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Milestone MNA2.1:  
Guideline document for AARC training material

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Abstract

This document by NA2 Task 1 “Learning Needs Analysis” sets clear guidelines and standards for all parties responsible for producing training materials within the NA2 activity.

Table of Contents

Executive Summary 1

1 Introduction 2

2 The Training cycle 3

2.1 Designing a successful Learning Event 4

2.1.1 Training Needs Analysis 4

2.1.2 Course Aims and Learning Objectives 4

3 Training content 6

4 Training Material 6

5 Different types of Material 7

5.1 The Slide set 7

5.1.1 Too much text 8

5.1.2 Too much information 8

5.1.3 Too many slides 8

5.1.4 Too much animation 8

5.1.5 Slide notes 8

5.2 Student notes and/or accompanying texts 9

5.3 Hands-on exercises 9

5.4 Exercise hand-outs 10

6 Conclusions 11

References 12

Table of Figures

Figure 1: The Training Cycle 3

Executive Summary

Designing an effective training course is different to designing a workshop presentation. The aims and requirements are different, the structure is different and the audience has different needs. It is essential to understand that producing a slide deck and presenting them to an audience, does not constitute training. To secure the best possible outcomes, training should be an interactive experience, a learning conversation between trainer and trainee. This work by NA2 Task1 “Learning Needs Analysis” is a set of guidelines to follow when preparing AARC training material.

The starting point for any training course should be to set out unambiguous goals, and to achieve this it is extremely important to first identify the training needs.

Once this has been done, the next and equally important step is to formulate some key learning objectives, which means defining outcome statements that capture specifically what knowledge, skills and attitudes learners will be able to exhibit at the end of the training.

After that, the content of the training can be determined. The content is a list of topics to be covered in order for the learning objectives to be met.

Once the content has been defined the training material can be developed. When choosing which type of material and the structure of it, it should be kept in mind that the result of this work should enable lasting education to the trainees, and should address aspects such as having an effective structure, ability to understand, easy reference, readability and portability.

Finally, the trainer must keep in mind that people have different preferences when it comes to learning, and that different topics lend themselves more to differing methods of delivery than others. Whatever you are training, the trainer should aim to recreate a realistic working environment in the training context as closely as possible, so that it makes sense and is memorable when the learners are back at their desks.

# Introduction

Training describes the process of developing in oneself or others, the identified gaps in skills, knowledge or attitudes that relate to specific useful competencies. Training has specific goals of improving someone's capability, capacity, productivity or performance.

One of AARC’s [AARC] goals is to deliver training to targeted user communities (e.g. libraries, biomedical, arts and humanities) on both technical and legal aspects of implementing an Authentication and Authorisation Infrastructure (AAI).

NA2 will provide:

* Training for institutions on the key concepts of data protection laws to ease the release of attributes;
* Training for scientific resource and service providers to understand what it takes to join a federation and to offer federated access to their service or resources;
* Training for libraries to enable them to replace IP-based access control;
* Dissemination of AARC’s results;

The training and outreach material will not be designed from scratch where possible. Instead, existing materials created by the GÉANT project, NRENs and other e-Infrastructures will be reused and enhanced as needed. This document describes the guidelines to follow when creating new or enhancing existing training material.

A significant amount of this work was covered in the document “Good Practice Guide on Training Methodologies” [ENISA Document] and we have included a lot of that content in this document as appropriate with permission from the authors.

# The Training cycle

Designing an effective training course is different to designing a workshop presentation. The aims and requirements are different, the structure is different and the audience is different. It is essential to understand that producing a slide deck and presenting them to an audience, does not constitute training. There is an established iterative process to follow when designing and delivering any training event, known as the Training Cycle.

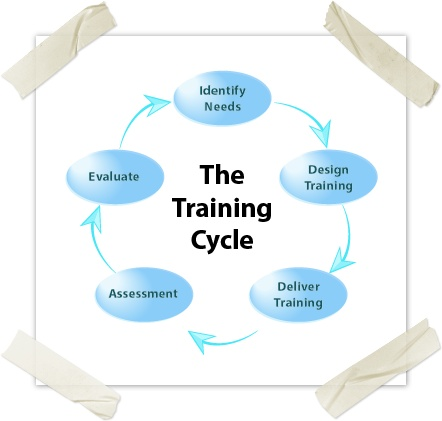


Figure 1: The Training Cycle

The training cycle shows how to plan an effective training programme that meets the needs of the organisation and the individual.

