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Report on **Training gaps identified and recommended training to fill the gaps**

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1. INTRODUCTION

The present report starts by listing the generic skills gaps identified in the survey carried out in the frame of Work Package 4: “*New Generic Skills and Competences Approaches in Europe*” of the AQUA-TNET project (results in Deliverable 4.6). Following this, the report describes the survey undertaken with key-people, the selection of courses and the course outline templates for the selected courses, based on EQF descriptors (WAVE methodology).

2. SUMMARY OF FINDINGS FROM THE SURVEY

The survey carried out in the frame of Work Package 4: “*New Generic Skills and Competences Approaches in Europe*” of the AQUA-TNET project (results in Deliverable 4.6) identified gaps in the current provision of general skills training for researchers seeking employment or employed in aquaculture, fisheries and aquatic resources. Specifically, it identified skills which were considered important but not regularly taught. Thus, we consider only the skills that students, graduates and employers (University teachers and researchers, industry and research institutes) ranked most highly and, from these, selected the subset of skills that more than 50% of interviewees (students, graduates, university staff and other employers) identified as not being taught.

There were clear gaps in generic skills training. The 16 skills gaps identified fall mostly into three categories: “practical/management skills”, “communication skills”, and “career and life skills”, with all groups interviewed identifying some of these skills as missing. Table I summarises the gaps in generic skills training as identified by students, graduates and employers (University teachers, industry, and research institutes).

Table I. Gaps in generic skills training. Data source: Survey to students, graduates, University teachers, industry and research institutes (Deliverable 4.6).

	Students	Graduates	Employers
“Numerical, computational, statistical skills”			
• Statistical software		+	
“practical/management skills”			
• Project management		+	
• Time management	+		+
• Team management			+
• Budget management			+
• Risk assessment(safety in lab and fieldwork)		+	
• Awareness of legal and procedural issues (licensing of animal research, health and safety, data protection, anti-discrimination)			+
“Scientific methods”			
• Research ethics		+	
“communication skills”			
• Literacy in own language		+	
• Poster presentation		+	
• Networking			+
• Effective behaviour in the workplace			+
“career and life skills”			
• CVs, job applications, interviews	+	+	+
• Grant applications, research funding	+	+	
• Career development planning			+
“science in society”			
• Interdisciplinary studies		+	

3. SURVEY OF KEY-PEOPLE

3.1. Purpose of the Survey

The survey carried out with students, graduates, University teachers and other employers (industry and research institutes) (results in Deliverable 4.6) identified 16 generic skills gaps in the current provision of generic skills training for researchers seeking employment or employed in aquaculture, fisheries and aquatic resources.

A second questionnaire was designed to be carried out with selected key-people. This survey aimed at identifying which of the 16 skills gaps are priorities and, as such, should be selected to develop new training modules.

3.2. Methodology

The questionnaires aimed at prioritizing the 16 generic skills identified as skills gaps, and collected information only about these skills. Appendix I shows the questionnaires used to collect information from key-people.

The survey was based on face-to-face and telephone interviews. The “key-people” survey was carried out from June-August 2011. During this period, a total of 17 people from universities, research institutes and industry were interviewed.

3.3. Results

Table 2 shows how interviewees classified graduates in terms of strengths, weaknesses and needs. Table 3 shows the ranking of categories of skills. Interviewees were also asked to rank a set of 16 generic skills on a 5-point Likert-scale, answers ranging from strongly agree

(5) to strongly disagree (1). Table 4 shows the results for the importance that key-people allocated to the set of generic skills under analysis.

The results revealed that key people prioritized those generic skills related to scientific methods, and numerical, computational, statistical and IT skills (Table 3). Key people selected 8 of the 16 key skills has being of high priority (time, team and budget managements; literacy in own language; networking; effective behaviour in the workplace; grant application and research funding; and, statistical methods) (Table 4).

The survey also identified a set of non skills-based behavioural attributes such as, “loyalty”, “responsibility”, “reliability”, “common-sense” and “acceptance of a challenge” as qualities which were looked for/expected in graduates (Table 2).

