. Description of various levels for D.11 competence across job roles

STEP 2b. Writing the learning outcomes

Firstly, a table containing all knowledge and skill items (e-CF dimension 4) is compiled (Table 4). Note that, most of these items are in effect the result of the contextualization of the generic knowledge and skill items listed in the D.11 competence of e-CF (shown in the first row of Table 4); extra items are colored in red.

	KNOWLEDGE	SKILL
Generic e-CF	K1 emerging technologies and the relevant market applications K2 business needs K3 organisation processes and structures K4 customer need analysis techniques K5 communication techniques K6 "Story telling" techniques	S1 analyse and formalise business processes S2 analyse customer requirements S3 present ICT solution cost/benefit
Cultural ICT consultant	K1 emerging technologies and the relevant market applications K2 museum needs K3 key stakeholders needs K4 organisation processes and structures K5 customer need analysis techniques K6 communication techniques K7 "Story telling" techniques	S1 analyse and formalise business processes S2 analyse customer requirements S3 present ICT solution cost / benefit S4 match key stakeholders needs with existing products S5 analyse the impact of functional/technical changes on key stakeholders
Cultural ICT guide	K1 technologies and their relevant applications K2 museum's goals K3 audience needs / expectations K4 museum processes and structures K5 audience needs' analysis techniques K6 communication techniques K7 "Story telling" techniques	S1 analyse audience requirements S2 match audience needs with existing ICT applications S3 analyse the impact of functional/technical changes on audience S4 identify museum advantages and improvements of adopting new technologies based on user experience
Digital cultural asset manager	K1 emerging technologies and the relevant market applications K2 museum's needs K3 user needs K4 museum processes and structures K5 user need analysis techniques K6 communication techniques K7 "Story telling" techniques	S1 analyse and formalise digital asset management processes S2 analyse user requirements S3 present digital asset management solution cost / benefit S4 match user needs with existing products S5 analyse the impact of functional/technical changes on user
Interactive cultural experience developer	K1 emerging technologies and the relevant market applications K2 key stakeholders needs K3 museum processes and structures K4 user need analysis techniques K5 communication techniques K6 "Story telling" techniques	S1 analyse and formalise asset management processes S2 analyse audience requirements S3 evaluate interactive and multimedia installations/tools /applications cost / benefit S4 match key stakeholders needs with existing products

		S5 analyse the impact of functional/technical changes on key stakeholders
Online cultural community manager	K1 emerging technologies and the relevant market applications K2 museum's communication needs K3 key stakeholders needs K4 museum processes and structures K5 audience need analysis techniques K6 communication techniques K7 "Story telling" techniques	S1 analyse and formalise online communication processes S2 analyse museum and audience requirements S3 present ICT solution cost / benefit S4 match key stakeholders needs with existing products S5 analyse the impact of functional/technical changes on key stakeholders

Table 4. Knowledge and skill items for D.11 competence across all job roles

Secondly, similar knowledge and skill items are merged, resulting to broad (knowledge and skill) items. For the D.11 competence, these are:

1. **Technology and market** (knowledge of emerging technologies and the relevant market applications, present ICT solution cost/benefit)
2. **Organization** (business needs, museum needs, museum goals, organisation processes and structures, museum processes and structures, museum communication needs, analyse and formalise business processes, analyse and formalise digital asset management processes, analyse and formalise online communication processes)
3. **Stakeholders and users** (customer need analysis techniques, audience needs analysis techniques, user need analysis techniques, key stakeholders needs, audience needs / expectations, user needs, analyse customer requirements, analyse museum and audience requirements, analyse user requirements, match key stakeholders needs with existing products, match audience needs with existing ICT applications match user needs with existing products, match key stakeholders needs with existing products)
4. **Communication** (communication techniques, "Story telling" techniques, present ICT solution cost / benefit, present digital asset management solution cost / benefit, analyse and formalise online communication processes)
5. **Impact analysis** (analyse the impact of functional/technical changes on key stakeholders, identify museum advantages and improvements of adopting new technologies based on user experience, analyse the impact of functional/technical changes on user, evaluate interactive and multimedia installations/tools /applications cost / benefit)

These five broad items will form the Core learning outcomes of the learning units.

In the third step, for each of the broad knowledge and skill items, learning outcomes are produced, following the ABCD approach and using verbs appropriate to the Bloom taxonomy level. This step entails allocation of learning outcomes to one of the six levels of Bloom taxonomy. In Table 5, the outcome of this step regarding D.11 competence is shown.

The Learning Outcomes that relate to specific job roles (contextualized learning outcomes) have been colored.
The outcome of this step is a list of learning outcomes per unit of the module.

STEP 2c. Define assessment techniques

STEP 3: Prepare training material – one separate training session for each of the job roles on the basis of the learning units (and core competences defined therein)

STEP 4: Adapt training methods/ Fine-tuning

When all learning units are ready and all profiles covered, we need to check whether learning outcomes, evaluation methods, KPIs, responsibilities and deliverables are covered

Module	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Technology and market	Can look for and enumerate three ICT suitable for museums	Can describe three ICT and their application in museums	Can operate or apply three ICT in museums	Can analyze cost / benefit of three ICT in museums	Can present ICT solution cost / benefit Can present digital asset management solution cost / benefit	Can assess emerging ICT and their possible application in museum context Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis
Organization		Can identify museum needs and goals, organizational chart, information, communication and control processes		Can analyze three digital asset management processes. Can analyze three online communication processes	Can formalize three digital asset management processes. Can formalize three online communication processes	

Stakeholders and users	Knows five stakeholder and user need analysis techniques	Can identify ten museum key stakeholders and users.	Can demonstrate the application of three needs analysis techniques Can record twenty requirements of museum key stakeholders and users	Can analyze twenty requirements of museum key stakeholders and users		Can select the appropriate needs analysis technique based on criteria Can match user key stakeholder and user needs with existing ICT applications and products
Communication	Knows five communication techniques		Can demonstrate the application of three communication techniques Can present ICT solution cost / benefit Can present digital asset management solution cost / benefit	Can analyze online communication processes	Can formalize online communication processes	Can select the appropriate communication technique based on criteria
Impact analysis		Can identify ten museum advantages and improvements of adopting new technologies based on user experience		analyse the impact of functional/technical changes on key stakeholders and users		Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis Can evaluate the impact of functional/technical changes on key stakeholders and users

Table 5. Learning outcomes per module for D.11 competence

Annex 8.2. – Writing the learning outcomes

The adoption of learning outcomes in the educational process marks a shift from the traditional "teacher centred" approach to a "student centred" approach. In the former model, only teachers were responsible for the content to be taught and the instructional strategy to be used. Course descriptions consisted of the content that would be covered in lectures, while assessment focused on how well the students absorbed this content. The "student centred" model adopts an "outcome-based" approach, focusing on what the students will learn, master and be able to do as they progress through the course.

Various definitions of a learning outcome appear in the literature. The common ground among them is that learning outcomes describe:

- what the learner has achieved rather than the intentions of the teacher;
- what the learner can demonstrate at the end of a learning activity.

In this document we shall adopt the following definitions (EQF, 2008):

- A **"learning outcome"** is a statement of what a learner knows, understands and is able to do on completion of a learning process, which is defined in terms of knowledge, skills and competence;
- **"Knowledge"** means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual;
- **"Skills"** means the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments);
- **"Competence"** means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy.
- **"Qualification"** means a formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards;

The learning outcome approach requires, first of all, a change in perspective and a new way of approaching teaching goals, in order to develop valid courses. Then, the actual process of writing the learning outcomes is a consequence of these changes.

The following general guidelines may be of assistance when writing learning outcomes:

- Use the ABCD / SMART approaches in writing the learning outcomes

- Each learning outcome should refer to one and only level in Benjamin Bloom's taxonomy
- Avoid complicated sentences. If necessary use more one than one sentence to ensure clarity
- Each learning outcome should contain one and only one action verb; use the list of verbs associated with each level in the taxonomy
- Avoid vague terms like know, understand, learn, be familiar with, be exposed to, be acquainted with, and be aware of. These terms are associated with teaching objectives rather than learning outcomes
- The learning outcomes must be observable, measurable and capable of being assessed
- Bear in mind the timescale within which the outcomes are to be achieved. There is always the danger that one can be over-ambitious when writing learning outcomes. Ask yourself if it is realistic to achieve the learning outcomes within the time and resources available
- Before finalizing the learning outcomes, ask your colleagues and possibly former students if the learning outcomes make sense to them

The ABCD and SMART approaches

In order to write useful learning outcomes, we suggest adopting the ABCD approach (Mager, 1984):

- **Audience:** determines who will master the outcome. A very common way to begin a learning outcome is: "The student will be able to…"
- **Behavior:** says what a learner is expected to be able to perform as a result of achieving the learning outcome, or, in other words, how will the student demonstrate achievement of the outcome
- **Condition:** describes the important conditions (if any) under which student's performance is to occur
- **Degree:** wherever possible, describes the criterion of acceptable performance by describing how well the learner must perform in order to be considered acceptable.

Note that the verb used to describe a desirable behaviour in a learning outcome must be observable. However, a performance can be overt or covert. The former refers to any kind of performance that can be observed directly, whether that performance be visible or audible, while the latter refers to performance that cannot be observed directly, performance that is mental, invisible, cognitive, or internal. A performance can be covert as long as there is a direct way determining whether it satisfies the outcome. "A direct way" means a single behavior that will indicate the covert skill.

When specifying the condition, one should be detailed enough to be sure the desired performance would be recognized by another competent person. Here are some questions to ask:

- What will the learner be allowed to use?
- What will the learner be denied?

- Under what conditions the desired performance is expected to occur?
- Are there any skills that the student specifically should not develop?

Examples of degrees: time limits, accuracy, quality. By specifying the acceptable level of performance for each outcome, one has the means for determining whether instruction is successful. Both the teacher and the student would know the quality of performance necessary to work for or exceed.

Examples of well written outcomes are:

- "Given a sentence written in the past or present tense, the student will be able to re-write the sentence in future tense with no errors in tense or tense contradiction."
- "Given the opportunity to work in a team with several people of different races, the student will demonstrate a positive increase in attitude towards non-discrimination of race, as measured by a checklist utilized/completed by non-team members."
- "Given 3 minutes of class time, the student will solve 9 out of 10 multiplication problems of the type: 5 X 4 = _____."
- "Given a map of Europe, the student will be able to list 8 capital cities in 5 minutes".

Legend:

- Audience - Green
- Behavior - Red
- Condition - Yellow
- Degree - Blue

The ABCD approach can be combined with the SMART approach for better results:

- **Specific** means that the learning outcome describes the knowledge, skills and competences that a learner should be able to demonstrate following exposure to a learning activity.
- **Measurable** means that achievement of learning objectives can be measured by specific evaluation methods during or after the session.
- **Action-oriented** means that the objective includes an action verb that demonstrates change or acquisition of knowledge, skills or competences.
- **Reasonable** means that the objective reflects realistic expectations of knowledge, skills and competences acquisition/change given the conditions for instruction.
- **Time-bound** means that the objective specifies a time frame in which learners are expected to achieve the learning objective(s)—usually by the end of the session.

Examples of SMART outcomes:

- Following this session, participants will describe four factors that increase the risk of HIV transmission in women.
- After attending the lecture and studying the assigned handouts, participants will list three types of tests.

Legend:

- Specific - Magenta
- Measurable - Blue
- Action oriented - Red
- Reasonable - Green
- Time bound - Yellow

To include:

The taxonomy of Benjamin Bloom

Contemporary approaches to writing learning outcomes are based on the work of Benjamin Bloom (1913 – 1999), who studied in Pennsylvania State University, USA and graduated with bachelor and master degrees from that institution. He then worked with Ralph Tyler at the University of Chicago and graduated with a PhD in Education in 1942.Bloom identified three domains of learning – cognitive, affective and psycho-motor – each of which is organized as a series of levels or pre-requisites. It is suggested that one cannot effectively — or ought not try to — address higher levels until those below them have been covered (it is thus effectively serial in structure). The three domains can be defined as follows (Atherton, 2011):

- **Cognitive:** it is the most widely used of the three domains. It refers mostly to knowledge structures and contains a classification (or taxonomy) of thinking behaviors from the simple recall of facts up to the process of analysis and evaluation (Bloom et al, 1956). A revised taxonomy of levels has been proposed by Anderson and Krathwohl (2001).
- **Affective:** it is concerned with values, or more precisely perhaps with perception of value issues, and ranges from mere awareness (Receiving), through to being able to distinguish implicit values through analysis (Bloom, Krathwohl and Masia, 1964).
- **Psycho-Motor:** it mainly emphasizes physical skills involving co-ordination of the brain and muscular activity and is commonly used in areas like laboratory science subjects, health sciences, art, music, engineering, drama and physical education. Bloom never completed work on this domain, and there have been several attempts to complete it. One of the simplest versions has been suggested by Dave (1970); a more detailed one by Simpson (1972).

As well as providing a basic sequential model for dealing with topics in the curriculum, Bloom's taxonomy also suggests a way of categorizing levels of learning, in terms of the expected ceiling for a given course.