Running through the five key stages of the cycle is important to ensure effective training.

## Designing a successful Learning Event

### Training Needs Analysis

The starting point for any training course should be to set out unambiguous goals, and to achieve this it is extremely important to first **identify the training needs**.

A **training need** is found through identifying a gap in the skills, knowledge or attitude, between where they are today, and where they need to be in order to achieve the goals. It is simply the answer to a couple of questions:

1. What is the current level of knowledge (or skill, or attitude)?
2. What is the required level of knowledge (or skill, or attitude)?

Therefore, the training need is the gap between these two, and it is specifically what the training needs to achieve. Of course, it is easier to ask the questions than to answer them, so it may be helpful to quantify the two questions, using metrics appropriate to the Training Need. It will be necessary to ask a number of qualifying questions in order to reach the real answer to the two main questions. It will often not be possible, nor advisable, to try and close the entire gap in one single learning event. This is the stage that you find that you don't need training at all; perhaps a written guide or setting up a wiki page would be more appropriate solution? If you do discover a real training need, and you can quantify the answers using suitable metrics, it will help very much in the next step, setting the learning objectives for the course.

### Course Aims and Learning Objectives

The next, and equally important, step is to formulate some key **learning objectives** for each learning event.

A learning objective is an outcome statement that captures specifically what knowledge, skills and attitudes learners will be able to exhibit at the end of the training.

Learning objectives should be “*SMART*” [SMART]:

* **S**pecific: The learning objective clearly and unambiguously describes the knowledge, attitudes, or skills that a learner should be able to demonstrate at the end of the learning event
* **M**easurable/Observable: The achievement of learning objectives can be measured by evaluation methods during or after the session, using appropriate metrics
* **A**chievable: The learning abject should be attainable for the target audience within scheduled time and specified conditions
* **R**elevant and realistic: the objective reflects realistic scenarios which the attendees are likely to encounter in their work after the training.
* **T**argeted to the learner and to the required level of learning

Importantly, they should capture what an attendee will be able to do, i.e. using active verbs, as a result of the training.

So instead of:

By the end of the course the attendees will be able to:

* Understand legal aspects pertaining to AAI

(*Understand* is a passive verb)

Aim for:

By the end of the course the attendees will be able to:

* Explain the six main fundaments of the eduGAIN Code of Conduct to a colleague

(*Explain* is an active verb)

Once you have your specific learning objectives, which are designed to cater for the learning needs identified earlier, the following key points with relative questions should be considered and answered at the beginning of the preparation:

* **Target audience**. Who is the training for? How many people need to be trained? If there is a wide variety in knowledge level, how will that affect the training? What language is the training in, and what are the mother tongues of the trainees? Are there cultural and/or gender differences that need to be taken into account? Where are they based? Are they attending training because they have to, or because they want to?
* **Success/fail factors**. What potential barriers might exist which could prevent this group from achieving your stated learning objectives, and how will you prepare to help them to overcome these barriers? Why should they be interested in this training?

These are the 'Course Aims' and should be formulated early in the process, as this will help direct your thinking during the entire design process. They should be as clear as possible.

# Training content

The content is a list of topics to be covered in the training in order for the learning objectives to be met.

To determine the topics the training designers should:

* Brainstorm all the content that *could* be included, necessary to achieve the learning objectives
* Prioritise the content to be included in the final course
* Organise a logical sequence and structure the content
* Think of the types of activities/training methods that should be adopted

When designing the training, consider that 'active learning' is several times more effective than 'passive learning'. For example, a lecture (a person talking through some slides) for any more than 20 minutes is almost useless in terms of retention, when compared to topics augmented by practical exercises, discussion, brainstorming and challenges and other interactive activities, which allow participants to practice, interact and share the knowledge they have gained. A training session should be fun, it helps the retention and enthusiasm for the learning among the attendees.

