

# **Pedagogical-didactic frame concept**

to carry out

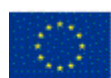
Web-based  
European Training Courses

for the

## **Water Framework Directive of the EC**



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Education and Culture

**Leonardo da Vinci**

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## 0 Introduction

### 0.1 Introduction to the frame concept

In the NEPTUN EC Leonardo project, a team including members from five European countries developed a training course in order to implement the EC's Water Framework Directive (WFD). All activities pertaining to the content and technical implementation were based on a so-called "frame concept", which was updated or completed over course of the duration of the project. According to this concept, from the first analysis of requirements through defining the specifications for the required qualification, the following questions were continuously investigated, refined, answered and updated:

- What kind of knowledge is needed, and what issues have to be taught (basis curriculum, professional subjects)?
- How should these subjects be made available (learning modules, glossary, knowledge base, good practice) (technical concept)?
- How should these subjects be taught (pedagogical-didactic concept)?

Implementing the technical concept generated on the basis of this documentation, the project members established a web-based learning platform available for public use on Internet under [www.neptun-project.org](http://www.neptun-project.org). Registered users of this portal may also find appropriate instructions for use there.

In its final version, the product documentation as a whole consists of three separate documents, which are brought together with a document called "frame concept":

- The content objectives, as well as the aspects of content implemented in the course's portal, are documented in the basic- or **framework curriculum** (Part A).
- The **pedagogical-didactic basic concept** (Part B) elucidates comprehensive, holistic considerations of how to methodologically implement the courses according to circumstances specific to each participating country and/ or participant. These reflect the designed technical options and the opportunities regarding content.
- In a **web portal documentation** (Part C), the structure and technical functionalities of the NEPTUN platform are described.

The **frame concept** serves to bracket the three above-mentioned components, which belong beneath the rubric of the frame concept (Annexes). The frame concept briefly sketches and summarises how the components interact, and shows the major opportunities for use of the technical and didactic offerings, as well those pertaining to content, that were created within the scope of this project.

### 0.2 Introduction to the pedagogical-didactic frame concept

On the subject of didactics, that is, to develop a framework curriculum and a pedagogical-didactic concept, the following questions on teaching and learning within

this EC training course on the EC Water Framework Directive (WFD) had to be answered:

- What for (purposes)?
- What (content)?
- How (tutoring)?
- Who (role of the individuals involved in tuition)?
- When and Where?

The text classification also followed this structure.

The pedagogical-didactic frame concept deals with issues concerning the “How” (tuition) and the “Who” (role of the individual involved in the tuition) of the advanced training course.

The questions of “Where” and “When” for location and time of lessons, which are normally also part of a concept like this, can only be generally mentioned, since this course can be applied in many different ways. Location and time have to be defined in specific course planning.

In this pedagogical-didactic basic concept, the open concept the course relies on is outlined. This open concept, called "Flexible Use of Neptun", makes possible not only flexible time sharing between distance learning and presence-based training, but also monitoring of the educational volume and – level.

Essential prerequisites for this concept, such as modular structure, functionality of the learning platform, or the opportunities for distance support by a tutor, are also outlined. In addition to these aspects, suggestions for learning networks, project work and performance evaluation, as well as methodological recommendations for all involved in tuition, are given.

The explanations, which are comprehensive in part, are generally valid statements. They relate to the technical opportunities and those regarding content created within the project.

The implementation of these options in defined training courses, as well as the necessary modification of the respective required methodological didactic concept should remain the responsibility of each training service provider. This regulation is due to the great variety of requirements and general conditions in the individual countries, as well as the variety of target groups.

## **1 Teaching of content (How)**

According to the considerations regarding the course's target groups and objectives found in "1. Educational goals", the course was designed as an advanced training offering for employees of public administrations and SMEs dealing with tasks related to the implementation of the EC WFD in an extra-occupational manner.

Taking into account the requirements resulting from these objectives and the transnational structure of this course, the project partners elaborated an "open" concept, called "Flexible Use of NEPTUN", in co-operation with associated experts. The concept is based on the following basic modules:

1. Learning platform – Internet – Online
2. Modular structure
3. Phases of individual learning
4. Presence-based training events
5. Learning networks
6. Working in projects
7. Tests for orientation
8. Tutoring

The teaching and learning concept outlined in the following uses an internet-based study design, which enables the learning platform to be as flexible as possible in terms of time and location: It can be run from at home, the worksite or any given location equipped with Internet access. The NEPTUN learning platform, which can be tailored to the requirements of the corresponding course of study, functions as a virtual seminar room. A timetable providing the necessary frame for orientation is given by the structured modular sequence.