Cognitive domain

Bloom's work is most advanced in the cognitive domain and provides a framework in which one can build upon prior learning to develop more complex levels of understanding. It is frequently used for writing learning outcomes, since it provides a ready-made structure and list of verbs. The use of the correct verbs is the key to the successful writing of learning outcomes.

Bloom's taxonomy of cognitive domain consists of the following six levels (Bloom et al, 1956, Kennedy et al, 2006):

1. **Knowledge:** may be defined as the ability to recall or remember facts without necessarily understanding them. Some of the action verbs used to assess knowledge are:
   Arrange, collect, define, describe, duplicate, enumerate, examine, find, identify, label, list, memorise, name, order, outline, present, quote, recall, recognise, recollect, record, recount, relate, repeat, reproduce, show, state, tabulate, tell.

2. **Comprehension**: may be defined as the ability to understand and interpret learned information. Some of the action verbs used to assess comprehension are:
   Associate, change, clarify, classify, construct, contrast, convert, decode, defend, describe, differentiate, discriminate, discuss, distinguish, estimate, explain, express, extend, generalise, identify, illustrate, indicate, infer, interpret, locate, paraphrase, predict, recognise, report, restate, rewrite, review, select, solve, translate.

3. **Application**: may be defined as the ability to use learned material in new situations, e.g. put ideas and concepts to work in solving problems. Some of the action verbs used to assess application are:
   Apply, assess, calculate, change, choose, complete, compute, construct, demonstrate, develop, discover, dramatise, employ, examine, experiment, find, illustrate, interpret, manipulate, modify, operate, organise, practice, predict, prepare, produce, relate, schedule, select, show, sketch, solve, transfer, use.

4. **Analysis**: may be defined as the ability to break down information into its components, e.g. look for inter-relationships and ideas (understanding of organisational structure). Some of the action verbs used to assess analysis are:
   Analyse, appraise, arrange, break down, calculate, categorise, classify, compare, connect, contrast, criticise, debate, deduce, determine, differentiate, discriminate, distinguish, divide, examine, experiment, identify, illustrate, infer, inspect, investigate.

5. **Synthesis**: may be defined as the ability to put parts together. Some of the action verbs used to assess synthesis are:
   Argue, arrange, assemble, categorise, collect, combine, compile, compose, construct, create, design, develop, devise, establish, explain, formulate, generalise, generate, integrate, invent, make, manage, modify, organise, originate, plan, prepare, propose, rearrange, reconstruct, relate, reorganise, revise, rewrite, set up, summarise.

6. **Evaluation:** may be defined as the ability to judge the value of material for a given purpose. Some of the action verbs used to assess evaluation are:
   Appraise, ascertain, argue, assess, attach, choose, compare, conclude, contrast, convince, criticise, decide, defend, discriminate, explain, evaluate, grade, interpret, judge, justify, measure, predict, rate, recommend, relate, resolve.

A more detailed classification of verbs per level can be found in BCIT (1996) and online.

Bear in mind that, when writing learning outcomes, try to avoid overloading the list with outcomes which are drawn from the lower levels of Bloom's taxonomy, but also try to challenge the students to use what they have learned by including some learning outcomes drawn from the higher levels.

Affective domain

In order to describe the way in which we deal with things emotionally, Bloom and his colleagues developed five major categories (Bloom, Krathwohl and Masia, 1964):

1. **Receiving**. This refers to a willingness to receive information, e.g. the individual accepts the need for a commitment to service, listens to others with respect, shows sensitivity to social problems, etc.
2. **Responding**. This refers to the individual actively participating in his or her own learning, e.g. shows interest in the subject, is willing to give a presentation, participates in class discussions, enjoys helping others, etc.
3. **Valuing.** This ranges from simple acceptance of a value to one of commitment, e.g. the individual demonstrates belief in democratic processes, appreciates the role of science in our everyday lives, shows concern for the welfare of others, shows sensitivity towards individual and cultural differences, etc.
4. **Organisation.** This refers to the process that individuals go through as they bring together different values, resolve conflicts among them and start to internalise the values, e.g. recognises the need for balance between freedom and responsibility in a democracy, accepts responsibility for his or her own behaviour, accepts professional ethical standards, adapts behaviour to a value system, etc.
5. **Characterisation**. At this level the individual has a value system in terms of their beliefs, ideas and attitudes that control their behavior in a consistent and predictable manner, e.g. displays self reliance in working independently, displays a professional commitment to ethical practice, shows good personal, social and emotional adjustment, maintains good health habits, etc.

A set of verbs that can be used to express learning outcomes in the affective domain includes: *act, adhere, appreciate, ask, accept, answer, assist, attempt, challenge, combine, complete, conform, cooperate, defend, demonstrate (a belief in), differentiate, discuss, display, dispute, embrace, follow, hold, initiate, integrate, justify, listen, order, organise, participate, practice, join, share, judge, praise, question, relate, report, resolve, share, support, synthesise, value*

A more detailed classification of verbs per level can be found in BCIT (1996) and online.

Psychomotor domain

Dave (1970) proposed a hierarchy consisting of five levels:

1. **Imitation**: Observing the behaviour of another person and copying this behaviour. This is the first stage in learning a complex skill.

2. **Manipulation**: Ability to perform certain actions by following instructions and practicing skills.
3. **Precision**: At this level, the student has the ability to carry out a task with few errors and become more precise without the presence of the original source. The skill has been attained and proficiency is indicated by smooth and accurate performance.
4. **Articulation**: Ability to co-ordinate a series of actions by combining two or more skills. Patterns can be modified to fit special requirements or solve a problem.
5. **Naturalisation**: Displays a high level of performance naturally ("without thinking"). Skills are combined, sequenced and performed consistently with ease.

Subsequently, Simpson (1972) developed a more detailed hierarchy consisting of seven levels:

1. **Perception**: The ability to use observed cues to guide physical activity.
2. **Set (mindset)**: The readiness to take a particular course of action. This can involve mental, physical and emotional disposition.
3. **Guided response**: The trial-and-error attempts at acquiring a physical skill. With practice, this leads to better performance.
4. **Mechanism:** The intermediate stage in learning a physical skill. Learned responses become more habitual and movements can be performed with some confidence and level of proficiency.
5. **Complex Overt Responses:** Physical activities involving complex movement patterns are possible. Responses are automatic and proficiency is indicated by accurate and highly coordinated performance with a minimum of wasted effort.
6. **Adaptation:** At this level, skills are well developed and the individual can modify movements to deal with problem situations or to fit special requirements.
7. **Origination:** The skills are so highly developed that creativity for special situations is possible.

A set of verbs that can be used to express learning outcomes in the affective domain includes: *Adapt, adjust, administer, alter, arrange, assemble, balance, bend, build, calibrate, choreograph, combine, construct, copy, design, deliver, detect, demonstrate, differentiate (by touch), dismantle, display, dissect, drive, estimate, examine, execute, fix, grasp, grind, handle, heat, manipulate, identify, measure, mend, mime, mimic, mix, operate, organise, perform (skilfully), present, record, refine, sketch, react, use.*

A more detailed classification of verbs per level can be found in BCIT (1996) and online.

Methodology for writing learning outcomes

Given the above, we propose the following methodology for developing usable learning outcomes:

- **Step 1:** Collect data related to the topic of the course or the knowledge / skill / competence of the module and prepare a textual description
- **Step 2:** Analyze the meaning of every word given and define every unknown term
- **Step 3:** Differentiate between knowledge, skill and competence; these correspond to different levels in Bloom's taxonomy

- **Step 4:** Apply the ABCD approach to create one learning outcome for each knowledge, skill or competence
- **Step 5:** Evaluate the learning outcomes for clarity, coherence, completeness (with respect to the domain AND to Bloom's taxonomy levels) and ability to be assessed
- **Step 6:** Go to step 1 if any of the above conditions is not met and repeat the cycle

Note that steps 1 and 2 belong the Preparation phase, steps 3 and 4 belong to the Development phase and steps 5 and 6 belong to the Evaluation phase. Here is an example of the application of the methodology to the definition of learning outcomes for Webmaster, one job profile developed in project PIN. For the construction of learning outcomes specific data was used: the job profile of Webmaster, the competence B1, Design and development (e-Competence Framework), which belongs to competence area Build and a set of Technical skills, including:

- T01: Has knowledge of netiquette, interactive virtual environment, Social networks, etc.
- T02: Has knowledge of online usability requirements
- T04: Can create media elements
- T05: Can draft texts clearly, concisely, correctly

Preparation Phase

- Step 1: Collect data for the Webmaster's job, research associated qualifications and get additional information from a professional Webmaster.
    - E.g. read the analytical description of this job profile from the text developed in the context of PIN.
- Step 2: Analyze the descriptions, especially those that refer to qualifications or competences. Link qualifications with a curriculum that develops Webmaster related degrees. Research the study guide, find related courses and study the content and purpose of these courses.
    - E.g. For the technical skill "T01: Has knowledge of netiquette, interactive virtual environment, Social networks, etc.", the word netiquette must be clarified and how it can be linked to studies leading to Webmaster related degrees

Development Phase

- Step 3: Take under consideration the words used in description of outcomes. This will help classification of the learning outcomes in the taxonomy.
    - E.g. For the technical skill "T04: Can create media elements", the verb can states capability, as a result there are expected learning outcomes mainly at the higher levels of Application and Synthesis and probably less at levels of Knowledge and Comprehension.
    - In contrast the technical skill "T01: Has knowledge of netiquette, interactive virtual environment, Social networks, etc.", the substantive knowledge refers more to the low levels of Knowledge and Comprehension.

- Step 4: After getting a direction for the levels, which will represent the expected action to be performed, follows the choice of the appropriate verb (from the verb-list which is included in each Bloom level). This verb supports conceptually the learning outcome.
    - E.g. For the technical skill "T01: Has knowledge of netiquette, interactive virtual environment, social networks, etc." after understanding the words netiquette and virtual environment and having comprehended Webmaster's responsibilities, follows the choice of verb that completes the learning outcome and relates it to the appropriate level. In this case, the verb is chosen for the Knowledge level and will be associated with the background that Webmaster has in Network Theory. As a result, the following learning outcome is derived:
        - Knowledge: After completing this course, the student will be able to define using 500 words how network theory views social relationships.

Evaluation Phase

- Step 5: The learning outcomes are evaluated for clarity, coherence, completeness (with respect to the domain AND to Bloom's taxonomy levels) and ability to be assessed.

E.g. the above learning outcome adopts both ABCD and SMART approaches; it can be assessed by asking the student to write an essay using 500 words on how network theory views social relationships.

Annex 8.3. The EQF leaflet

Please see document attached

Annex 8.4. The European e-Competence Framework 3.0.

Please see document attached

Annex 8.5. Case study: The 14 e-competences of Digital Cultural Asset Manager developed and evaluated in the training sessions

There will be a complete methodology analyzed on how to train the 14 e-competences so to achieve the competences and the skills according to the Profile. Specifically there will be a statement, the learning outcomes, keywords, the resources and the assesment methods for each e-competence required for the DCAM.

8.5.1 Digital Asset Management Plan Development

When the institutions start to make the preparatory arrangements to implement DAM, they should create in advance, like with the physical collections, a collections' policy. This document is the basis of a good system implementation and should allow the answering of all questions derived from the museum employees during the process.

In order to learn how to design and develop a collection management policy please follow the American Alliance of Museums (AAM) **"Developing a Collections Management Policy"** resource available at: http://www.aam-us.org/docs/continuum/developing-a-cmp-final.pdf?sfvrsn=2 or use an example of the Metropolitan Museum's collection policy available at: http://www.metmuseum.org/about-the-museum/collections-management-policy.

Taking that in consideration you can start working on the museum's Digital Asset Management Plan focusing on three essential areas:

1. **Human resources or Digital People:**
2. **Digital Strategy;**
3. **Digital systems.**

These three focus areas are described in the former Collections Trust CEO, Nick Poole, posts on Going Digital. Please read them. They are available at:

1. **Going Digital Part 1: Digital People - http://www.collectionstrust.org.uk/blog/past-posts/item/13500-going-digital-part-1-digital-people;**
2. **Going Digital Part 2: Digital Strategies - http://www.collectionstrust.org.uk/blog/past-posts/item/13506-going-digital-part-2-digital-strategy;**
3. **Going Digital Part 3: Digital Systems - http://www.collectionstrust.org.uk/blog/latest-posts/item/13509-going-digital-part-3-digital-systems.**

In this posts Nick Poole tries to explain all the aspects in a Collection Trust campaign in order to promote the development of Internet and new technology used in the UK museums. These three detailed materials can be implemented in your Digital Asset Management Plan.

The resources published by CT in the Going Digital program page can help you see in a wider picture the issues concerning the plan. These are available at: http://www.collectionstrust.org.uk/collections-link/going-digital.

You can prepare a detailed business plan with costs, risks, strengths and weakness based on these three areas. These resources will help you preparing the next issue of this course.

