

# DRINK PURIFIED H<sub>2</sub>O!

A Project for the Drinking Water Treatment Plants



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“PURE-H2O Implementation of ECVET for  
Qualification Design in Drinking Water  
Treatment Plants and Sanitation for Pure  
Drinkable Water”**

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## TABLE OF CONTENTS

Table of Contents	3
List of Tables	4
List of Figures	4
Introduction	5
1 Profile identification of groups for testing in each country and target institution	6
1.1 Recommendations for preparation of targets list; determination of potential actors (PMB)	6
1.2 Connection with target groups and end-users (NPOs)	8
1.3 Determination of indicators for evaluation of testing process	8
2 Performance of testing sessions in the partner countries	10
2.1 Arrangement of testing schedule in the viewpoint of specific vocational qualifications acquisition (LPs and SICs)	10
2.2 Performance of sessions for lecture presentations and seminars on specialized topics and languages	10
2.3 Organization of testing sessions through presentation of teaching-training material to end users (PMB, NPOs)	11
3 Final assessment and curriculum tuning	13
3.1 Gathering the feedback information from targets and end-users	13
3.2 Study the number of target learners in different organizations	19
3.3 Evaluation the learner staff support available at different partner settings (PMB, NPOs)	19
3.4 Results review and final tuning of units and corresponding learning outcomes	20
4 Approbation of the applicability of PURE-H2O system for PURE-H2O Skill Passport assembly – mobility procedure for cross-organizational/multinational cooperation	21
4.1 Preparation of a guideline for generation of specific core qualifications' description (NPOs)	21
4.2 Outline of prospects for PureH2O Skill Passport issue	21
4.3 Provision of recommendations regarding mobility procedure	21
4.4 Quality arrangement of testing process	21
5 Dissemination and use activities during project testing stage	22
5.1 Dissemination measures – AL4 (NPOs, PDUG)	22

**LIST OF TABLES**

Table 1: Potential participants list

Table 2. Multiplier event schedule

Table 3 The target learners distributed by groups and professional area of activity

**LIST OF FIGURES**

Fig. 1 Gender:

Fig. 2 Educational degree:

Fig. 3 Perception of the learning material

Fig. 4 Training possibilities of Pure-H2O project

Fig. 5 The evaluation system

Fig. 6 Session organization

Fig. 7 Learning objectives importance

Fig. 8 On-line training materials

Fig. 9 Obtained results

Fig. 10 Need of pre-requisites

Fig. 11 learning objectives met

Fig. 12 Impact of Pure-H2O b-learning model

## Introduction

The **aims** of P2 testing and evaluation policy were:

- To facilitate the successful completion of the project Intellectual Outputs;
- To provide user acceptance of Pure-H2O programme;
- To investigate its functioning in accordance with the design parameters and satisfaction of all business, technical and management stakeholders;
- To approve project progress during follow up phase through:
  - providing instant evaluation in industry oriented short, intense 2-3 days VET courses, by adapting, testing and validating the new online service;
  - testing and validation of Intellectual Outputs by using modern, easy to use response technology.

**The objectives and activities of the testing process encompass:**

- Issue of written instructions
- Performance of testing sessions / work-shops
- Issue of national report on the basis of the accumulated data concerning:
  - the progress against objectives; satisfaction with the impact and outcomes;
  - the functionality and operation capacity of the web-site;
  - the b-learning module specific content and structure;
- Elaboration of national report – issue of recommendations for final tuning of project outputs.

# **1 PROFILE IDENTIFICATION OF GROUPS FOR TESTING IN EACH COUNTRY AND TARGET INSTITUTION**

## **1.1 Recommendations for preparation of targets list; determination of potential actors (PMB)**

Following the instructions of Project Management Board (PMB) for identification and selection of participants in Pure-H<sub>2</sub>O multiplier events for project achievements approbation and sharing P2 R & D Center 'Biointech' Ltd. have prepared a list with potential participants encompassing the predefined project target groups.