# Training Material

The training material should enable lasting education to the trainees, and should address the following issues:

* **Effective structure:** It should have a structure that enables as many trainees as possible to meet the training goals. One established system, the 4MAT system [4MAT] addresses the needs of all different types of learners, and does so in the most effective order. All it requires is to break up the training topics in logical chunks or topics, and that for each one of those topics the training is ordered as follows:
  + - WHY: To make the trainees curious about “why” they should want to pay attention to this part of the training.
    - WHAT: This is the content, the theory, the body of learning for this topic.
    - HOW: This explains how the theory is actually applied.
    - WHAT IF: Variations on the theme. Time for questions. The WHAT IF people learn by wondering how to apply the learnings in different ways, under various circumstances
  + **Ability to understand**: The language used should be straightforward and avoid idiomatic expressions, or colloquialisms. The over use of acronyms should be carefully managed, especially in our environment.
  + **Easy Reference**: A good table of contents is a must. It should be easy for a learner to find what they need to know when they need to know it. If the topic warrants a lot of extra reading material, provide a set of references to it, this will help the trainees to integrate the content or look for more input. Don't spend precious time in a learning event doing what can easily be done outside of it.
  + **Readability**: The produced material (of any type) should be readable. This means: big enough fonts, no distractions and text and background contrast in both colour and light/darkness. For a text slide four or five bullet points is much to be preferred over 7 or more – less is more where it comes to slides. For printed materials, black on white printing and clear fonts.
  + **Portability**: E-materials are increasingly popular. USB sticks are the most commonly used now. Whatever e-format is used, it should work on most computers, e.g. PDF is the most common. If audio or video materials are supplied, it is wise to have them in mp3 for audio and mp4 for video.

# Different types of Material

You must keep in mind your learning objectives when designing your training materials and also that people have different preferences when it comes to learning, and that different topics lend themselves more to differing methods of delivery than others.

Listed below are some general ideas to help you create course materials which are participatory, keep the audience engaged and increase the chances that your Learning Objectives will be achieved.

## The Slide set

It cannot be stressed too strongly that the slide deck is the learners' worst enemy. Avoid the overuse of slides as much as possible, be creative in how you deliver the learning. The worst kind of 'training slides' contain too much text and are just read out to the attendees. Do not fall into this trap!

While you should try, it's almost unavoidable that you will require some slides in your training, but you should consider what they do best from a learning perspective. The following sections should give you some helpful tips and potential pitfalls when designing your slides.

### Too much text

When it comes to learning, human beings have two main input channels, an audio one and a visual one. We are capable of taking in information via both channels simultaneously, but we begin to struggle if one of those channels is overloaded. When we read (quietly to ourselves) we are actually accessing our audio channel, by using our inner voice. When we are listening to someone speak we are also accessing our audio channel. Now think about slides with lots of text on them, and consider how much information is really getting through to a learner who is simultaneously listening to what the trainer is saying, and reading what it says on the slides.

Reduce the words on the slide, and learners will hear more of what you say.

### Too much information

There is often a temptation to put all the information you think the learners need in the slides, so that they can download them and study them later. Do not do this. Instead, think about other ways, appropriate to the learners needs, in which this information could be accessed i.e. when will they need this information and in what format would it be most useful to them? Perhaps a handout, on a wiki page, a reference card, a manual. Do not put it in the slides.

### Too many slides

Linked to the above, there are often simply too many slides created. On average, each slide should take around 2 minutes to deliver, and given that the human's average attention span for passive listening while maintaining the ability to retain any of the information is approximately 20 minutes, you never want more than 10 slides per section.

### Too much animation

Slide animations should be kept to a minimum because it can disturb the flow of the trainer and distract the audience. Animations can be both functional and part of the fun factor, which helps to make the training digestible, but they should used sparingly, if at all.

### Slide notes

Slide programs usually have the functionality to add notes to provide further information to the trainer. On the whole, these are of no use to a trainer in a live situation, as the text is often unreadable or completely invisible. They can be helpful during the preparation stage, but for the live training situation, it is recommended to have separate Tutor Notes, prepared specifically for that purpose.