Learning outcomes

At the end of the training session the learner:

- Knows three emerging technologies (interactive/ multimedia installation/tool/ application);
- Knows three present market needs;
- Can report three present market needs;
- Can identify four main milestones in a management plan;

- Can identify five museum needs and goals;
- Can identify five stakeholders needs and goals;
- Can conduct an IS/ online communication/ digital asset management strategy;
- Can identify the risks and the opportunities of the plan
- Can demonstrate three emerging technologies (interactive/ multimedia installation/tool/ application);
- Can use the web technology for the museum's benefit;
- Can record five requirements of stakeholders and users;
- Applies strategic thinking in exploitation of ICT;
- Can apply three risk and opportunity assessment techniques;
- Provides analysis of the present market environment;
- Can analyse the museum's environment;
- Can analyse the impact of two business management plans on stakeholders;
- Can analyse the impact of functional/ technical changes on users;
- Addresses the design and structure of a business plan;
- Can make a SWOT analysis based on the museum's strategy;
- Can manage the creation of the best suited IS strategy;
- Can explain how the online communication plan complement the overall communication strategy;
- Evaluates the product features based on the business plan;
- Can recommend the best online communication plan;
- Can evaluate the best digital asset management strategy;

Keywords
Museum Mission; Collections Policy; DAM Planning; DAM Ecosystem; Build; Needs; Strategies; Communication; Analysis; Evaluation;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
10 Steps to a Successful Digital Asset Management Implementation	http://www.opentext.com/connect/global/sso_download_open?docpath=/product/opentext/media-management/ten-steps-to-a-successful-digital-asset-management-implementation-pdf	A 10 step approach to DAM system implementation.
A Framework of Guidance for	http://www.niso.org/publications/rp/framework3.pdf	A guideline from the National Information Standards Organization

Resource	Available at:	Description
Building Good Digital Collections		to build digital collections with quality.
A Business-Planning Template: Considerations for Cultural Heritage Organizations and Their Digital Asset Programs	http://www.clir.org/pubs/reports/pub124/template.html	The template described here is intended to help cultural heritage institutions prepare a plan about DAM.
How to Develop a Digital Asset Management Strategy [Infographic]	http://www.cmswire.com/cms/digital-asset-management/how-to-develop-a-digital-asset-management-strategy-infographic-022899.php	A specific infographic about DAM Strategy development.
Digital Asset Management: Implementing A Strategy	http://www.daydream.co.uk/digital-asset-management-implementation.asp	The process of implementing a Digital Asset Management strategy using a DAM system.
A global DAM strategic planning methodology – FirmCo: Business strategy and goals.	http://www.palgrave-journals.com/dam/journal/v6/n2/pdf/dam20104a.pdf	An article by Skiff Wager describing a case study about a DAM implementation and strategy development in a business company.
DAM, You Can Do It: Getting Started with Digital Asset Management	http://wcanada.sla.org/2012/05/22/dam-you-can-do-it-getting-started-with-digital-asset-management/	An article by Dawn Bassett on how to get started with DAM.
Digital Asset Management: Elements of an Institutional Program	http://www.dartmouth.edu/~library/col/0607/docs/DukeDartmouth.pdf?mswitch-redir=classic	A report about the Duke/Dartmouth project on Digital Asset Management.

Assessment methods

To assess the training session the tutor should prepare/ask a case study using relevant context regarding the learner's situation or specific needs (if the training session occurs in a museum they should use the museum situation to build the case study). An example of context for a case study to a DAM plan development could be:

The X Museum has a collection of 10000 objects covering the history of the City X since the 19th Century. This museum is situated at the city centre and was founded 10 years ago by the city

municipality. The museum staff is composed by one historian, two guards, one administrative official and one curator. The museum wants to be more relevant for its community and has in place a digital strategy with the main goal to be recognized as a important references to the study of X city and a place of edutainment for younger audiences. The museum want to use the digital collection to promote the museum and engage more audiences (virtual and physical ones) to their premises.

Please discuss with your tutor and colleagues and write a DAM plan based on the resources that you've read/listen/seen in this training session.

This training session is a specific part of the first step to prepare a DAM ecosystem - PLAN. Please read also the specific chapter above.

8.5.2 Product / Service Planning

For product and service planning you will need to have in mind the resources read above so to define the overall management plan. Nevertheless you will need to assess the institution status on digital asset management. To do so, the DAM Foundation created this tool: The DAM Maturity Model (available at http://dammaturitymodel.org).

Using this tool will enable you and your institution to audit and improve the DAM capabilities. The DAM Maturity Model (DAM-MM) uses 15 dimensions organized in four categories to define the digital asset management ecosystem:

1. People;
2. Information;
3. Systems;
4. Processes.

Please read the information at the DAM-MM website and download the Maturity Model and asses your institution ecosystem by using that MM. It will help you to define current and target status, regardless the point of development of your organisation.
The DAM case studies published by DAM Foundation will be helpful at this (and other) point of the plan development. They are available at http://damfoundation.org/?cat=11.

Another must-read resource is the presentation entitled **"Implementation of systems for Media / Digital Asset Management Systems in 10 Steps"** by Kara van Malssen, from the Poland National Audiovisual Institute, available at:
http://pt.slideshare.net/kvanmalssen/implementation-mam-10steps.

Learning outcomes
At the end of the training session the learner:

- Can label four basic decision – making methods;
- Can define the different plans;

- Knows two structured project management methodologies;
- Knows five organization need analysis techniques;
- Knows how to document a plan;
- Can describe four basic decision – making methods;
- Can identify five museum needs and goals;
- Can identify five decision makers/users needs and goals;
- Can identify the key users;
- Can classify complex documents;
- Can identify ten museum advantages and improvements of managing the change request process;
- Can apply four basic decision – making methods;
- Can use optimization methods;
- Can operate two project management methodologies;
- Can predict three documentation requirements for the digital asset management plan;
- Can produce quality plans;
- Can analyse two project management methodologies;
- Can identify three additional documentation requirements for the digital asset management plan;
- Can generate optimization methods in the product/ service planning;
- Can develop and maintain plans;
- Can manage the change request processes;
- Can formalize two project management methodologies;
- Can manage adequate information for the decision makers;
- Can develop two digital asset management plans and the related documentation;
- Can evaluate basic decision – making methods
- Can assess two project management methodologies

Keywords

Planing; Project methodology; Technical documentation; Reports; Digital Asset Management Models; Implementation; Diagnosis and analysis;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
Getting the product and service plan right	http://pt.slideshare.net/roymogg/the-marketing-mix-price-the-bizface-on-line-mba	A brief presentation about product and service planning. Not focused on DAM, but it can help the

Resource	Available at:	Description
		discussion.
Introduction to Decision Making Methods	http://academic.evergreen.edu/projects/bdei/documents/decisionmakingmethods.pdf	An article by János Fulop about decision-making methods.
Building a Scalable Digital Asset Management Platform in the Cloud	https://youtu.be/kJq0y1wwioY	A presentation about the a scalable DAM platform in the cloud.
Service focus	http://www.optimityadvisors.com/IndustryExperience/MediaEntertainment/ServiceFocus/	A brief but important text about Service focus.
Information Governance Maturity Model	http://eiarquivos2013.weebly.com/uploads/1/6/7/0/16700556/a_maturity_model_for_information_governance.pdf	A presentation about Information Governance and service delivery.
Guidelines for producing effective documentation	http://www.technical-communicators.com/articles/Guidelines_for_producing_effective_documentation.pdf	A short article with a 9 rules approach to produce effective documentation.
Digital Asset Management Plan template	https://www.idigbio.org/wiki/images/2/20/NMNH_Digital_Asset_Plan_Template.pdf	A digital asset management plan template from the Smithsonian Institution that can be analysed in this context.
How to maximize your content management strategy with DAM	http://www.widen.com/blog/how-to-maximize-your-content-management-strategy-with-digital-asset-management-part-1	A two part article about DAM implementation and best pratices.

Assessment methods

To assess the training session the tutor should prepare/ask a case study using relevant context regarding the learner's situation or specific needs (if the training session occurs in a museum they should use the museum situation to build the case study). An example of context for a case study to product or service planning could be:

The X Museum has a collection of 10000 objects covering the history of the City X since the 19th Century. This museum is situated at the city centre and was founded 10 years ago by the city municipality. The museum staff is composed by one historian, two guards, one administrative official and one curator. The museum wants to be more relevant for its community and has in place a digital strategy with the main goal to be recognized as an important reference to the study of X city and a place of edutainment for younger audiences.

The museum wants to use the digital collection to promote the museum and engage more audiences (virtual and physical ones) to their premises. The museum is using a digital management system for almost one year and has only 500 objects/digital assets recorded. The only person using the system is the museum curator, but the museum board wants to make available at last 75% of the collection in 6 months.

Please discuss with your tutor and colleagues and write a product/service plan based on the resources that you've read/listen/seen in this training session.

This training session is a specific part of the first step to prepare a DAM ecosystem - PLAN. Please read also the specific chapter above.

8.5.3 Technology Trend Monitoring

Trend monitoring in the cultural sector regarding the use of technologies that can benefit in some way the digital collection management is a huge task.

Everyday we find new technology, new tools, faster systems, new hardware, etc. that can help museums to accomplish the tasks implied in DAM management. In many ways these technologies can help us, but some times they can be a problem to a well-implemented management and documentation system, because they have an extended learning and implementation curve or they don't reply to the institution needs or to the expectations of their audiences.

Therefore a digital curator needs to stay informed about the most recent developments and research in issues like standards, technology (hardware or software), web development, etc. Usually a curator can stay informed by subscribing and reading selected and renowned scientific journals and by participating in conferences, workshops, scientific meetings or trade fairs organised by vendor associations.

These more traditional forms of trend monitoring are still important, but today a digital asset manager can't forget the online tools at his disposal. Above all, the social networks have the power to quickly disseminate information about a new technology, standard or a specific and important event about DAM. To learn more about this subject you can read "What's Trending In Dam, Take-Home Messages From Henry Stewart Dam New York" by James Rourke at the DAM Foundation blog (available at http://damfoundation.org/?p=31799).

There are some monitoring tools for social networks that a digital asset manager should learn about and use regularly. A list of these tools, with a small description, can be found at http://smallbiztrends.com/2012/09/20-free-social-media-monitoring-tools.html.

You can also monitor trends through professional associations (the International Council of Museums (ICOM), which is the most important at the museum sector – www.icom.museum) or by participating in webinars and online courses available regularly on the web.

The participation in professional associations will help the digital curator to stay informed in implementing and using specific DAM systems and strategies since many times these associations develop training sessions and courses in this field of expertise. The DAM Foundation has a free online course entitled "Introduction to Digital Asset Management" that will help the newcomers into the DAM issues. This five parts course is available at http://damfoundation.org/?course=intro.

Visiting thematic blogs, vendor websites and experimenting online software demos are another forms to monitor technology trends. A specific DAM systems vendor, Canto, has a diverse offer of resources, including webinars, available for free online as well (https://www.canto.com/dam-resources/).

Trend monitoring is an essential part for the innovation competences investigated to a digital curator.

Learning outcomes

At the end of the training session the learner:

- Can name three emerging technologies and their relevant applications;
- Can investigate three latest ICT technological developments;
- Can investigate three ICT technological developments in managing digital assets;
- Can propose three latest ICT technological developments;
- Can recommend three latest ICT technological developments;
- Can identify three vendors and providers of the ICT solutions;
- Can select two vendors/ providers of the most promising ICT solutions;
- Can evaluate and justify the proposed vendors/ providers of ICT solutions;
- Knows the relevant sources of information (magazines, conferences, events, newsletters, opinion- leaders, on-line – forum etc.);
- Can discriminate the two most promising sources of information;
- Can propose the two most promising sources of information
- Can assess the two most promising sources of information in the strategic decision – making;
- Knows five museum goals and needs;
- Identifies five museum advantages and improvements of adopting ICT;
- Can relate the existing products with the museum's needs;

- Can illustrate expert guidance and advice to the museum teams;
- Can propose three options for strategic decisions;
- Can decide the best ICT for the museum;
- Knows five audience goals and needs;
- Can take strategic decisions predicting ICT solutions for audience- oriented processes;

Keywords

New technology; Analysis; Needs diagnosis; Market knowledge; Strategy; Information sources; Social Networks; Training; Research;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
Digital Asset Manegement News	http://digitalassetmanagementnews.org	DAM News is a website with revelant information about DAM (Vendors, resources, news, features, etc.).
CMS Wire	http://www.cmswire.com	CMSwire is a web magazine that covers a range of useful topics to DAM.
Top 10 social media analytics tools: The VentureBeat index	http://venturebeat.com/2013/12/20/top-10-social-media-analytics-tools-the-venturebeat-index/	10 Social Media analytics tools described by VentureBeat that can be used to analyse social networks about DAM.
Social Media Analysis tool	http://sysomos.com	A product to analyse data from Social Media
Social Media Analysis services	http://www.socialbakers.com/products/analytics	A service from SocialBakers to analyse social media.
Free Social Media Analysis tools	http://www.socialmediatoday.com/marketing/2015-03-10/9-best-free-social-media-analytics-tools	Some free and online available tools for social network monitoring.

Assessment methods

The most appropriate method to use in this training session is a questionnaire (Questions/answers) to determine the knowledge and skills absorbed by the learners. The questionnaire should focus on the learning outcomes defined to the session according with the level of expertise and specific needs of each learner. The tutor and learner should discuss the answers after the period determined to finish this task.