The profile of the different groups is quite different depending on their roles, tasks and activities in the project. They also have different interest of use of the project products, creating different biases to the content development and the delivery structure of the content.

The choice is focused on teachers, trainers and other VET providers in microbiology, chemistry, civil and environmental engineering as well as genetics, landscape architecture and computer science. Training and staff development professionals within the same professional areas are also chosen as potential participants. Research and development managers working within biotechnological SMEs equipped with (D)WTPs were also considered as appropriate targets. Finally representatives of social sciences interrelated to educational policy were included in the potential list of participants. The information is summarized and presented in Table 1, below.

Table 1: Potential participants list

Target group	Professional area						
	Microbiology	Chemistry	Civil engineering	Environmental engineering	Mechanical Engineering	Chemical Engineering	Others
Teachers/trainers/ VET providers	X	X	X	X			X
Training and Staff Development Professionals	X	X	X	X			X
Research and development managers	X	X				X	X
School counsellor							
Policy decision makers							X

## 1.2 Connection with target groups and end-users (NPOs)

The said target groups were connected during the information campaign preceded the evaluation events performance. During this campaign the following information materials and channels were used:

- Information channels: Telephone calls  
Face-to-face meetings  
e-mail messages
- Information materials Invitation notes  
Programme of the multiplier event

Exemplary Invitation notes and events' programmes are included in Annex 1 of this report.

## 1.3 Determination of indicators for evaluation of testing process

The main qualitative and quantitative Key Success Indicators (KSI) for evaluation of the testing process encompass the measures that link the testing actions to the anticipated outcome: approbation and applicability of the e-training programme of Pure-H2O project (O2 and O3) and their interrelation with K&S Passport (O4). They were as follows:

### ➤ **Qualitative KSI:**

- Project piloting justified
- Matching of Multiplier Events with project objectives, targets, and resources
- Multiplier events performance confirmed
- Workflow for events' deadlines respected
- Quality indicators for piloting followed
- Acceptance of the proposed methodologies by teachers and learners
- Performance of learners individually and at the group level
- Evaluation sessions delivered
- Covered at least 50 % of test-trainees' expectations

### ➤ **Quantitative KSI:**

- Project operational plan followed



- 2 evaluation events timetable stipulated
- 60 potential evaluation targets contacted
- Guidelines for testing/evaluation performance
- Evaluation tools prepared and issued:
  - test sheet with testing questions (Annex 1)
  - feedback questionnaire
  - information flyer and trainee reply card
- 2 evaluation sessions with 50 participants performed
- 1 national evaluation and sharing of results report issued

## **2 PERFORMANCE OF TESTING SESSIONS IN THE PARTNER COUNTRIES**

### **2.1 Arrangement of testing schedule in the viewpoint of specific vocational qualifications acquisition (LPs and SICs)**

The testing strategy exploited aims to ensure that the project benefits will endure beyond its life and assure sustainability of project results through their approbation and verification. During the testing event short-term vocational training courses have been organized with trainees to be trained for testing of project results

The testing schedule envisaged performance of both formative and summarize evaluation activities. The aim of the testing was to ensure that these activities impacted the project performance and resulted in:

- development of the technical framework in accordance with the training needs identified by consortium partners;
- training courses planned in accordance with the specific vocational qualifications acquisition (LPs and SICs), delivered and evaluated professionally according to the proposed methodology;
- recommendation and development of final project actions based on the findings during the testing performance;
- evaluation of the different tasks and project report preparation giving stakeholders recommendations for future actions;
- feedback to teachers/trainers for future developments in trainees' the trainers' programmes;
- recommendations for future enhancements of the Pure-H2O employment opportunities.

### **2.2 Performance of lecture presentations on specialized topics**

The objective of the testing was to provide guidelines, check and evaluate the validity and success of project main products bringing together representatives from the key project stakeholders in facilitated group sessions.