Table 2. Main strength, weaknesses and needs in graduates

	Replies
Qualities/skills looked for/expected in graduate employees	Intellectual capacity; Good level of training; Quantitative skills (statistics, data analysis), Ability to analyze and solve problems, critical, good acceptance of challenges; Autonomous, with initiative, independent, inquisitive, creative; The ability to work in a team, ability to work on own; A positive attitude, motivation, willingness to work; Adaptable, flexible; Responsible, reliable, loyal; Good knowledge of English (reading and writing) Efficient, determined; Ability to network and good communication skills; Ability to write proposals and fundraise; Multi-disciplinary;
Graduate strengths	Technical abilities; Motivated, interested, willingness to work; Independent; Inquisitive; Good background (theory and practice) in ecology, fisheries, biology; Good fieldwork abilities (sampling, trials, etc), good laboratory skills; Good quantitative skills (data analysis);

Graduate weaknesses	Lack team working skills, lack interpersonal skills; Knowledge of English; Lack specific quantitative skills (e.g. statistics), interpretation of data; Time management; Grant writing, applying for funding, writing proposals; Writing scientific papers for publication in peer review scientific journals; Difficulty passing theory to action;
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Table 3. Ranking of categories of skills and qualities (by order of importance, 1=highest importance).

	RANK
Scientific methods	1
Numerical, computational, statistical skills	2
IT skills	3
Communication skills (scientific and general)	4
Career and life skills	5
Practical skills	6
Management skills	7
Science in society	8

Table 4. Descriptive statistics for importance of generic skills. Average classification. Strongly agree (=5), agree (=4), neither agree nor disagree (=3), disagree (=2), strongly disagree (=1).

Likert-scale item	Classification	
	Universities and research institutes	Industry
a. "Knowledge of statistical methods is an important skill"	4.3	4.0
b. "Project management is an important skill"	3.8	4.1
c. "Time management is an important skill"	4.3	4.5
d. "Team management is an important skill"	4.3	4.4
e. "Budget management is an important skill"	4.0	4.3
f. "Risk assessment(safety in lab and fieldwork) is an important skill"	4.0	3.6
g. "Awareness of legal and procedural issues (e.g. licensing of animal research, health and safety) is important"	4.2	4.0
h. "Awareness of research ethics is important"	4.2	2.9
i. "Literacy in one's own language is important"	4.3	4.3

j. "Poster presentation is an important skill"	3.9	3.3
k. "Networking is an important skill"	4.3	3.4
l. "Effective behaviour in the workplace is important"	4.6	4.0
m. "Understanding of how to approach writing CVs and job applications, and interview techniques is an important skill"	3.7	3.4
n. "The ability to write grant applications/ obtain research funding is an important skill"	4.4	3.3
o. "It is important to be able to plan your career development"	3.9	3.0
p. "It is important to understand approaches used in other disciplines"	4.2	3.3

4. SELECTED COURSES

A cut-off point of 4.3 was used in order to select the most important skills from the previously selected 16 generic skills "gaps". This cut-off point results in eight generic skills being prioritized (50% of the most important skills for which there were gaps). Table 5 provides a list of the most important generic skills selected by the key-people.

Table 5. List of prioritized courses

List		Course title
Team management	One course	Project management
Time management		
Budget management		
Project management		
Grant applications, research funding	One course	Research Funding Procurement
Effective behaviour in the workplace	One course	Successful career
Networking		
Statistical methods	One course	Statistical analysis

5. GENERIC SKILLS TRAINING MODULES

The generic skills gaps were identified from the questionnaires and EQF descriptors (WAVE methodology) were used to develop several courses. The following courses were developed:

- Project Management
- Research Funding Procurement

- Successful Career
- Statistical Analysis

The generic skills gap identified were also identified as skills gaps in another project which used a similar questionnaire to collect information from researchers and stakeholders employed in aquaculture – AQUALABS (2009-1-TR1-LEO05-0864), Lifelong Learning Programme, Leonardo Da Vinci - Transfer of Innovation. As such, the course templates developed for the AQUALABS project were used in this project.

A list of the course templates and learning outcomes developed by the partners is provided below in Appendix 2.

APPENDICES

A1: Survey – Key-people

A2: Course Templates

Annex A I. Interview key-people

INFORMATION ABOUT INTERVIEWEE:

Name:

Date:

Institution / company:

1) Do you employ graduates?

Yes No **If no, STOP here**

2) What qualities/skills do you look for/expect graduate employees to have?

3) In your experience, what are graduates good at?

4) What are they not good at?

5) Do you provide any on the job training?

Yes No **If yes, please specify what kind of training this is (topic, length of courses, etc)**

6) Rank these 8 categories of skills and qualities (by order of importance, 1 = highest importance):

	RANK
Numerical, computational, statistical skills	
IT skills	
Scientific methods	
Management skills	
Communication skills (scientific and general)	
Career and life skills	
Science in society	
Practical skills	

7) To what extent do you agree with these statements?