Some questions examples could be:

1. Please list five museum goals on the digital asset management ecosystem?
2. Please name the principal and most reliable source of information about DAM in the cultural sector?
3. Why do you think that is the most reliable source of information about DAM in the cultural sector?
4. Please name three emergent technologies and their application in the DAM ecosystem of a museum?
5. If your institution needs to buy a specific system for DAM who may them contact and why? Please name three or more vendors.
6. If your museum wants to make the collection available online what kind of tools do you recommend for them to use?
7. According with the plan defined in the training session "DAM Plan Development" please name a specific product to deal with the Digital Asset Collection online accessibility?

This training session is a specific part of the first step to prepare a DAM ecosystem - PLAN. Please read also the specific chapter above.

8.5.4 Innovating

This is the most difficult competence for a digital asset manager or a digital curator to attain. To accomplish this competence he must have proficiency with all the competences needed to plan, implement and manage a DAM ecosystem, but he also needs to do research regarding any DAM issue (technology, standards, terminology, informatics, etc.).

In some countries there are university degrees and other technical courses that can help a digital curator to be involved in research and innovation. The Digital Curation Center, a "world-leading centre of expertise in digital information curation with a focus on building capacity, capability and skills for research data management" has published a list of some international courses that might be useful to check: (http://www.dcc.ac.uk/training/data-management-courses-and-training).

In Portugal, for instance, there is a postgraduate course at the Nova University of Lisbon that is focused on information management and digital curation (in Portuguese available at

http://fcsh.unl.pt/ensino/pos-graduacoes-pt/gestao-e-curadoria-da-informacao), but is very common to find this kind of courses in universities with archives, libraries and museum studies.

The digital curator should have, alongside with the research habits referred, implemented in the institution a system to receive feedback from the internal users and from external sources (audiences, costumers, in-house visitors, etc.). This kind of interaction will potentiate creative thinking, new concepts, public engagement and social impact through the products delivered by a DAM ecosystem.

There are many forms to do this (social networks monitoring, user feedback, surveys, website analytics, etc.), but a Return on investment (ROI) approach such as the one described by Ralph Windsor (available at http://digitalassetmanagementnews.org/features/how-to-avoid-wasting-your-dam-budget-an-roi-oriented-approach-to-digital-asset-management-implementation/) can give us a perspective with financial data alongside with the more qualitative information about the implementation of a DAM system.

Another way to promote innovation within internal and external audiences is to engage them in the innovation process. Smithsonian Institution (http://www.si.edu) has done it by creating an wiki called **"SI Web and New Media Strategy Wiki"** (available at https://smithsonian-webstrategy.wikispaces.com) for the Smithsonian's Web and New Media strategy development (2009-2014) that is (still) open for public (internal and external) participation in that process.

These kinds of tools should be used according to the mission and policies of your institution and they don't apply in any scenario. So you must use those more appropriate for your case.

Learning outcomes

At the end of the training session the learner:

- Can present novel and open thinking;
- Knows three latest technological applications;
- Knows three business and market trends;
- Knows five museum's goals and needs;
- Knows five audience goals and needs;
- Applies innovative thinking;
- Can demonstrate revolutionary concepts;
- Applies technological awareness;
- Applies the technological solutions to the museum needs;
- Applies the technological solutions to the audience needs;
- Can identify four appropriate resources;
- Can identify five advantages of adopting new technologies;
- Can analyze different target groups of audience (needs/ characteristics);
- Analyze the impact of functional/ technical changes on audience/ users;
- Can generate two innovation processes techniques in the provision of solutions;
- Can devise two creative solutions for supporting the digital asset management plan;

- Can assess the two innovation processes techniques in the provision of solutions;
- Can recommend innovative changes to the ICT strategy;
- Evaluates the technological solutions to the museum needs;
- Evaluates the technological solutions to the audience needs;

Keywords
Research; Training; New technologies; Market knowledge; Audience feedback; Innovation; New tools; Creative thinking; Teamwork; Strategy;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
The New Cooper Hewitt Experience	http://www.cooperhewitt.org/new-experience/	This project intend to change the way that museum visitors interact with the museum collection with the help of a interactive tool with the shape of a pen.
Cleveland Art Museum Collections Wall	http://www.clevelandart.org/gallery-one/collection-wall	The Collection Wall, a 40-foot interactive, multitouch, MicroTile wall, displays in real time all works of art from the permanent collection currently on view in the galleries.
Cleveland Art Museum ArtLens app	http://www.clevelandart.org/gallery-one/artlens	ArtLens is an app developed by the Cleveland Museum of Art that allows you to explore works in the permanent collection both at the museum and from home.
Museums and the Web	http://www.museumsandtheweb.com	A useful platform with a lot of information about recent museum innovation and new technologies applied to the sector.
MuseumNext	http://www.museumnext.com/conference/	MuseumNext is a major conference on the future of museums.

Assessment methods

Innovation is difficult to learn and therefore is difficult to assess as well. However this training session can be assessed with the help of a case study where the tutor and the learner(s) could evaluate the skills needed to develop this competence. An example of context for a case study about innovating could be:

The Museum X had digitised the physical collection to respond to the continuous educational and promotional needs identified with their staff and external audiences. 30.000 art objects dated from the 17th and 18th centuries compose the museum collection. This university museum uses this collection with educational and research purposes and the museum audiences (mainly art history students and researchers) need specific raw metadata information (according with standards) and also tools for information analysis. Nevertheless the museum wants also to engage with other audiences to increase their online and onsite visitors. They will need, as well, to transform the metadata in curated information that could be transformed in knowledge by this specific audience target.

This situation is quite common but the museum board wants to develop a single answer to the scientific community and to the other audiences with a single and innovative web platform where you can learn about the collections and also use the information available in art history studies and research.

Please discuss with your tutor and colleagues and write an essay discussing on a innovative answer for the museum website needs based on the resources that you've read/listen/seen in this training session.

This training session is a specific part of the first step to prepare a DAM ecosystem - PLAN. Please read also the specific chapter above.

8.5.5 Documentation Production

In the museum sector the production of documentation to use, support and enable collections management systems (CMS) or DAM systems, is quite common. They are often called Procedure Manual or Staff Handbook and they provide the details needed to guide the institution staff across the processes and procedures established. They are already in use for the physical museum collections, so in order to assure the integration of the digital asset management specifications they must be reviewed according with the specifications detailed at the DAM plan.

A good procedural manual must start to define the organisation work environment (that must be checked with safety and health regulations and laws applied in) and the specific roles and

responsibilities of every department and staff that is involved in digital asset management tasks.

This documentation should focus on the four areas determined by Collections Trust in the framework cited in the Plan topic of this course:

1. Collections development;
    a. Defines procedures and processes for acquisition, entry, disposal and deaccession;
2. Collections information;
    a. Defines procedures and processes for inventory control, location, cataloguing, valuation, audit, rights management, documentation metadata, etc.;
3. Collections preservation;
    a. Defines procedures and processes for risk management, loss or damage, digital preservation, condition checking, formats, etc.;
4. Collections accessibility;
    a. Defines procedures and processes for loans, exploitation (including monetization) and every use of the digital assets collection.

This document shouldn't be a repetition of the Collections Management Policy, but it should be instead a how-to guide with step-by-step instructions on how to proceed, according with the institution mission and collections policy, when a specific task is needed.

Alongside with these step-by-step instructions the procedural manual should also include definitions on:

1. Information input:
    a. Rules for terminology, metadata, file formats, edition tools and other issues related with collections management;
2. Information output:
    a. Standards, templates, classification on different categories of information, legal context and all the other issues related with collections' use and accessibility. In this area you might consider to define the system reporting (internal and external) capabilities.

At the end you should also include information about the document version and establish the review period of the procedures manual. The review process is fundamental for a up-to-date manual according to the DAM specifications and needs and should be established if anything is altered in the DAM ecosystem.

The SPECTRUM DAM document (available at http://www.collectionstrust.org.uk/collections-link/collections-management/spectrum/item/1688-spectrum-digital-asset-management), cited above in the Plan session, is a essential guide to enable the production this documentation.

To prepare the production of this documentation you can read and use the following examples:

- California State Parks Museum: Collections Management Handbook (PDF) - http://www.parks.ca.gov/pages/22491/files/museum_collections_mgmt_handbook_revised_2007.pdf.

- MIT Museum Collections Manual (PDF) - http://web.mit.edu/museum/collections/manual.html.

- University of California Santa Barbara Libraries: Collections Manager's Manual (HTML) - http://collman.library.ucsb.edu.

- Museum of Texas Tech University: Collections Management Procedures (PDF) - https://www.depts.ttu.edu/museumttu/Materials%20for%20web/operations/CM%20Procedures%20final%206-14-06.pdf.

- Birmingham Museums: Collections Management Framework (PDF) - http://www.birminghammuseums.org.uk/system/resources/W1siZiIsIjIwMTUvMDYvMDkvdmN6N2JxbHRtX0NvbGxlY3Rpb25zX01hbmFnZW1lbnRfRnJhbWV3b3JrXzIwMTVfMTkucGRmIl1d/BMT%20Collections%20Management%20Framework.

It is also useful to read the reference book "The Manual of Museum Management" by Gail and Barry Lord (available also online) as a guide for the documentation process.

At the end of the training session, the learner is able to create and develop a Procedure Manual that is a guide for all the processes, procedures, rules, tools and outputs of the museum's DAM system.

Learning outcomes

At the end of the training session the learner:

- Knows two standards in documentation;
- Knows four objectives of documentation;
- Knows different documents for designing/ developing and deploying products/ applications/ services;
- Knows three tools for production/ editing and distribution of professional documents;
- Knows two tools for multimedia presentation tools;
- Knows two museum ICT technologies;
- Can clarify the requirements of documentation;
- Applies standards to define document structure;
- Can produce documents describing interactive products/ tools/ applications;
- Can produce documents describing products/ tools/ applications for online communication;

- Can produce documents describing products/ tools/ applications used for digital asset management;

Keywords

Standards; Documentation; Planning; Strategy; Product development; Service development; Reporting; Data structure definition; Information interchange; Information reuse; Knowledge creation;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
Object ID	http://archives.icom.museum/objectid/	Object ID is an international standard for describing cultural objects. It is the result of years of research in collaboration with the museum community, international police and customs agencies, the art trade, insurance industry, and valuers of art and antiques.
A day in the life – Museum registrar	https://youtu.be/wUw-VWILF0Q?list=PL4xukRGEJAjPreqi--B4VFFHnBikbiGVP	A short video about the work of museum registrars with the physical collections and documentation production.
Collections Trust	http://www.collectionstrust.org.uk	The Collections Trust is the UK professional association for collections management.
SPECTRUM	http://www.collectionstrust.org.uk/collections-link/collections-management/spectrum	SPECTRUM is the most used collection management standard in the museum sector. It's available in different languages.
The SPECTRUM Community	http://www.slideshare.net/nickpoole/welcome-to-the-spectrum-community	An introduction to the SPECTRUM Community by

Resource	Available at:	Description
		Nick Poole.
SPECTRUM DAM Resources	http://www.collectionstrust.org.uk/collections-link/collections-management/spectrum/spectrum-dam-resources	SPECTRUM resources about DAM.
What is Digital Asset Management & why should you do it?	https://youtu.be/C-ZbG2iS21c	A presentation by David Walsh from the Imperial War Museums about DAM

Assessment methods

The best way to assess the acquisition of skills and competences needed in this training session is to build a case study that helps the learners to produce a specific documentation manual to be used in the daily work with the collections. An example of context for a case study about innovating could be:

The X Museum has a collection of 10000 objects covering the history of the City X since the 19th Century. This museum is situated at the city centre and was founded 10 years ago by the city municipality. The museum staff is composed by one historian, two guards, one administrative official and one curator. The museum wants to be more relevant for its community and has in place a digital strategy with the main goal to be recognized as an important reference to the study of X city and a place of edutainment for younger audiences.

The museum wants to use the digital collection to promote the museum and engage more audiences (virtual and physical ones) to their premises. The museum is using a digital management system for almost one year and has only 500 objects/digital assets recorded. The only person using the system is the museum curator, but the museum board wants to make available at last 75% of the collection in 6 months.

Please discuss with your tutor and colleagues and write the information input needs in a documentation manual to respond to this situation based on the resources that you've read/listen/seen in this training session.

This training session is a specific part of the second step to prepare a DAM ecosystem - BUILD. Please read also the specific chapter above.

8.5.6 Purchasing

Purchasing a DAM system isn't simple. There are many relevant issues to consider before the final choice or even before starting the procurement process to buy the wanted solution.

The first step needed to do when your institution decides to manage the digital assets collection is to analyse its current state.

You can do it by analysing the processes used before the implementation of a DAM system and the needs defined in the DAM plan. You should consider at this point the user's roles and responsibilities, staff skills and number, existing technological infrastructure (hardware and software), internal and external publics, digital collection dimension, physical collections digitization status, digital preservation issues, terminology used, processes with failures, excessive documentation backlogs, etc.

You can use the approach defined by Collections Trust in SPECTRUM and examine the current status according with collection development, documentation, preservation and accessibility (Cf. SPECTRUM at:
http://www.collectionstrust.org.uk/collections-link/collections-management/spectrum).
The DAM Maturity Model (http://dammaturitymodel.org) cited above is also a good tool for the current status analysis.