This "Blended learning" paradigm, which combines phases of self-controlled learning with presence-based- and web-based co-operative learning, makes flexible and participant-oriented studies possible.

The concept's explanation, given below, shows that an innovative learning model designed according to the blended learning principle makes possible a diversified practice- and communication-oriented course design, not only in didactics, but also regarding content.

## 1.1 Flexible concept for presence-based- and distance learning (organisation)

The NEPTUN organisation concept assumes flexible course design for specific target groups based on

A. the proportion of

- Self-learning (with /without tutor) and
- Presence-based learning

As well as

B. Evaluation of learning progress (continuous/ selective) and confirmation of learning progress (certificate).

Consequently, the "Flexible Use of Neptun" concept enables the following forms of step-by-step organisation:

- "stand-alone" E-learning, wherein the participants have access to the learning platform WITHOUT a tutor during the distance learning stage and WITHOUT being present, as well as WITHOUT evaluation/ confirmation of learning results.

- "digital consulting" E-learning, wherein the participants may access the learning platform with the support of a tutor in the distance learning stage and WITHOUT presence; the learning results may be regularly evaluated via the learning platform by the learner him-/ herself or by the tutor, and there is confirmation of participation in the "digital study"

⇒ 6 credits are scheduled, these entails a workload of 180 hours

- "Blended Learning", wherein participants may access the learning platform with the support of a tutor in the distance learning phase and in the presence phase (seminars and group work, consultations, excursion); evaluation of learning progress and confirmation of learning results for the participants (written final exam and certificate)

⇒ Schedule 6 + x Credits, i.e. 180 + n hours presence workload ( $x = n/30$ )

### 1.1.1 Modular sequence

The didactic scheme of the modules' sequence for the final, most demanding variant should be as follows:

#### Preparation phase

The study material made available via the NEPTUN platform is worked through by the participant him-/ herself. Online tasks are provided to evaluate learning results. Tutors give individual feedback (without marks) to the learner's solutions. The participants obtain another learning cycle through the online tasks. Feedback assists the learner both with reading retention and in identifying gaps in knowledge.

x weeks  
(flexible timing)

#### Presence-based phase I

The first presence-based phase is expected to provide efficient exchange among the learners, lecturers and tutors. Curriculum content is intensified in a workshop. Project tasks relevant for practice are determined and project schedule are generated for intended project work.

1-2 days  
(location)

### **Project phase/ 2nd self-learning phase**

In the project phase, the participants and their team work on project tasks they have chosen themselves, for which they follow the schedule. Procedures like fine-tuning organisation, communication, exchange of experience and linking together the results are run online through the NEPTUN learning management system for the course of studies. At the end of the project task, the team summarises the results in a presentation. Project work in teams is intensively supported by the tutors of the study module. The lecturers are available to answer all substantial questions of the learners.

about 8 weeks  
(flexible timing)

If there is no project work foreseen in the corresponding course, then the next self-learning phase will follow, which may be interrupted by another phase of presence-based learning.

### **Presence-based phases II and more**

In the other phases of presence-based learning within a module, content is reinforced in corresponding workshops, practices (laboratory courses) or exchange of experience. In project work, the teams present their project results and obtain feedback from the lecturers, tutors and their learners' group.

1...2 days  
(location)

Marking of the presentations or certification of other results is possible and reasonable; both procedures give a kind of feedback about the learning results that have been thus far achieved.

### **Reinforcement phase**

After the completion of a course module, a final exam or exposition about the sequence of the project stage and the project results may be expected on demand of the executing facility.

4 weeks  
(flexible timing)

More detailed information about the process of a module will still have to be provided on this basis in the specific course planning.

## **1.1.2 Self-learning phases**

The participants receive specific assignments to be done in the self-learning phases. These assignments have to be worked through by means of the learning materials. These can be, for instance, learning methods such as problem-oriented learning or special learning materials, such as teaching texts and module books.

In the self-learning phases, the course instructors offer support through the NEPTUN learning platform, via telephone or other means of communication. Learning during the self-learning phase may be supported by establishing regional or virtual learners' groups. Furthermore, it is also anticipated that learners will form study groups, in which the participants assist one another in helpful consultation.

## **1.1.3 Phases of presence-based learning**

It is recommended that no less than two, and perhaps several, presence stages during a module be planned as a function of the volume and type of the course. In these measures, the participants become acquainted with their lecturers, tutors and

the other learners. The presence-based phases are aimed at the execution of tutorials, workshops, presentations and practices. The focus is on teaching and learning types tailored to the participants, enabling the participants to reflect, work scientifically, and transfer knowledge.