To realize this objective the testing programme (see Annex 1) included selected lecture presentations on predefined topics to support and further clarify the aims of Pure-H2O project and its main activities with special emphasis on evaluation of the project progress

against its objective, and to assess the functionality and operation capacity of the project web-site, especially the specific content and organization of the b-learning module.

The lecture presentations contribute as well to increase the community's awareness on the Pure-H2O problems, needs and priorities.

### 2.3 Organization of testing sessions through presentation of teaching-training material to end users (PMB, NPOs)

The testing process comprises practices that aim to make objective judgments of the extent to which the project meets, exceeds or fails to meet stated objectives. It has two fundamental purposes: verifying all specific deliverables and risk managing. These purposes are achieved through:

- verifying that the planned initiatives are in compliance with project deliverables: it verifies that the project products meet the functional design and implementation requirements identified in the project specifications.
- risk management for project programme performance. The exploring testing programme is tuned to identify the time for work “completion” and ensures that the obligations are fulfilled in time, and the system can be shifted to maintenance phase of the project.

The testing session “**Pure-H2O model of education in Sanitation for Pure Drinkable Water contributes to the EU efforts for sustainable economy**” was performed on 19th of September, 2016 in Sofia, Bulgaria as one-day session with the timetable:

Table 2 Multiplier event schedule

<b>P R O G R A M M E</b>	
<b><u>Type of activity</u></b>	<b><u>Time</u></b>
<b>Welcome address</b>	15 min
<b>Presentation of Pure-H2O project – aims, objectives and products</b>	15 min

<b>Technical instructions for work with the b-learning module</b>	15 min
<b>Presentation of the tested subject</b>	15 min
<b>Coffee break</b>	30 min
<b>Acquaintance with the tested subject: Chapters 2 and 5 of the “Drinking purified water” book and corresponding LPs</b>	30 min
<b>Performance of testing</b>	90 min
<b>Lunch</b>	75 min
<b>Discussion on the results</b>	30 min
<b>Filling the questionnaire</b>	30 min
<b>Conclusion remarks and final briefing – coffee break</b>	60 min

### 3 FINAL ASSESSMENT AND CURRICULUM TUNING

#### 3.1 Gathering the feedback information from targets and end-users

##### General information about the trainees

Fig. 1 Gender:

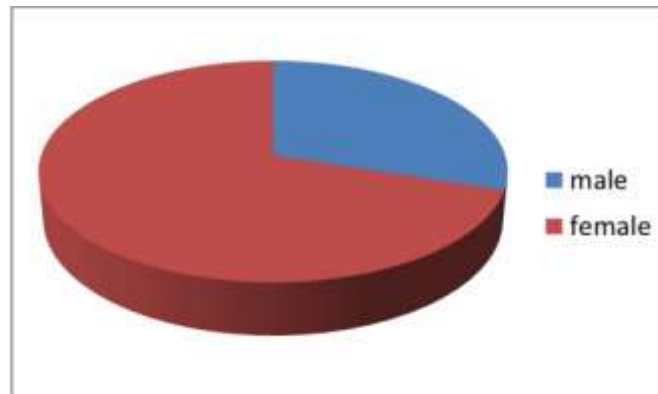
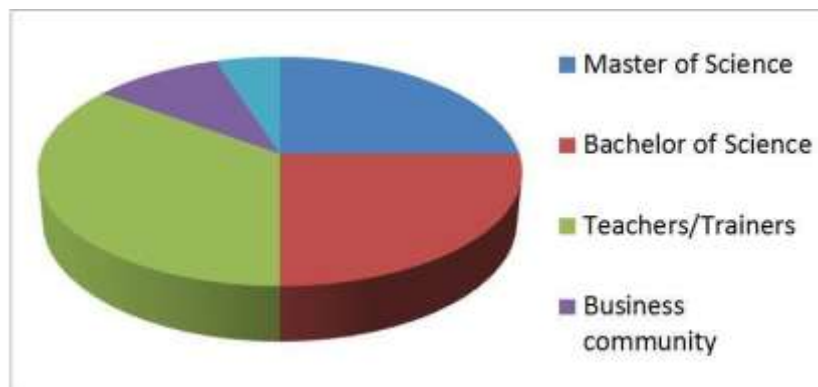