The second step needed to acquire and implement a DAM system is to identify and involve the stakeholders. You should involve everyone affected by a DAM implementation in your institution (IT department, curators, other digital curators, partners, marketing and communication departments, vendors and (above all) the institution board and managers) since their contribution will lead to a successful system. From the stakeholders you can get information about:

1. Priorities;
2. Current status of digital assets management;
3. Current ecosystem problems and non resolved issues;
4. Defining strategies to accomplish success in the medium and long run;
5. Specific needs and audience requests.

Afterwards, you can establish a representative task force that can manage the purchasing and implementation processes, according to the specifications determined in the DAM plan and the information gathered from the stakeholders' participation.

This task force, or DAM implementation managing team, will have the responsibility for all the projects, but still the involvement of stakeholders is crucial for success.

The task force should be responsible for:

1. Implementing the strategy defined in the DAM plan;
2. Defining the short, medium and long-term objectives;

3. Setting selection criteria;
4. Selecting the system;
5. Defining standards;
6. Defining training and creating training documentation;
7. Defining user's roles;

This project management team would be a great help for implementation, but now in many small museums throughout Europe is quite common to have a very small team, or even only one technician with the skills necessary for this task. In that case you should consider bringing in an outside expert in DAM. He/she can help these small institutions with the implementation process.

Another issue of extreme relevance for the purchasing process is the definition of standards that you should include in your ecosystem. In the cultural sector there is a wide range of relevant standards (some of them for the same purpose) that you must know and include in your selection criteria. They'll be fundamental for the success of a DAM System's implementation. This wide array include standards for metadata, terminology, formats, descriptions, cataloguing, etc. and a organized list that can be read at the Athena Project (http://www.athenaeurope.org) booklet entitled **"Digitisation: standards landscape for European museums, archives, libraries"** that is available at: http://www.athenaeurope.org/index.php?en/110/promotional-material/11/10-booklet-digitisation-standards-landscape-for-european-museums-archives-libraries.

In most cases available on the market you should be able to have a demo or trial software to experiment the applications proposed to you by vendors, but you should always ask or find referrals or experiences from similar customers to evaluate every single functionality publicized.

Last, but not least, you should take a deep look at the administrative part of your procurement process. This part of the process presupposes that the digital asset manager understands and applies the mission statement of the museum and the legislature.

Since purchasing and implementing your DAM system, is a complex project, you should read these guiding documents:

- SPECTRUM Digital Asset Management - http://www.collectionstrust.org.uk/collections-link/collections-management/spectrum/item/1688-spectrum-digital-asset-management.

- SPECTRUM DAM Resources - http://www.collectionstrust.org.uk/collections-link/collections-management/spectrum/spectrum-dam-resources.

- Extensis[16]: Digital Asset Management Best Pratice Guide - http://doc.extensis.com/DAM-Best-PracticesGuide-EN.pdf.

For selection criteria or software comparison you can use the following tools available online:

- Choose a DAM System – by Collections Trust – http://www.collectionstrust.org.uk/collections-link/collections-management/spectrum/item/13715-choose-a-dam-system.

- 10 Core Characteristics Listing Of Qualified Dam Vendors[17] – by DAM Foundation - http://damfoundation.org/?p=31619/.

- Bynder[18] Vendor Comparison Guide - http://info.getbynder.com/vendor-comparison-guide.

It might also be useful to take in consideration the example budget, published by Collections Trust, that is available at: http://www.collectionstrust.org.uk/media/documents/c1/a924/f6/DAM_example_budget.pdf. It will help you defining the cost structure of a DAM system implementation.

Learning outcomes

At the end of the training session the learner:

- Knows the current market for relevant products/services;
- Knows four museum needs;
- Knows the museum purchasing policy/ budget;
- Knows four audience needs;
- Can select two suppliers/ products/services;
- Can select two products/ services that improve digital asset management;
- Can select two products/ services that improve museum ICT strategy;
- Can use two benchmarking methods to find best tools/ systems;
- Can investigate the best suppliers/ products/services for the museum;
- Can examine the evaluation of process/ timeliness/cost/quality for products/ services;
- Can analyse received proposals/ offers;
- Can make recommendations on the best purchasing policy for the museum;
- Can manage museum purchasing budget;
- Can decide on the ultimate procurement policy;
- Can match museum needs with the existing products;
- Can match audience needs with the existing products;

[16] Extensis is a vendor of DAM Systems (http://www.extensis.com).
[17] In this article you'll find a tool to measure any vendor compliance with the 10 core characteristics of a DAM system.
[18] Bynder is a vendor of DAM Systems (https://www.getbynder.com/en/).

Keywords

Market Knowledge; Budget analysis; Needs; Vendor; Benchmark techniques; Legal context; Purchasing process management; Procurement policy; Strategy;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
Top Digital Asset Management Software Products	http://www.capterra.com/digital-asset-management-software/	A list of software available with reviews and classifications

Assessment methods

The most appropriate methodology to assess the Purchasing training session is continuous evaluation. The learner along with the tutor should continually make some exercises and discuss along with other learners, through the learning platform, the best way to purchase a DAM system according with different scenarios defined by the tutor with the learners' collaboration. These scenarios should address specific issues like:

1. Legal context;
2. Museum needs;
3. Museum constraints;
4. Different museum budgets;
5. Museum strategy on documentation/procurement/ICT
6. Audience needs;
7. Vendors;
8. System specifications;
9. Standards;
10. Evaluation methods for DAM systems;
11. Return on investment evaluation;

The learner and the tutor should discuss the result of these exercises, regardless of its form, after their conclusion.

This training session is a specific part of the third step to prepare a DAM ecosystem - ENABLE. Please read also the specific chapter above.

8.5.7 Information and Knowledge Management

Managing a digital asset collection, as we see is a difficult and complex task. A digital curator needs to be aware and acknowledged of a wide range of tools, policies, legal issues, communication, etc. and, in many cases, an expert in the specific thematic field of the collection (art, history, sciences, etc.).

Despite this complexity, the digital curator must always turn the data available for the collections into information and then create the tools that will allow figuration of information into knowledge for the audiences and users.

To facilitate that chain of events the digital curator or digital asset manager, should start by using standards for every single aspect of the DAM ecosystem. Standards are a unique way to enable the use (and therefore reuse) of information.

A guidance tool available in the specific standard landscape for museums, libraries and archives is the (above cited) booklet entitled **"Digitisation: standards landscape for European museums, archives, libraries"** (available at: http://www.athenaeurope.org/index.php?en/110/promotional-material/11/10-booklet-digitisation-standards-landscape-for-european-museums-archives-libraries) where you can find the specifications and different types of standards applied to this sector. This document includes also the basic concepts (metadata, digitisation, interoperability, types of standards) that will help you to understand some technical issues, but the main objective of this resource is to list the different standards for use (see chapter 2).

These kind of standards are produced by many museums or projects, but before starting exploring the benefits of using them a digital curator should visit three international recognised organisations in the areas of museum, libraries and archives:

- ICOM – International Council of Museums – http://www.icom.museum.
    - See mainly the work carried out by CIDOC, the ICOM international committee for documentation, and the standards produced by or with this committee collaboration. A leading interoperability standard that you must know is CIDOC-CRM (or ISO 21127:2006).
- IFLA - The International Federation of Library Associations and Institutions - http://www.ifla.org.
    - An organization that deals with standards for libraries and have published, among other, the Functional Requirements for Bibliographic Records (FRBR).
- ICA – International Council on Archives - http://www.ica.org.

- A organization that works in the archives' field and has developed, among many others, the ISAD(G) standard for archival description that has been used by every professional in this field of expertise.

These specific standards will help you to organise, document, preserve, publish and provide access to your collections, but nowadays you will also need to acknowledge other types of standards and tools that are essential for managing information and knowledge about your collection. These include database knowledge, web communication standards, development tools and code languages, social networks applications, legal environment, communication tools and skills or hardware and network infrastructure knowledge.

At the end of the day your focus should be the successful relation between your museum and the public.

To get more information on this topic, please read the white paper about the future of Museum Standards by Nick Poole available at: http://www.collectionstrust.org.uk/blog/past-posts/item/947-where-next-for-museum-standards and the presentations that he published entitled "Where next for Museum Documentation?" (available at: http://www.slideshare.net/nickpoole/where-next-for-museum-documentation) and "Communicating through objects and collections" (available at: http://www.slideshare.net/nickpoole/communicating-through-objects-and-collections-belgrade).

Learning outcomes

At the end of the training session the learner:

- Knows two digital asset management processes;
- Knows two data mining methods;
- Knows four museum needs;
- Knows four audience needs/ requirements;
- Knows two information distribution policies;
- Can select the appropriate ICT devices/ tools for management of the digital assets (organization, discovery, preservation, access and use);
- Translate museum behavior into structured information;
- Can apply the appropriate ICT devices/ tools for management of the digital assets (organization, discovery, preservation, access and use);
- Correlates digital assets and knowledge;
- Can create the appropriate information structure;
- Correlates information and knowledge;
- Can analyze two digital asset management processes;
- Can apply two data mining methods;
- Applies two innovative solutions according to appropriate the information structure;
- Makes available the digital assets;
- Can set up the most appropriate digital asset structures;

- Can formalize the audience requirements;
- Makes information available;
- Can justify the most suitable digital asset management process;
- Can recommend the most appropriate digital asset structure for the museum;

Keywords

Documentation processes: Digital Asset Management processes; Needs; Market knowledge; Digital curation; Digital information context; New technology; Process implementation; Data structure; Data analysis;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
DAM and Metadata	http://www.databasics.com.au/solutions/dam/dam_meta.html	A brief article about DAM metadata standards
Why Interoperability Standards Are So Critical To The Future Of Digital Asset Management	http://digitalassetmanagementnews.org/features/why-interoperability-standards-are-so-critical-to-the-future-of-digital-asset-management/	An article by Andreas Mockenhaupt (Director of Professional Services at Canto – a vendor company) about the importance of interoperability in DAM
DAM Standads and Specification Organizations	http://www.dameducation.com/digital-asset-management-standards-specifications/	A reference list of some key standards and the organizations that produce them.
Getty Research Institute vocabularies	http://www.getty.edu/research/tools/vocabularies/	A specific group of reference vocabularies for the heritage sector.
Canadian Heritage Information Network	http://www.rcip-chin.gc.ca/index-eng.jsp	The Canadian Heritage Information Network (CHIN) enables museums and other heritage institutions to connect with each other and their audiences through digital technologies.
CIDOC-CRM	http://www.cidoc-crm.org	The CIDOC Conceptual Reference Model provides definitions and a

Resource	Available at:	Description
		formal structure for describing the implicit and explicit concepts and relationships used in cultural heritage documentation.

Assessment methods

The most appropriate method to use in this training session is a questionnaire (Questions/answers) to determine the knowledge and skills absorbed by the learners. The questionnaire should focus on the learning outcomes defined to the session according with the level of expertise and specific needs of each learner. The tutor and learner should discuss the answers after the period determined to finish this task.

Some questions (examples) could be:

1. Please name the three essential organizations that produce standards for the MLA institutions?
2. Please list three mandatory standards for museum documentation?
3. Name the fields of an object information record using Object ID?
4. List the standards that a museum should use to make the collection available online?
5. What is the standard that help museums with collections management procedures?
6. What is the name of the standard developed by CIDOC that is being used in the Archive and Libraries sector as well?
7. Why standards are important to fulfil the audiences needs on collections information?
8. What kind of standards is available for digitisation in the MLA sector according with the Athena Project?

This training session is a specific part of the third step to prepare a DAM ecosystem - ENABLE. Please read also the specific chapter above.

8.5.8 Needs Identification

In the last section of this training session we'll go through the methods available to identify specific institution needs regarding a DAM system implementation and use.

In many aspects there are some basic needs for a DAM system that are covered in the above sections of this training session. In every single tool you don't need to identify the application's needs in formatting metadata, since it is a standard functionality.

Needs identification methods should address the singularities of your museum and the DAM ecosystem. For instance, if your organisation needs to publish information in social network

profiles, and you need a specific format, dimension or integration you are facing specific needs. If you have a specific CMS implemented, and you want to integrate it at your DAM system processes and procedures, you are facing specific needs as well.

To identify the specific needs of your institution the best way is to take into consideration to the museum's internal and external users that have specific needs regarding to the DAM ecosystem. They'll give you processes workflow, input functionalities, system outputs (reports, analytic data, etc.), terminology standards to use, information categories needs according to different audiences, etc. You can read a good example of needs identification in a final report (with methodology explained) from University of California Libraries at: http://libraries.universityofcalifornia.edu/groups/files/ngts/docs/pots/pot1_lt1a_finalreport_july2012.pdf.

As in other sessions a good way to organise your questionnaire is by using the SPECTRUM collections framework focusing the questions on matters of information, preservation, accessibility and development of your digital assets collection.

Please read the DAM case study about Museum Victoria, available at: http://www.palgrave-journals.com/dam/journal/v5/n3/full/dam20094a.html and visit the presentation of a case study about the Pitt Rivers Museum DAM implementation, also available online at: http://www.palgrave-journals.com/dam/journal/v5/n3/full/dam20094a.html. These two documents are good examples for the work needed here.