During the first stage of presence-based learning, in principle, the curriculum study subjects are picked up again, repeated and intensified.

However, in the first phase of presence-based learning, the main focus may be on preparation for the project phase. Preparation includes the generation of a module using associated project topics from the participants' professional domain, as well as the opportunity to build up a project team consisting of the participants. Course instructors and tutors support this process.

During ongoing presence-based phases, the knowledge acquired is reinforced, and when a project has been finished, the participants discuss the project results. Course instructors, tutors and participants give their feedback on the project results, and the group analyses the learning process together.

As explained previously, about 30% of the total number of course hours should be devoted to presence-based phases. Assuming a course requires about 200 hours, this percentage would equal 60 hours or approx. 7 days of presence.

The exact timetable of this course phase depends on the specific conditions of the corresponding course. It can also take place during the weekend, running from Friday afternoon to Sunday noon.

## **1.2 Study materials and learning networks**

The blended learning concept used for the courses and coupled with presence-based phases, is enhanced by learners' networks and study materials.

The NEPTUN courses are distinguished from classical distance learning courses by their web-based organisation of the studies and by the fact that they are consequently tailored to specific target groups. The main differences can be seen in the following aspects:

- Study materials and online tasks are always available through the learning platform
- The virtual learning environment makes possible continuous access to a network of experts and tutors, participants and consultants.

### **1.2.1 Study materials and online tasks**

The study materials were particularly designed for the NEPTUN courses by experts and scientists. These materials, which follow a clear didactic structure and a practice-oriented design, present both general scientific subjects and topics specific to educational facilities and scientific organisations. Thus, the information required for each module is available in a concise form: Since time-consuming research, searches for materials in the library and similar activities are no longer necessary, the participants may focus all their attention on the content itself.

The participants may check their learning and retention through online tasks in the virtual learning environment. They obtain individualised feedback on their answers.

This closed loop for learning identifies the gaps in the participants' knowledge. Long-term retention is improved.

### **1.2.2 Learning network consisting of tutors, lecturers and learners**

Learning through online interaction is successful above all when it is supported by tutors who are in direct and close contact with the learners, and enhanced by classical presence-based tutorials.

The lecturers distribute the prepared modularised learning subjects for the self-learning stages via the Internet. In an online forum, the learners may ask related questions. Moreover, the presence-based phases are prepared and reinforced and ultimately intensified. The learning platform summarises the learning content of all modules in a systems approach. It offers opportunities for communication and interactions among the learners and with the lecturers outside the presence-based phases. The learning platform is regarded as a special aid for those learners who do not take part in the individual presence-based phases.

In addition to largely technical support by scientific experts, the tutors continuously assist the participants through all learning phases. The tutors are either practitioners qualified at the required level or scientific assistants. They are available not only to answer questions regarding content, but also to assist in the field of study- and labour organisation. In most cases, individuals or working groups are consulted online through the learning platform. However, if necessary, the participants may also phone the tutors.

### **1.3 Project work**

Online project work is to be planned as an additional course component, whose volume depends on the type of each course and the time available for learning. When using this didactic element, it should be an essential component of the module – both in terms of the time available for studies and the demand of the content. For the online project, the participants should generate the project task from their own professional context. The participants introduce their expertise and knowledge immediately into the studies while they co-operate in a project team with other learners, who wish to address similar problems. They also acquire ongoing knowledge essential to solving the problem, and develop methodological – and problem solution variants in teamwork. While doing this, the tutors and lecturers consult with the learners.

### **1.4 Evaluation of performance through examinations and marked assignments**

The appropriate training service provider has to determine the volume, type and content of the evaluations. It is recommended that one or two assessed assignments be given module. For legal reasons, these exams should be given in the presence-based phases. When carrying out projects, this work may also consist of a presentation summarising the results of the teamwork. In cases where no other interim- or final examinations are planned, it is thus possible to achieve a homogeneous distribution of the workload during the course. Another advantage is that the exam preparations, which is usually very time-consuming, is unnecessary. However, it is also possible to plan and execute further exams, depending on the requirements given by the certification facility.

## **1.5 Tutoring**

Tutoring is intended to ensure the continuous support of the course participants during the phases of distance learning. We intentionally did not define any final regulations about the kind and volume of the expected tutoring, since these depend on many factors in specific course planning (clients, course volume, spatial boundary, technical feasibility etc.). In fact, it is guaranteed that the original development concept [1] takes into account the considerations about strategies and organisation options in the development of the learning platform mentioned in 4.1. Thus, the requirements to be fulfilled by tutoring in the context of specific curricula planning highlighted there are available and may be implemented and used within the learning platform, if necessary.