Fig. 2 Educational degree:



## Questionnaire data and test results

1. Was the material easy to understand?

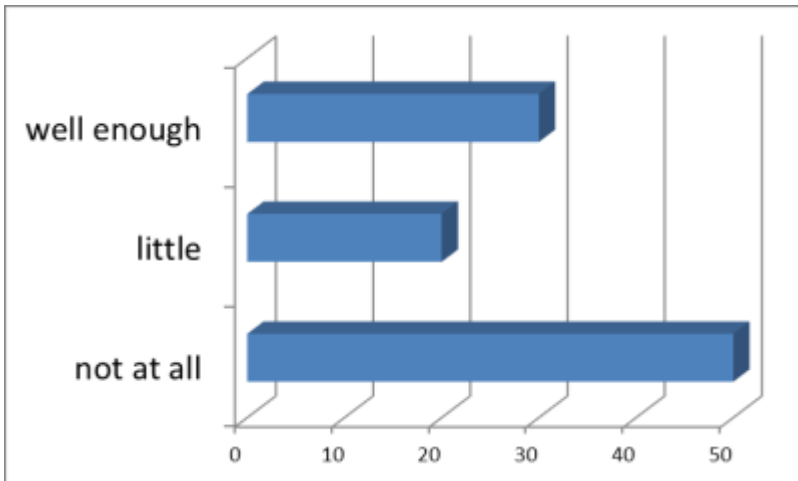


Fig. 3 Perception of the learning material

2. How do you estimate the training possibilities in the Pure-H2O project?

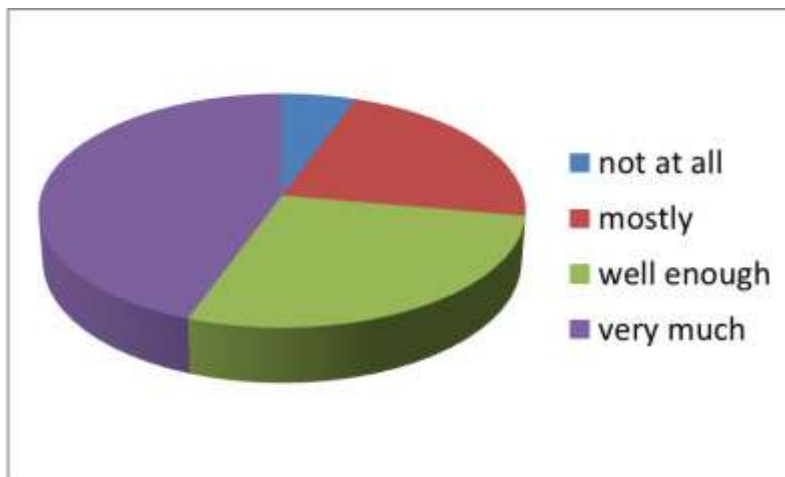


Fig. 4 Training possibilities of Pure-H2O project

3. How do you estimate the evaluation system used?

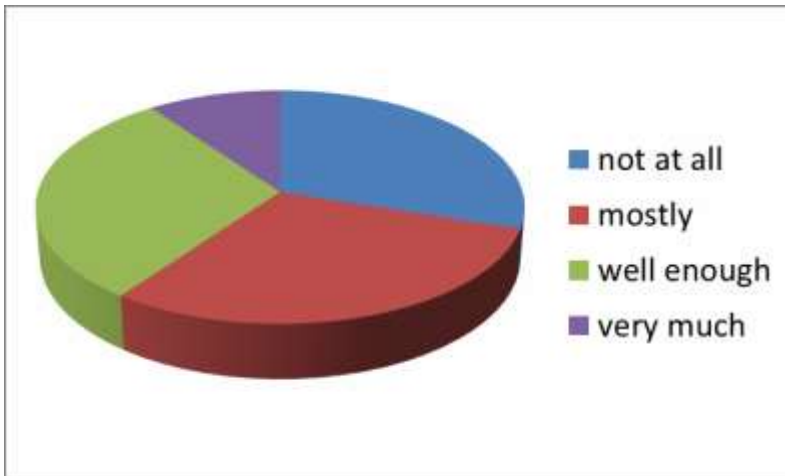


Fig. 5 The evaluation system

4. How well was the session organized?