Learning outcomes

At the end of the training session the learner:

- Can look for and enumerate three ICT suitable for museums;
- Knows five stakeholder and user need analysis techniques;
- Knows five communication techniques;
- Can describe three ICT and their application in museums;
- Can identify museum needs and goals, organizational chart, information, communication and control processes;
- Can identify ten museum key stakeholders and users;
- Can identify ten museum advantages and improvements of adopting new technologies based on user experience;
- Can operate or apply three ICT in museums;
- Can demonstrate the application of three needs analysis techniques;
- Can record twenty requirements of museum key stakeholders and users;
- Can demonstrate the application of three communication techniques;
- Can present ICT solution cost / benefit;
- Can present digital asset management solution cost / benefit;
- Can analyze cost / benefit of three ICT in museums;
- Can analyze three digital asset management processes;

- Can analyze three online communication processes;
- Can analyze twenty requirements of museum key stakeholders and users;
- Can analyze online communication processes;
- Analyze the impact of functional/technical changes on key stakeholders and users;
- Can present ICT solution cost / benefit;
- Can present digital asset management solution cost / benefit;
- Can formalize three digital asset management processes;
- Can formalize three online communication processes;
- Can formalize online communication processes;
- Can assess emerging ICT and their possible application in museum context;
- Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis;
- Can select the appropriate needs analysis technique based on criteria;
- Can match user key stakeholder and user needs with existing ICT applications and products;
- Can select the appropriate communication technique based on criteria;
- Can evaluate digital asset, interactive and multimedia installations/tools/applications using cost / benefit analysis;
- Can evaluate the impact of functional/technical changes on key stakeholders and users;

Keywords

Needs (internal and external) knowledge; Analysis; Organization diagnosis; ROI analysis; Communication skills; Assessment; Standards; Process implementation; Process workflows analysis; Market knowledge;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
Five tips to identify business goals for DAM	http://digitalassetmanagement.com/blog/five-tips-business-goals-dam/	An article with five specific points to take in consideration on identifying needs.
Methodology to identify Information needs	http://kslibassoc.org/pdf/klcideninfnneed.pdf	A presentation by Francis J. Devadason with a method to identify needs in the information sector.
A Methodology for the Identification	http://archive.ifla.org/IV/ifla62/62-devf.htm	An article by Francis J. Devadason and P. Pratap

Resource	Available at:	Description
of Information Needs of Users		Lingam about methods to identify information needs.

Assessment methods

To assess this training session on Needs identification we can use two different methods: Case Studies and Multiple choices evaluation. The tutor and learners should determine the most appropriate one for each competence or skill defined for this role profile.

To assess acquisition of some skills in this session the tutor should give a context and ask for an essay about the most appropriate methods to determine the museum needs to implement a DAM ecosystem. An example of a case study context could be:

The X Museum has a collection of 10000 objects covering the history of the City X since the 19th Century. This museum is situated at the city centre and was founded 10 years ago by the city municipality. The museum staff is composed by one historian, two guards, one administrative official and one curator. The museum wants to be more relevant for its community and has in place a digital strategy with the main goal to be recognized as an important reference to the study of X city and a place of edutainment for younger audiences.

The museum wants to use the digital collection to promote the museum and engage more audiences (virtual and physical ones) to their premises. The museum is using a digital management system for almost one year and has only 500 objects/digital assets recorded. The only person using the system is the museum curator, but the museum board wants to make available at last 75% of the collection in 6 months.

Please discuss with your tutor and colleagues and determine the methodology that should be used to list the museum needs to deal with the museum goals in this situation based on the resources that you've read/listen/seen in this training session.

For multiple-choice evaluation the tutor, along with the learner, can use the above-described context and then ask what kind of methodologies are more appropriate to establish the museum needs. In this specific context we could use the following choices:

1. To determine the museum needs you should gather information on the relevant sources on DAM systems available online like blogs, DAM system vendors websites, DAM specialists websites, DAM scientific journals, etc.;
2. To determine the museum needs you should use questionnaires and interviews to gather information with the relevant stakeholders of the museum (staff, board, trustees, audiences, etc.);
3. To determine the museum needs you should use other museum examples gathered in case studies published online about the DAM implementation in worlds biggest museums;

At the end of each exercise the tutor and learner should discuss the results and define the next steps on continuous evaluation (if this assessment methodology was the chosen one).

This training session is a specific part of the third step to prepare a DAM ecosystem - ENABLE. Please read also the specific chapter above.

8.5.9. Service Delivery

Once your museum has the DAM system up and running it'll start to deliver a service that couldn't or shouldn't be interrupted in any circumstances and it must be delivered in compliance with the quality goals defined in the DAM plan/strategy.

The digital asset manager needs to be proactive to ensure that the system is running and he must be able to put together a monitoring system that acts in the following points of stress:

- Infrastructure
    - Regardless of the choice between a cloud solution and an in premises installation, your infrastructure should be closely monitored. There are some monitoring tools available directly from your system software, but is recommended to find a vendor that ensures the infrastructure security (with a cloud solution) or, in case of in premises network and servers, find a monitoring tool that allows the digital asset manager in compliance with the IT department to plan upgrades to its capacity (bandwidth, storage space, processing speed, etc.). In this case the IT department should have a monitoring and reporting tools like the ones provided by Splunk (http://www.splunk.com);
- Workflows and procedures
    - Monitoring the procedures and workflows is an essential task after you start to manage a digital assets collection. To do this you must go randomly to a product of a workflow or procedure and compare it in correlation with the quality and objectives determined in the strategy plan. If they don´t match, the digital asset manager needs to go through the workflow or procedure to determine and solve the wrong step or steps;
- Standards and information control
    - As we saw before, standards are the best way to enable the use of a cultural institution collection (digital or physical). They help you organizing the collection's metadata and data, they provide structured databases and terminology for collections documentation and they are responsible for the

success of a good search engine. Nevertheless a digital asset manager or curator must create a check routine to see if metadata, terminology, classifications, name attributions, file location, etc. are matching with the previously defined rules. Using the reporting and search features of the DAM system is the best way to do it;

- Integration

    - DAM systems can help you organizing your digital asset collections, but they aren't the only systems used in museums or cultural institutions. They are commonly integrated with other tools and systems that use digital assets for managing, documentation, communication and other purposes. These integrations represent a stress point because there are many reasons for them to fail: a new system version, hardware upgrades, new web technology, etc. The digital asset manager must have a complete records on the specifications of every integration in the DAM ecosystem, so he can act appropriately when needed (you can find a good example of integration documentation on the presentation by Paul Bevan available at http://www.dpconline.org/component/docman/doc_download/178-);

- Operational staff

    - Maybe the most sensible part of a DAM implementation and operation is the staff that works together. Don't get the wrong message. The staff that will work with the DAM system is a key part of the system and you should always check for their needs and cooperate with them, listen about the system problems and review with them the difficulties on implementing the procedures and workflows defined. The digital asset manager, as the responsible for the DAM ecosystem should collaborate with the staff manager to ensure the professional needs and the number of professionals needed for the DAM tasks;

- Help and operational documentation

    - Another crucial task for maintaining the DAM ecosystem is the help and operation documentation. The digital asset manager should always have the procedure manual, help documentation and log problems, system failures, suggestions for new features and system analytics up-to-date. This task can only be done with the help of all stakeholders involved that will enable the continuous verification of the DAM ecosystem. It's very important the version control and the dissemination of the recent material available.

If carried out correctly, this tasks will help you in the next point of this learning session about how to manage DAM ecosystem problems.

Learning outcomes

At the end of the training session the learner:

- Knows how to interpret digital asset management application requirements;
- Knows how to complete documentation used in digital asset management applications delivery;
- Can identify at least three digital asset management applications delivery actions;
- Can identify failures in digital asset management applications delivery actions;
- Can interpret the organization's digital asset management strategy;
- Can report digital asset management applications delivery provision to superiors;
- Can examine digital asset management applications;
- Can examine digital asset management infrastructure management;
- Can analyze three practices and standards in digital asset management applications;
- Can analyze at least three web, cloud and mobile technologies;
- Can examine digital asset management applications delivery provision;
- Can identify at least three processes which comprise the organization's digital asset management strategy;
- Can determine manpower workload / requirements for efficient and cost effective service provision;

Keywords

DAM process analysis; DAM ecosystem assessment; Reporting; Documentation product delivery; Digital curation; Metadata; Standards; DAM Applications; Documentation workflows analysis; Resources assessement;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
Overview of Digital Asset Management Systems	https://net.educause.edu/ir/library/pdf/DEC0203.pdf	An overview of DAM Systems in high dregree studies that can be helpful in this training session.
DAM If You Do! BlueStream Digital Asset Management Infrastructure	http://www.nmc.org/pdf/2008-King.pdf	A article about DAM and supporting infrastructures presented at the NMC 2008 Summer Conference.
When You Think DAM, Think Integration	http://www.cmswire.com/cms/digital-asset-management/when-you-think-dam-think-integration-	A article by John Horodyski about the relevance of integration in DAM Systems.

	028304.php	
The Open Archival Information System Reference Model: Introductory Guide	http://www.dpconline.org/component/docman/doc_download/347-introduction-to-oais-introduction-to-oais?q=integration	A document about the OAIS reference model that can help with integration.
An interview with Katrina Sluis, Digital Curator at the Photographers' Gallery	http://www.furtherfield.org/features/interviews/interview-katrina-sluis-digital-curator-photographers-gallery	An inside view of one example of a digital curator work.
Thinking like a digital curator: Creating internships in the Cognitive Apprenticeship Model	https://www.academia.edu/2738683/Thinking_like_a_digital_curator_Creating_internships_in_the_Cognitive_Apprenticeship_Model	Conference proceedings about digital curation work.
Documentation Production Under Next Generation Technologies	http://eprints.cs.vt.edu/archive/00000163/	An article that describes the development of the Abstraction Refinement Model as a basis for linking the development and maintenance tasks in software systems.

Assessment methods

The most appropriate method to assess the Service delivery training session is to build a questionnaire to evaluate the acquisition of skills and competences defined in the digital curator role profile. The questionnaire should focus on the learning outcomes defined to the session according with the level of expertise and specific needs of each learner. The tutor and learner should discuss the answers after the period determined to finish this task.

Some questions (examples) could be:

1. Please name the principal processes in digital asset management?
2. Please name three points of stress in a DAM ecosystem that should be monitored closely by the Digital Asset Manager?
3. Please name three technologies that can help to integrate DAM systems with other systems used in the museum?
4. How can standards help to evaluate the service delivery of your DAM ecosystem?

5. Define the staff needed in a small museum to deliver a continuous service in the DAM Ecosystem?
6. What measures should a Digital Asset Manager take to prevent a service delivery interruption?
7. What is the basic infrastructure needed to implement DAM in any museum?
8. How can a digital curator evaluate quality in service delivery?

This training session is a specific part of the fourth step to prepare a DAM ecosystem - RUN. Please read also the specific chapter above.

8.5.10 Problem Management

In a DAM ecosystem of a museum it's quite probable that some problems will appear. As we have seen before there are so many issues in the ecosystem for the same purpose and some of them can go wrong even if the digital asset manager or the stakeholders act in the proper way. Solving problems (not seek for a culprit), or better, implementing a strategy to manage problems is a key issue when the system is running in your institution.

The primary objective of problem management is to prevent incidents from happening, and to minimize the impact of incidents that cannot be prevented. When a digital asset manager implement a problem management strategy he acts on problem and error controls and he is proactive to resolve or prevent problems. The goal in the institution strategy is to minimize their impact in the DAM ecosystem, no matter the cause, and prevent the recurrence of significant problems that affect the system's normal use.

To implement a problem management strategy the digital curator will need information on every single incident or problem founded and reported by him or by the team. So the first task is the implementation of a knowledge system that is used by everyone on the DAM system. This tool should allow users to report problems and incidents and classify them according with a pre-determined list of problem types. It's helpful if the system allows users to classify the problem's priority. This tool informs the digital manager to act and resolve the problem to its causes.

Problem management isn't a unique attribution of the digital asset manager. In many problems he will only act as an interaction facilitator between all the parts involved in the problem or incident resolution. In matter of fact he should be more likely a problem management analyst and controller. A person that knows every single aspect of the system and can understand the root problems so to explain them to the vendor support team or allocate the necessary resources (internal and external) to minimise or resolve them.

To implement a problem management system that can minimise the incidents or prevent them please read and use the resource published by ITSM community at:

http://www.itsmcommunity.org/downloads/Sample_Process_Guide_-_Problem_Management.pdf and adapt it to your institution needs. This resource isn't focused on DAM, but can be adapted to DAM systems as well.