## **2 Role of the individuals involved in tuition (Who)**

Beginning with the conceptual paradigms explained above, as well as the means of communication to be accessed in the distance learning period, the course planning strategies summarised below were developed:

- Clearly defined and reliable objectives
- Well-structured methodology
- Clearly defined, but widely differing communication channels in the distance learning phase, communication protocol
- Team learning (Learning in team)
- Ensure frequency of contacts
- Continuous tests for orientation

The tasks and the roles of all individuals involved in tuition result from these strategic determinations.

### **2.1 Clearly defined and reliable objectives**

The course providers are responsible for unambiguous definition of objectives tailored to each target group, as well as for the goal of the specific course.

- What is to be learnt?
- Which level has to be reached?
- What is demanded during exam?
- What should be worked through autonomously by the learner?
- How great an effort is required?

These points should be clarified even at the beginning of the course. It should be possible to refer to them, and they should not be altered. The participants should receive the impression of being guided down a path. This self-image is of special importance for the distance-learning phase, when the participants do their studies at home. Making the learners feel that they are being monitored prevents a lack of motivation.

### **2.2 Well-structured methodology**

Work style and the methods to be used, in particular in the distance-learning phase, have to be constant. What must be strongly avoided is the impression that new things are being tried over and over. The training service providers should offer a clear diagram for the design of the presence-based- and the follow-on distance learning blocks. At the end of one block the portfolio for the next block in the course should be distributed. To play it safe, the block portfolios should also be stored in the workspace, so that participants who are absent can print them out subsequently.

The portfolio includes a list of the future curriculum content; the required prerequisites, practice examples, and a list of control questions.

Since it is neither expected nor possible to represent the curriculum content completely and in detail due to the short time available during the presence-based blocks, a clear methodology should also clearly state the points the course instructor does not have enough time to deal with, and which, in consequence, have to be worked through in self-studies by the participants themselves. It must be determined which points the participants are responsible for themselves. Dealing with a problem in detail is only possible selectively.

### **2.3 Clearly defined communication channels and their documentation**

The type of communication in the distance learning phase is closely linked to a well-structured methodology. The communication channels have to be identified clearly, but there should be several. For the sake of organisation, two forms have to be subdivided:

- Communication performed centrally in the workspace via the NEPTUN platform, on the one hand, and
- Communication between two individuals, whether course instructor, tutor or participant – that is personal contact via e-mail, telephone or fax, on the other hand.

Central communication is advantageous with respect to a generally efficient course organisation. There are used documents to be used (Word, HTML or pdf) which can be stored in the workspace, such as input data for an exercise to be done at home, etc. In the workspace of the Neptun platform, each document may be linked to comments, even to a discussion. In this way, lists with questions and answers that can be followed by all participants can be generated. Once a question is asked and answered, it can be read again and again. Furthermore, each event is logged in the workspace. Thus, it is visible at all times who has asked a question, and when, and also who has read the corresponding answers. For this reason, technical communication should be handled as much as possible in the workspace.

Other forms of personal contact, whether via phone, e-mail, or fax, have to be regarded as additional opportunities. They should be used where the workspace is too impersonal, or where the learner is uncomfortable "kibbitzing" with others, or where direct reply is necessary.

An essential function of the personal channels is to motivate the participants. In cases where a participant has not taken part in a workshop for a long time, an e-mail or telephone call may help to find out whether help is necessary.

### **2.4 Team learning**

To counteract a lack of motivation in the distance learning phases, learning in teams is regarded as a possible component of passing a course successfully. To do this, the participants have to be motivated from the very beginning. It will be the job of the course instructor to encourage the participants to "meet" each other independently

via the Internet platform, to work through new content together, to practice and also to learn to speak about the topic.

## **2.5 Ensure sufficient frequency of contacts**

To prevent participants from quitting in the distance learning phase, and to motivate them to keep at their work, the course instructors are responsible for maintaining contact in so that the number of contacts does not fall below a critical threshold, e.g. one or two contacts per week are desirable. Types of contact include a presence - based phase, a visit to the workspace, an e-mail, a fax, a telephone call or a personal meeting. A communication portfolio may be essential to guarantee the necessary contact frequency. In this portfolio, all contacts are reported with a brief description of content. Thus, the course instructors are sure to provide contact as often as necessary.

## **2.6 Continuous tests for orientation**

Tests are given and homework results are collected at the end of each module. These are important documents for the course instructors in order to check the corresponding level of the participants and to determine where intensified learning is necessary.