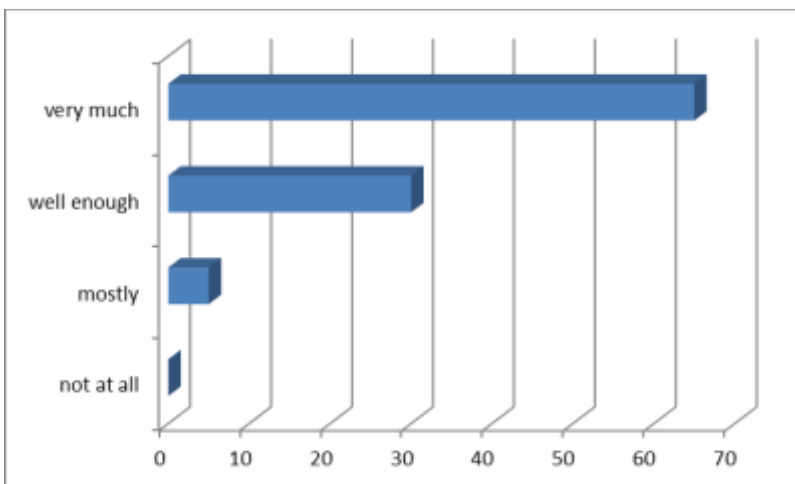


Fig. 6 Session organization

5. Did you consider the learning objectives important?

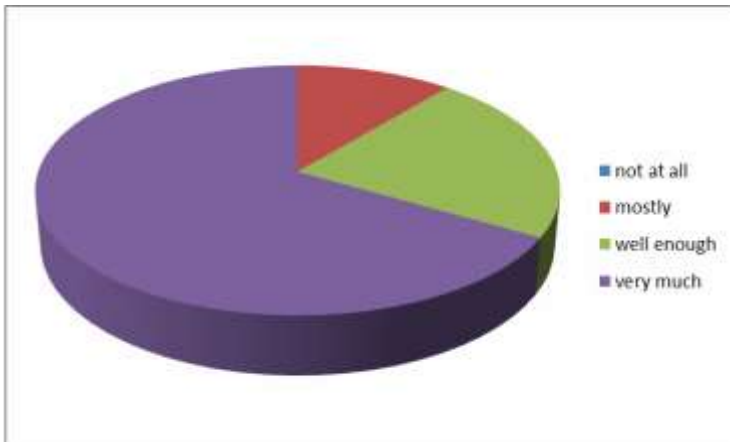


Fig. 7 Learning objectives importance

6. Are you satisfied with the provided on-line training materials?

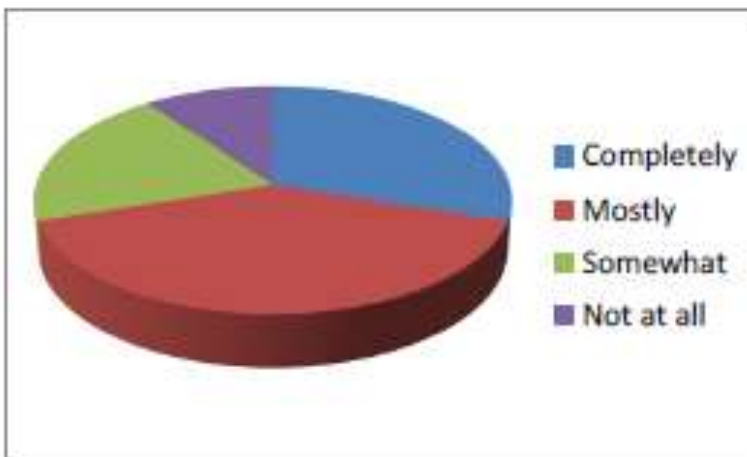


Fig. 8 On-line training materials



7. What type of results did you obtain?

	Up-to-date knowledge	Practical skills	Professional competence	Other
Number of respondents	18	7	0	0
Percentage of respondents	86%	33%	0%	0%