Learning outcomes

At the end of the training session the learner:

- Knows the museum's overall ICT infrastructure and key components;
- Knows the museum's reporting procedures;
- Knows the museum's critical situation escalation procedures;
- Knows at least three risk management techniques
- Can identify at least three evaluation, design and implementation methodologies;
- Can identify at least two applications and availability of diagnostic tools;
- Recognizes the importance of preciseness;
- Can identify the link between system infrastructure elements and impact of failure on related business processes;
- Can select digital asset management solution that fits the budget of the museum;
- Can demonstrate the application of three communication techniques;
- Can identify progress of issues throughout lifecycle;
- Can critically analyze at least three digital asset management solutions;
- Can identify the appropriate resources to deployed internally or externally to minimize outages;
- Can propose solutions to at least two critical component failure;
- Can manage risk management audits;
- Can propose appropriate resources to maintenance activities, balancing cost and risk;

Keywords

Organisation assessment; Needs; Risk management; Diagnostic tools; Act on failure; Planning; Resources management; Audits techniques knowledge; Services and products lifecycle;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
RPR Problem Diagnosis	https://www.academia.edu/15686081/RPR_Problem_Diagnosis	A book about methodologies used in problem management in the IT sector.
Reactive Proactive	https://www.academia.edu/15681876/Reactive_Proactive_Problem_Manage	A presentation about reactive and proactive

Problem Management	ment	problem management.
Pareto Analysis	https://en.wikipedia.org/wiki/Pareto_analysis	Pareto analysis is a creative way of looking at causes of problems because it helps stimulate thinking and organize thoughts.
RPR problem diagnosis	https://en.wikipedia.org/wiki/RPR_problem_diagnosis	RPR (rapid problem resolution) its a problem diagnosis method that can be used in this field as well.

Assessment methods

The most appropriate methodology to assess the Problem management training session is continuous evaluation. The learner along with the tutor should continually make some exercises and discuss along with other learners, through the learning platform, the best way to manage problems found in the DAM ecosystem according with different scenarios defined by the tutor with the learners' collaboration. These scenarios should address specific issues like:

1. Museum dimension;
2. Museum or collections constraints;
3. Different museum budgets;
4. Museum strategy on documentation and/or ICT;
5. Product delivery problems;
6. Different incidents and system failures;
7. System specifications;
8. Standards;
9. Information quality;
10. Evaluation methods for DAM systems;
11. Maintenance plan and activities;

The learner and the tutor should discuss the result of these exercises, regardless of its form, after their conclusion.

This training session is a specific part of the fourth step to prepare a DAM ecosystem - RUN. Please read also the specific chapter above.

8.5.11 Forecast Development

In this first topic of the manage learning session we are going to explore the ability and the tools available for a digital curator investigate the internal and external needs and the evaluation process needed in order to implement the DAM in the products and services provided by the museum. To help the digital asset manager fulfilling the tasks successfully it's better to act in two plans: internal and external.

The digital curator needs to collect and analyse information separately, internally and externally and then connect the essential dots if needed.

Internally the task is simpler. First of all the digital asset manager should control and have access to all the report and managing tools that allow him to see the current status of the DAM ecosystem. With this tools and the proper administrator profile he can verify:

1. Workload and staff number needs;
2. Progression of the digitisation process;
3. System failures;
4. Hardware problems and needs;
5. Integration issues;
6. Workflow or procedures problems and needs;
7. DAM system capacity.

Secondly, it's easier to get feedback (or implement a feedback process) internally. The digital asset manager has (or should have) facilitated access to every internal stakeholder and gives them the tools to report any malwares or malfunctions of the system (incidents, problems, needs, old hardware, integration issues, etc.). A good way to gather information from internal sources is to conduct interviews with staff members from different departments about the DAM ecosystem. They'll give qualitative information about DAM questions in your institution environment.

Gathering information from external sources is more difficult and often less precise. Nevertheless the digital asset manager has some specific tools available to analyse external user's information on the DAM products and services. These tools are website's or repository analytics, that give us data about terms used, items viewed and downloaded, products purchased, services used, categories of information asked for, social network sharing, etc. In some museums requests by users for material such as publications, publicity, research or other specific purposes are also a good information source when you are preparing the viability of the system. In order to analyse external information is often useful to listen to your audiences or external stakeholders. They can do this, as well, through the use of surveys or specific in-house interviews about the use of digital assets.

Finally the digital asset manager should also pay attention to all forms of information (internal and external) indirectly connected to the use of the DAM products and services. These

information sources come from journals, magazines, scientific research, vendors, new laws and legal contexts, new institution policies, procedures or rules, new hardware and so on, that can, in any way, be a improvement to the current status of the DAM system used.

These specific tasks should be carried out regularly and the digital asset manager should prepare a systematic approach using information for upgrades, new tools, services or products. Implementing these tasks in the DAM policy of your institution might seem rare for the board, but a digital curator should be able to see this described, as it is his job responsibility.

Learning outcomes

At the end of the training session the learner:

- Knows the market size and relevant fluctuations;
- Knows accessibility of the market according to current conditions (e.g. government policies, emerging technologies, social and cultural trends, etc.);
- Can interpret the extended supply chain operation;
- Knows museum's budget dedicated to ICT development;
- Knows museum and audience needs;
- Knows at least three museum and audience need analysis techniques;
- Can identify at least two methods to generate sales forecasts in relation to current market share;
- Can interpret external research data and analyze information;
- Can apply at least three large scale data analysis techniques (data mining);
- Can apply new emerging technologies (e.g. distributed systems, virtualization, mobility, data sets);
- Can apply at least three methods to analyze information and business processes;
- Can apply at least three what-if techniques to produce realistic outlooks;
- Can connect museum and audience needs with products in the market;
- Can identify organizational processes and the way they are integrated and their dependency upon ICT applications;
- Can compare sales and production forecasts of forthcoming/newly launched ICT tools and solutions and analyze potential mismatches;
- Can connect museum and audience needs with products in the market;
- Can analyze in at least three different ways information and online communication processes;
- Can identify organizational processes and the way they are integrated and their dependency upon ICT applications;
- Can identify four business advantages and improvements of adopting emerging technologies for the museum;
- Can analyze three future developments in business process and technology application;
- Can analyze feasibility in terms of costs and benefits;
- Can combine museum and audience needs with interactive and multimedia installations/tools/applications developed;

Keywords

Market knowledge; Data analysis; Audiences needs analysis; Business processes; Communication; ROI Analysis; Market knowledge; Services and products development; Product placement;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
How to Choose the Right Forecasting Technique	https://hbr.org/1971/07/how-to-choose-the-right-forecasting-technique	A description about the forecast techniques and methods available.
CMS Wire	http://www.cmswire.com	CMSwire is a web magazine that covers a range of useful topics to DAM.
Top 10 social media analytics tools: The VentureBeat index	http://venturebeat.com/2013/12/20/top-10-social-media-analytics-tools-the-venturebeat-index/	10 Social Media analytics tools described by VentureBeat that can be used to analyse social networks about DAM.
Technology forecasting	https://en.wikipedia.org/wiki/Technology_forecasting	An Wikipedia article about technology forecasting.

Assessment methods

The best way to assess the acquisition of skills and competences needed in this training session is to build a case study that helps learners on how to act in a specific situation regarding the issues developed in this session. An example of context for a case study about forecast development could be:

The X Museum has a collection of 10.000 objects covering the history of the City X since the 19th Century. This museum is situated at the city centre and was founded 10 years ago by the city municipality. The museum staff is composed by one historian, two guards, one administrative

official and one curator. The museum wants to be more relevant for its community and has in place a digital strategy with the main goal to be recognized as an important reference to the study of X city and a place of edutainment for younger audiences.

The museum wants to use the digital collection (digital assets representing the physical collection) to promote the museum and engage more audiences (virtual and physical ones) to their premises. The museum is using a digital management system for almost one year and has almost 9.000 objects/digital assets recorded. The only person using the system is the museum curator (the digital curator as well), but the museum board wants to use collections information to build new and innovative products according with audiences needs.

Please discuss with your tutor and colleagues and write an essay about the ways and techniques available to match audience and museum needs and develop specific answers to respond to this situation based on the resources that you've read/listen/seen in this training session.

This training session is a specific part of the fifth step to prepare a DAM ecosystem - MANAGE. Please read also the specific chapter above.

8.5.12 Risk Management

Risk management is often forgotten in many institutions. In the cultural sector and despite of the long tradition in this area, because of the high risks concerning physical collections (Cf. the Risk management program area at Collections Trust - http://www.collectionstrust.org.uk/collections-link/risk-management), we can still find many museums and cultural institutions with no risk management strategies implemented in their digital collections.

Studies in this area are focused in some specific issues about digital collections like, for instance, file formats (Cf. "Risk Management of Digital Information: A File Format Investigation" available at: http://www.clir.org/pubs/reports/pub93/pub93.pdf or **"Risk Management of Digital Information: Case Study for Image File Format"** available at: https://www.library.cornell.edu/preservation/IMLS/CLIRImageStudy.pdf.). But it is easy to see that studying file format issues, website availability and transformations or some domain-specific requirements don't really help museums to build a risk assessment methodology to define, classify, analyse and, finally manage the risks of their digital collections.

Nevertheless efforts are made in many museums and research centres to take into account risk management when developing digital assets policies and strategies. That can help to prevent information loss or damage and to minimise the effects of these kinds of events. One of this studies, published by Barbara Borghese (available at: https://www.academia.edu/1022982/Digital_Preservation_and_Life_Cycle_Management_of_D

igital Collections), help museums and cultural institutions to define a risk assessment methodology or a risk management policy based on these functional areas:

- Insurance
  - Ad-hoc insurance covers for digital objects not widely available and possibly higher in cost;

- Access/Display
  - Possible damage to the object (software/hardware failure, physical support is obsolete, etc.);

- Storage
  - Corruption/loss of digital object due to incorrect storage- Possible unsustainable cost due to lack of appropriate storage programme;

- Preservation
  - Corruption/loss of the digital object due to lack of appropriate preservation strategy- Higher than expected or planned-for cost of preservation due to inappropriate choice of preservation strategy or standard;

- Conservation
  - Corruption/loss of the digital object due to lack of appropriate conservation strategy;
  - Loss of value due to alteration of the original format/content of the digital object;

- Disposal
  - Risk of disposing a digital object that is not supposed to be disposed (loss of value).

So in order to define a risk assessment method that your institution can use as the basis for a risk management system you can analyse the current status of the DAM ecosystem by the institution functional needs. A very important step in the risk management policy is the participation of all museum departments in the risk assessment. So the first task for a digital curator is to publicize it, by all means possible, to be used by the internal and external stakeholders. Knowing the risk management policy is a first and very important step to reduce to a minimum the resources needed when something goes wrong.

Please read also, as guidance for this subject, the **"Framework Of Guidance For Building Good Digital Collections"** a National Information Standards Organization (NISO), a recommended practice that is available at: http://www.niso.org/publications/rp/framework3.pdf or

http://www.niso.org/publications/rp/ and, for example, please read the British Library Digital Preservation Strategy[19] available at: http://www.bl.uk/aboutus/stratpolprog/collectioncare/digitalpreservation/strategy/BL_DigitalPreservationStrategy_2013-16-external.pdf.

Learning outcomes

At the end of the training session the learner:

- Knows at least three evaluation, design and implementation methodologies;
- Can identify at least four corporate values and interests;
- Knows at least three good practices (methodologies) and standards in risk analysis;
- Can solve at least three conflicts;
- Can interpret museum's risk analysis outcomes and risk management processes;
- Can interpret museum's risk analysis outcomes and risk management processes applicable to interactive and multimedia installations/tools/applications;
- Can interpret museum's risk analysis outcomes and risk management processes to digital asset management;
- Can apply at least three risk and opportunity assessment techniques;
- Can apply risk analysis taking into account corporate values and interests;
- Can calculate the return on investment compared to risk avoidance;
- Can develop risk management plan to identify required preventative actions;
- Can design and document the processes for risk analysis and management;
- Can design and document the processes for risk analysis and management applicable to interactive and multimedia installations/tools/applications;

Keywords

Evaluation; Assessment; Risk analysis; Risk Management; DAM processes analysis and assessment; Strategy; Planning; Documentation; Reporting;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
Risk management	https://en.wikipedia.org/wiki/Risk_management	An Wikipedia article about risk management.
ISO Risk Management standards	http://www.iso.org/iso/home/standards/iso31000.htm	Using ISO 31000 can help organizations increase the likelihood of achieving objectives,

[19] The chapter about risks is a must-read for this subject.

		improve the identification of opportunities and threats and effectively allocate and use resources for risk treatment.
Risk Management plan	https://en.wikipedia.org/wiki/Risk_management_plan	An Wikipedia article about risk management plan.
Create Risk Management Plan – Template	http://www.pmhut.com/project-management-process-phase-2-planning-create-risk-management-plan	A template to create a risk management plan.

Assessment methods

The most appropriate method to assess the Risk management training session is to build a questionnaire to evaluate the acquisition of skills and competences defined in the digital cultural asset manager role profile. The questionnaire should focus on the learning outcomes defined to the session according with the level of expertise and specific needs of each learner. The tutor and learner should discuss the answers after the period determined to finish this task.

Some questions (examples) could be:

1. Museums should address specific issues, like file formats, or they should address major issues like strategy? Why?;
2. Please name the functional areas that should be addressed in a Risk Management policy for museum digital collections?;
3. Name at least one methodology to analyse risks on a museum digital collection?
4. Data loss is a major issue on museum documentation in what functional area(s) this specific issue should be addressed? Why?
5. Documentation standards are a key factor to minimize risks. Is this true? Why?
6. The Risk Management Policy should be a public document? Why?