These are there to help the trainer with explanations about e.g. the slides, and with background information and can also contain timings and other helpful information.

## Student notes and/or accompanying texts

Slides should not be considered as full training materials. Students should be provided with sufficient materials so they can revisit the training when it becomes practically useful to do so.

The materials should also be in a format which is most useful to the learner at the point at which they will need it. This can be done by adding notes, handouts, reference guides, quickstart guides, a video, a wiki, a poster, which accompany the learning objectives referred to in the slides. The notes could be supplemented with additional texts, further reading, articles, whatever is relevant and helpful. If a good, relevant book is available, it should be recommended.

## Hands-on exercises

Many of the planned trainings in AARC will require hands-on exercises. The learning outcomes can be extremely successful if they are done well. However, a poorly prepared, badly executed hands-on exercise can easily have exactly the opposite effect.

It should be made sure that:

* + the pre-requisites are clear, valuable training time should not be wasted in setting people up. This may need time and effort on the part of the trainees before they arrive, and it may lead to technical support queries, so you should provide a contact for these queries.
  + you have the trainees contact details. It will be crucial to have clear communication with the trainees before they arrive, in which case, make sure you have a means to do that (e.g. registration).
  + everything is **prepared** and has been **tested**, preferably in a dry-run or pilot and preferably more than once with non-experts. It is important to know how the hands-on exercise will actually work with real people, and remember that the trainees don't already have this knowledge, so it will take longer for them to do the exercises than it might take you!
  + everybody should be kept on the 'same page'. Check in with each attendee regularly to ensure that they are keeping up. Allow time for this in your schedule, and incorporate review stages for each key learning point. Feel free to use 'interesting issues' as learning points for the rest of the group.
  + Don't try to cover too much in one session. It is much better to cover one thing in depth than to try and cover too many topics lightly. Ask yourself "What are the things that I would need to be able to do, to get started in this topic?"

If it is a very complicated or technical exercise, it is highly advisable to do a demo beforehand, so that the learners can see what should happen. Alternatively, a 'follow me' style demo can be done, to really make sure that everyone takes the same steps.

It is a good idea to set up a virtual environment to work in, so that everyone is working with the same software/versions/operating system etc. This will save setting up time and ensure that you don't encounter any unique unforeseen local issues with someone's laptop.

It is inadvisable to rely on a wireless network if your training depends on reliable internet access for success. If at all possible, provide wired connections to all participants in this case.

## Exercise hand-outs

The exercises should have extremely clear instructions and very explicit and clear hand-outs to go with them. Hand-outs should be constantly improved based on the outcomes of the session. There are many potential uses for such documentation to help augment the training outcomes, such as a quiz, a more detailed piece of information, a case study, an example, a reference table, a discussion piece, an inspirational picture. They key point is that more information can be put on a handout to be studied later than can (or should) be placed on a slide.

# Conclusions

The learning objectives must be set out first, and kept in mind when designing training materials. During the design process, be sure to cater for the fact that people have different preferences when it comes to learning.

Different types of material, and varying approaches to delivery, should be used to keep the audience engaged and increase the chances that the learning objectives will be achieved, and they all should be developed in a cohesive manner.

The slide set is what it is usually used as visible guide for both the trainers and the trainees. The overuse of slides must be avoided as much as possible and the amount of information on them shouldn’t be too much. The trainer should think of other ways, more appropriate to the learners' needs.

Students should also always be provided with sufficient materials so they can revisit the training when it becomes practically useful to do so.

Many of the planned trainings in AARC will require hands-on exercises. The learning outcomes can be extremely successful if they are done well. The pre-requisites should be clear and everything should be prepared and tested beforehand**.** If it is a very complicated or technical exercise, it is highly advisable to do a demo.

Finally the exercises should have extremely clear instructions, specific outcomes and very explicit and clear hand-outs to go with them.

References

**[SMART ]** http://ccoe.rbhs.rutgers.edu/forms/EffectiveUseofLearningObjectives.pdf

**[4MAT]** <http://www.aboutlearning.com/what-is-4mat>

**[ENISA Document]** https://www.enisa.europa.eu/activities/cert/support/exercise/good-practice-guide-on-training-methodologies