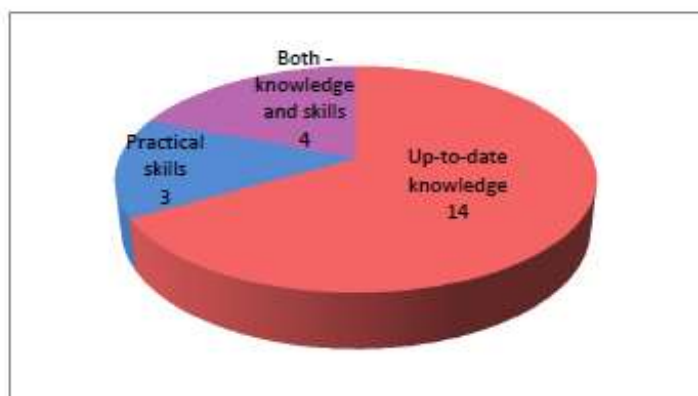


Fig. 9 Obtained results

8. Do you need any pre-requisites (e.g. specific education, practical experience, etc.) to be able to use this training product?

	No	Yes
Number of respondents	2	19
Percentage of respondents	10%	90%

Fig. 10 Need of pre-requisites

### 9. Did you meet your learning objectives?

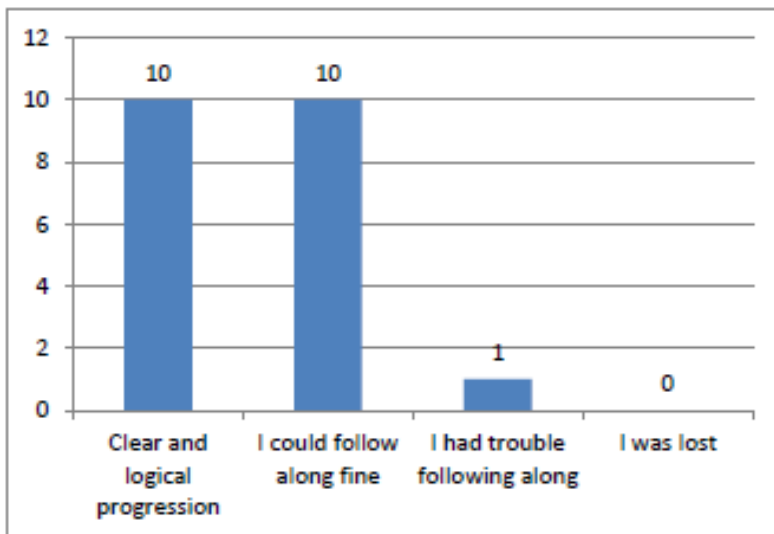


Fig. 11 Learning objectives met

10 Do you think the Pure-H2O b-learning model could contribute to your job performance making it easier and more productive?