This training session is a specific part of the fifth step to prepare a DAM ecosystem - MANAGE. Please read also the specific chapter above.

8.5.13 Relationship Management

This competence should be generally applied to all job profiles in a museum and a good professional should hold so to fulfil successfully his or her job tasks.

To be able to accomplish the relationship management, a digital curator needs to know the institution environment and every internal or external stakeholder that's related with the DAM

ecosystem (such as the board, the IT department, physical collections departments, audiences, museum visitors, etc.) and able to manage a stable and continuous connection with them when asking for or delivering some product or service. He needs to know the institution's processes, procedures, objectives and management structure and bear in mind the institution's mission and policies.

Some good communication skills are greatly appreciated in this competence, but the digital curator must perform pro-actively so to create empathy with the institution staff and the decision-making structure. Creating networks, joint programs with other departments, internal and external DAM workshops, using social network tools (like wikis, for instance), etc. are some specific operations that a digital asset manager could carry out in order to establish a useful relationship network.

A good example of the use of a tool for this is the example, above cited, of the Smithsonian Web And New Media Strategy Wiki (http://smithsonian-webstrategy.wikispaces.com/Strategy+--+Themes), but there are other ways to do this, like the Hack Days where museums and other cultural institutions ask their audiences to participate in the development of new services and products using the digital assets collection (you can see many examples of this initiatives at: http://openglam.org/category/hack-days/).

Another good tool to promote relationship management in your institution is to ask your human resources department to build a Welcome Manual for Staff that can provide newcomers (or everyone) with all the useful information about the institution.

Learning outcomes

At the end of the training session the learner:

- Knows at least four museum processes including, decision making, budgets and management structure;
- Can present good and bad news to avoid surprises;
- Can identify at least four objectives of the museum;
- Can identify museums, staff and technology providers needs;
- Can identify at least three challenges and risks of the museum;
- Can identify at least three objectives of stakeholders;
- Can identify at least three potential win-win opportunities for user/audience and museum;
- Can express him/herself also at least in one foreign language;
- Can demonstrate empathy towards museum staff needs;
- Can demonstrate good interpersonal skills;
- Can determine museum's challenges and risks as long as they are relevant to digital asset management;
- Can examine ongoing commitments to ensure fulfillment;
- Can determine stakeholders' objectives as long as they are relevant to digital asset management;

- Can establish realistic expectations to support development of mutual trust;
- Can propose at least three solutions to meet museums, staff and technology providers needs;
- Can examine and arrange resources to meet stakeholder requirements;
- Can propose at least three techniques to respond to audience needs and their motivation;
- Can explain (defend, argue, justify);

Keywords

Assessment; Strategy; Organisation management structure; Communication; Languages; Staff needs assessment; Interpersonal skills; Resources management; Teamwork; Planning; DAM ecosystem; Strategy;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read / hear / see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
Explicating Relationship Management as a General Theory of Public Relations	https://www.researchgate.net/publication/232982036_Explicating_Relationship_Management_as_a_General_Theory_of_Public_Relations	A paper by John A. Ledingham about the theory of relationship management in the Public relations sector.
Business Relationship Management Institute	http://brminstitute.org	An website about BRM with some resources that can help to understand the concepts of this field of expertise. Use as reference only.
Customer Relationship Management (CRM): Theory and Practice	http://pt.slideshare.net/stetsonhatter/customer-relationship-management-crm-theory-and-practice	A presentation by J. Todd Bennet about the theory and practice of CRM.

Assessment methods

The most appropriate method to assess the Risk management training session is to build a questionnaire to evaluate the acquisition of skills and competences defined in the digital cultural asset manager role profile. The questionnaire should focus on the learning outcomes

defined to the session according with the level of expertise and specific needs of each learner. The tutor and learner should discuss the answers after the period determined to finish this task.

Some questions (examples) could be:

1. Please list four museum objectives in a DAM system implementation;
2. According with the DAM definition please name the museum functional needs in a DAM system?
3. Do you think participation and collaborative tools like Wikis can be used to benefit a DAM ecosystem? Why?
4. How can we determine and evaluate the specific needs of each stakeholder in a DAM ecosystem?
5. How can we act to match the stakeholders needs with the DAM ecosystem and products?
6. Please name three objectives of the physical collections curators in a DAM system implementation process?
7. Please explain why DAM is the right answer for the stakeholders needs?

This training session is a specific part of the fifth step to prepare a DAM ecosystem - MANAGE. Please read also the specific chapter above.

8.5.14 Digital Asset Management Quality Management

Quality is the main issue when delivering a product or service from a DAM system in museums. Nevertheless it's quite common when we go through museum online collections systems or repositories to find digital assets with low resolution and bad quality media. These quality problems are, in great measure, caused by financial and copyright reasons.

Preserving and running up a digital asset management system is expensive for many museums. The needs of DAM are relevant and demand an investment that isn't reachable by many small and medium size institutions because they need to have the human and technological resources to establish a DAM ecosystem. At the same time there are a lot of questions about rights management and there can be noticed inappropriate use of digital assets collections by unauthorised user, other than the museum, so museums, create digital asset collections with low quality. More information about this subject in the **"Managing Intellectual Property for Museums"** by Rina Elster Pantalony available at: http://www.wipo.int/edocs/pubdocs/en/copyright/1001/wipo_pub_1001.pdf.

To cope with these issues, efforts can be done two major fields: politics and technology. The first one is promoting, in the cultural sector, the strategies for use of open data e.g. the European Commission funded projects like OpenGLAM (http://openglam.org), an initiative that promotes free and open access to digital cultural heritage held by Galleries, Libraries, Archives

and Museums and defends that concept (Cf. The Open Definition at http://opendefinition.org). The second one is the investment in new technology development, new tools, services or products that can help museums and cultural institutions to deal with these issues. A good example is the Google Art Project (Cf. https://www.google.com/culturalinstitute/project/art-project), from Google Cultural Institute, that helps museums to create and publish a digital assets collection (mostly) with Google resources.

A disruptive project in this area was the Rijskmuseum project making it's collections available online with the highest quality possible and without restrictions in use (Cf. Joris Pekel from Europeana Foundation article **"Democratising the Rijskmuseum"** at http://pro.europeana.eu/files/Europeana_Professional/Publications/Democratising%20the%20Rijksmuseum.pdf). Before the Rijskmuseum's initiative, not a single museum was even thinking to do so, but after that the museums started to see the benefits of such endeavour and made it the actual trend.

Nevertheless, this trend, the strategy followed by Risjkmuseum, and other international reference museums, can't be applied by every single museum. So, in order to take quality management to your DAM ecosystem you must first define quality indicators (mainly related with the products and services delivered) that allow you to assess the production and distribution chain of the current digital asset management strategy.

A great way to measure quality in museum digital asset collections and management is by using standards as a reference. As we mentioned before, standards are the best way to enable the use of museum collections and they are used to promote quality in Museum Accreditation Schemes like the one found in the UK: (Cf. Accreditation Scheme at http://www.artscouncil.org.uk/what-we-do/supporting-museums/accreditation-scheme/) or in other countries (Cf. Clara Camacho thesis about this subject available at: http://dspace.uevora.pt/rdpc/handle/10174/11718 (only in Portuguese).

Another way is to apply general standards like the ISO 9000 International Standards for quality management systems (QMS), commonly used in manufacturing or services industries, to quality management in museum or digital asset information systems. A very good work about this subject is the thesis by Fred H. Karr, available at: http://digital.library.unt.edu/ark:/67531/metadc5571/ and entitled **"Quality Management in Museum Information Systems: A Case Study of ISO 9001-2000 as an Evaluative Technique".**

Quality management is an intrinsic matter for every museum, so the digital curator should have in mind that museums already use quality management methods in which digital asset quality management should be embedded. There are many studies and publications about this subject, but a good starting point can be the book **"Quality in Museums"**, available at: http://culturalinformatics.org.uk/sites/culturalinformatics.org.uk/files/quality.pdf, and edited by Massimo Negri, especially the articles by Kenneth Hudson and Margherita Sani.

In quality management, as in the other topic of this course, a digital curator must consider the ICOM Code of Ethics (available at: http://icom.museum/the-vision/code-of-ethics//L/0/) since it is first tool to work with museum (even digital) collections.

Learning outcomes

At the end of the training session the learner:

- Knows which methods, tools and procedure are applied within the museum and where they should be applied;
- Knows three ICT quality standards;
- Understands regulations and standards in energy efficiency and e-waste;
- Understands the museum's enterprise architecture and internal standards;
- Can recognize the potential and opportunities of relevant standards and best practices;
- Understands the importance of being ethical;
- Understands the museum's enterprise architecture and internal standards;
- Can apply the IS internal quality audit approach;
- Can operate three ICT quality standards;
- Can apply digital asset management quality standards;
- Can apply all the required technologies (web/ cloud/mobile) and environmental requirements;
- Can illustrate how methods, tools and procedures can be applied to implement the museum's quality policy;
- Can select at least three measures to evaluate effectiveness and efficiency of the overall process;
- Can determine technologies and standards to be used during the deployment;
- Can analyze (monitor, understand and act upon) quality indicators;
- Can determine at least three technologies and standards to be used during the deployment;
- Can analyze process steps to identify at least three strengths and weaknesses;
- Can manage quality audits;

Keywords

Quality management; Legal environment; Standards; Sector regulations and laws; ICOM Code of Ethics; Implement quality assessment; Quality indicators analysis; Audits;

Resources

The following resources are mandatory for this session along with the ones cited in the training session introduction session. Please read/ hear/ see them and discuss it with your tutor and colleagues. For general guidance please see the chapter General References and Resources.

Resource	Available at:	Description
Knowledge	http://www.emeraldinsight.	An article about the ways to produce

Management: An Introduction and Perspective	com/doi/abs/10.1108/13673279710800682	quality information that can be transformed into knowledge by users.
ISO 9000 - Quality management – Implementation guidance	http://www.iso.org/iso/iso9001implementation_guidance.pdf	A guide to implement a ISO 9000 standard in your organisation DAM ecosystem.

Assessment methods

The best way to assess the acquisition of skills and competences in this training session is to build a case study that helps learners on how to act about quality management processes.

An example of context for a case study about this session theme could be:

The X Museum has a collection of 10.000 objects covering the history of the City X since the 19th Century. This museum is situated at the city centre and was founded 10 years ago by the city municipality. The museum wants to be more relevant for its community and has in place a digital strategy with the main goal to be recognized as an important reference to the study of X city and a place of edutainment for younger audiences.

The museum wants to use the digital collection (digital assets representing the physical collection) to promote the museum and engage more audiences (virtual and physical ones) to their premises. The museum is using a digital management system for almost one year and has almost 9.000 objects/digital assets recorded. The only person using the system is the museum curator (the digital curator as well), but the museum board wants to use collections information to build new and innovative products according with audiences needs. The museum board is focused on delivering high quality information and products using the digital collection.

Please discuss with your tutor and colleagues and write an essay about the ways and techniques available to provide and insure quality in the DAM ecosystem outputs based on the resources that you've read/listen/seen in this training session.

This training session is a specific part of the fifth step to prepare a DAM ecosystem - MANAGE. Please read also the specific chapter above.

8.6. General References and Resources

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General Online Resources

COPE – Create Once, Publish Everywhere (NPR concept) - http://www.programmableweb.com/news/cope-create-once-publish-everywhere/2009/10/13

DAM Learning Center - http://www.damlearningcenter.com.

DAM Education - http://www.dameducation.com

DAM Scientific Journals - http://www.henrystewartpublications.com/jdmm

DAM Terminology - http://damglossary.org.

DAM Systems Vendor Resources - https://www.canto.com/dam-resources/

Digital Curation Center - http://www.dcc.ac.uk

MET Collection Management Policy - http://www.metmuseum.org/about-the-museum/collections-management-policy

Research articles

Digital Curation: The Emergence of a New Discipline - http://ijdc.net/index.php/ijdc/article/viewFile/184/251

Skilling Up to Do Data: Whose Role, Whose Responsibility, Whose Career? - http://www.ijdc.net/index.php/ijdc/article/viewFile/126/133

How To Avoid Wasting Your DAM Budget: An ROI Oriented Approach To Digital Asset Management Implementation - http://digitalassetmanagementnews.org/features/how-to-avoid-wasting-your-dam-budget-an-roi-oriented-approach-to-digital-asset-management-implementation/

10 Core Characteristics Listing Of Qualified Dam Vendors - http://damfoundation.org/2015/01/12/10-core-characteristics-listing-of-qualified-dam-vendors/

A Business-Planning Template: Considerations for Cultural Heritage Organizations and Their Digital Asset Programs - http://www.clir.org/pubs/reports/pub124/template.html

The TOWS matrix - A tool for situational analysis: http://www.sciencedirect.com/science/article/pii/0024630182901200

University courses:

Master in Digital Curation (Robert Gordon University, Aberdeen) - http://www.rgu.ac.uk/information-communication-and-media/study-options/distance-and-flexible-learning/digital-curation

Master in Digital Curation (Johns Hopkins University, Washington) - http://advanced.jhu.edu/academics/certificate-programs/digital-curation-certificate/

Digital Curation Center information about courses - http://www.dcc.ac.uk/training/data-management-courses-and-training