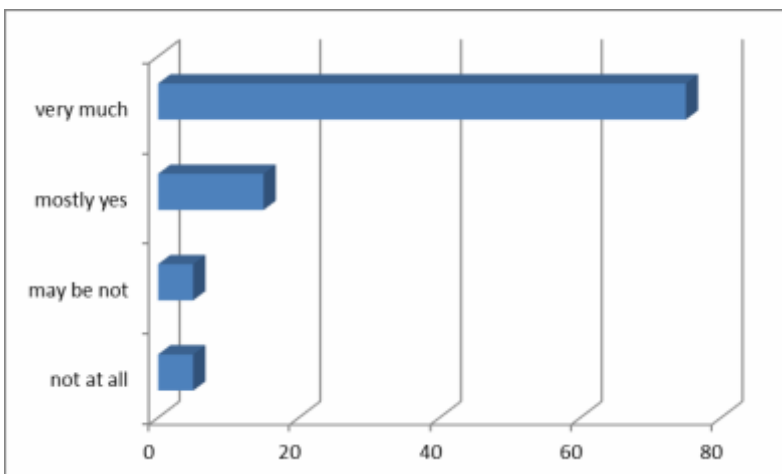


Fig. 12 Impact of Pure-H2O b-learning model

### 3.2 Study the number of target learners in different organizations

Training facilitators from different companies having practical interest in Pure-H2O programme; higher educational professors, representatives of the business community and mass-media were invited to the evaluation event. The target learners distributed by groups and professional area of activity were as follows:

Table 3 The target learners distributed by groups and professional area of activity

Professional area	Target group			
	Teachers /trainers / VET providers	Training and staff development professionals	Research and development managers	School counsellor
Microbiology	2		1	
Chemistry	1	1		1
Civil engineering	1	1		
Environmental engineering	1		4	
Mechanical Engineering				
Chemical Engineering	1		1	
Others	6*		4	1

\* See details in List of participants

### 3.3 Evaluation the learner staff support available at different partner settings (PMB, NPOs)

The testing session was supported fully by P2 staff members as follows:

- Support of the pre-session information campaign

- Support with experts the performance of the testing session: delivering of lectures and explanations; supervising activities – minding of KSIs determined by PMB;
- Support for data accumulation and evaluation;
- Support in conclusions launching and national report issue.

### 3.4 Results review and final tuning of units and corresponding learning outcomes

- The participants shared the opinion that the contents of the project, in particular the type of e-learning is very well done.
- The target respondents from various professional and work areas could quickly adapt to this type of learning.
- The b-learning is particularly important for them since makes them independent in their timing; they evaluated positively the combination of content, design and personal pace.
- The trainees can arbitrarily repeat the content without any difficulties, can communicate with other participants if needed, can learn contents they know are important for their profession.
- The target participants learn both technical, biological and economical content and in this way receive open up perspectives.
- They have received the basis for further professional development on the basis of the content and methods of Pure-H2O project.
- Such developments are recognized by employers and are honored to be a good initiative.
- Some of the target groups expressed willingness to experiment the proposed learning materials in some kind of professional training, thus implementing the Pure-H2O model in specific working reality.

## **4 APPROBATION OF THE APPLICABILITY OF PURE-H2O SYSTEM FOR PURE-H2O SKILL PASSPORT ASSEMBLY – MOBILITY PROCEDURE FOR CROSS-ORGANIZATIONAL/MULTINATIONAL COOPERATION**

### **4.1 Preparation of a guideline for generation of specific core qualifications' description (NPOs)**

The P2 staff assisted the trainees in their acquaintance with PureH2O K&S Passport in its applicability as a guideline for assemble and generation of specific core qualifications' descriptions.

### **4.2 Outline of prospects for PureH2O Skill Passport issue**

The prospects for issue of personal portfolio on the basis of PureH2O Skill Passport as a template were discussed and outlined.

### **4.3 Provision of recommendations regarding mobility procedure**

The application of PureH2O Skill Passport, structured in respect to EUROPASS template documents in intra/inter-national mobility schemes was discussed and useful recommendations were launched.

### **4.4 Quality arrangement of testing process**

The whole testing process was arranged in respect to the quality management operational plan prepared by QMD and the qualitative/quantitative/ KSI, specified in 1.3 of this report.

## **5 DISSEMINATION AND USE ACTIVITIES DURING PROJECT TESTING STAGE**

### **5.1 Dissemination measures – AL4 (NPOs, PDUG)**

Through performing pilot training activity during the project, consultations and involvement of end-users in the project life was ensured. During project follow up phase, it also demonstrated clear activities to ensure that the results/benefits will be spread throughout and beyond the consortium.

Elaboration and distribution of valorization products during approbation process:

- Brochures
- Leaflets
- Posters
- Newsletters
- e-Presentations
- Short e-messages
- Questionnaires, inquiries, info-sheets.

The materials are available in EN and BG languages in electronic and printable versions.

### **5.2 Use – AL4 (NPOs, PDUG)**

The use of project results is assured through their applicability testing and final tuning on the basis of the feedback information gathered

“Drink purified water” book, Chapter 2 and Chapter 5:

**Chapter2 Waterborne diseases**

**Q1. The waterborne diseases unify the following:**

- a) waterborne microbial diseases, water hygiene diseases, water contact diseases, water habitat vector-borne diseases, waterborne chemical diseases
- b) waterborne bacterial diseases, water hygiene diseases, water exchange diseases, water habitat vector-borne diseases, waterborne chemical diseases
- c) waterborne microbial diseases, water sanitation diseases, water contact diseases, water habitat animal-borne diseases, waterborne physical diseases
- d) waterborne animal diseases, water hygiene diseases, water contact diseases, water habitat insect-borne diseases, waterborne chemical diseases

A1: a) waterborne microbial diseases, water hygiene diseases, water contact diseases, water habitat vector-borne diseases, waterborne chemical diseases

**Q2: Microbiologically Influenced Corrosion (MIC) is a phenomenon resulting from the action of microorganisms in contact with a water surface**

- a) TRUE
- b) FALSE

A2: b) FALSE

**Q3: Key water quality parameters that influence corrosion are:**

- a) pO<sub>2</sub>, decrease alkalinity, buffer intensity and microbial water contamination
- b) pH, increase alkalinity, buffer intensity and mechanical water contamination
- c) pH, increase alkalinity, buffer intensity and microbial water contamination
- d) pO<sub>2</sub>, decrease alkalinity, buffer intensity and mechanical water contamination

A3: c) pH, alkalinity, buffer intensity and bacterial water contamination

**Q4: Iron/Manganese-Related Bacteria can convert soluble iron ions (ferrous) to insoluble iron ions (ferric).**

- a) TRUE b) FALSE

A4: a) TRUE

**Q5: MIC contributes to water supply enlargement, pipe breakage and potential water contamination.**

- a) TRUE b) FALSE

A5: b) FALSE

**Q6: Category 2 Water refers to a:**

- a) source of water that does not pose substantial threat to humans and is classified as "Clean Water".
- b) source of water that contains a significant degree of chemical, biological or physical contaminants and is known as "Grey Water"
- c) source of water that doesn't contain chemical and physical contaminants but is microbiologically contaminated
- d) source of water that is grossly unsanitary and is known as "Black Water"

A6: b) source of water that contains a significant degree of chemical, biological or physical contaminants and is known as "Grey Water"



## **Chapter 5 Disinfection**

**Q1: Which of the following substances generally is not used for chemical disinfection of water?**

- a) Hypochlorite
- b) Fenols
- c) Hexan
- d) Chloramines

A1: Hexan

**Q2: Physical disinfection of water could be achieved through application of sound waves.**

- a) TRUE
- b) FALSE

A2: a) TRUE

**Q3: The value of the contact time factor (CT) depends on:**

- a) The type and age of pathogenic microorganisms in the water
- b) Effective monitoring and assessment of drinking water quality
- c) Drinking water disinfection standards
- d) Values indicated in Biocidal Products Directive (Directive 98/8/EC)

A3: a) The type and age of pathogenic microorganisms in the water

**Q4: The EU Drinking Water Directive (98/83/EC) applies to drinking water from tankers.**

- a) TRUE
- b) FALSE

A4: a) TRUE

**Q5: The most effective disinfectant with very low CT is:**

- a) Free chlorine

- b) Chloramines
- c) Ozone
- d) Chlorine dioxide

A5: Ozone

**6: Cooling towers are not subjected to water disinfection.**

- a) TRUE
- b) FALSE

A6: b) FALSE