	<i>Strongly disagree</i>		<i>Disagree</i>		<i>Neither agree nor disagree</i>		<i>Agree</i>		<i>Strongly agree</i>
a "Knowledge of statistical software is an important skill"	1	...	2	...	3	...	4	...	5
b "Project management is an important skill"	1	...	2	...	3	...	4	...	5
c "Time management is an important skill"	1	...	2	...	3	...	4	...	5
d "Team management is an important skill"	1	...	2	...	3	...	4	...	5
e "Budget management is an important skill"	1	...	2	...	3	...	4	...	5
f "Risk assessment(safety in lab and fieldwork) is an important skill"	1	...	2	...	3	...	4	...	5
g "Awareness of legal and procedural issues (e.g. licensing of animal research, health and safety) is important"	1	...	2	...	3	...	4	...	5
h "Awareness of research ethics is important "	1	...	2	...	3	...	4	...	5
i "Literacy in one's own language is important"	1	...	2	...	3	...	4	...	5
j "Poster presentation is an important skill"	1	...	2	...	3	...	4	...	5
k "Networking is an important skill"	1	...	2	...	3	...	4	...	5
m "Effective behaviour in the workplace is important"	1	...	2	...	3	...	4	...	5
n "Understanding of how to approach writing CVs and job applications, and interview techniques is an important skill"	1	...	2	...	3	...	4	...	5
o "The ability to write grant applications/ obtain research funding is an important skill"	1	...	2	...	3	...	4	...	5
p "It is important to be able to plan your career development"	1	...	2	...	3	...	4	...	5
q "It is important to understand approaches used in other disciplines"	1	...	2	...	3	...	4	...	5

8) Any other comments?

Annex A2: Course Templates

Course Outline Template: Project Management (©Aqualabs Project)

This template is intended to outline the course (part of Aqualabs Project) before using the VALLA tool to fully define the course.

Course Designer:	Ankara University + Stirling University
Course Title:	Project Management
Course Description:	Project Management is the discipline of defining and achieving targets while optimising the use of resources (time, money, materials, people, space etc). This course allows candidates to integrate and use technical and management skills acquired to complete a successful project. This course provides candidates to be able to undertake and be aware of critical aspects of project management.
Entry Level:	No prior experience required
Unit 1 Name:	Fundamentals of Project Management
Unit 1 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - explain the characteristics of the project - differentiate between project and non-project work - identify reasons for undertaking projects - identify types of project and complexity
Unit 2 Name:	Building the project team
Unit 2 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - identify criteria for successful team selection - explain and describe team interfaces and roles - demonstrate application of behaviours conducive to working as a member of team - demonstrate for communicating for problem solving - demonstrate the principles for differing cultures within team - collaborate with other team members for project performance - demonstrate strategies for measuring performance of the project - develop methods to provide feedback for working relationship
Unit 3 Name:	Project Budgeting
Unit 3 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - identify the work elements of the project - determine the requirements of the project in terms of type, quantity and unit cost and documented in agreed form - estimate elements of cost for each work package - document a cost budget within agreed time - balance cost budget in accordance with project type - maintain financial records within agreement of the project
Unit 4 Name:	Time Planning
Unit 4 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - assess the project for work elements and the needed time - develop the schedule in line with the project timelines - estimate the duration for each work package - balance the time and the work - maintain time schedule records within agreement of the project
Unit 5 Name:	Risk Management Strategy

Unit 5 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - identify the potential risks - develop the risk management plan - analyse quantitative and qualitative risks - create risk response plan - monitor and control the risks
Unit 6 Name:	Quality Management
Unit 6 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - understand the concept of quality assurance - understand the concept of quality control
Unit 7 Name:	Communication in the Project
Unit 7 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - identify effective communication planning - identify knowledge distribution - develop a reporting structure for communication - communicate with other stakeholders
Unit 8 Name:	Evaluation of the Project
Unit 8 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - demonstrate post review of the project - identify project objectives versus project outcomes - evaluate the management performance in terms of time, budgeting and team working

**Course Outline Template: Research Funding Procurement
(©Aqualabs Project)**

This template is intended to outline the course (part of Aqualabs Project) before using the VALLA tool to fully define the course.

Course Designer:	AquaTT
Course Title:	Research Funding Procurement
Course Description:	The aim of the course is to enable candidates to understand underlying research policy and priorities, identify appropriate funding opportunities and increase their chances of being part of a competitive application.
Entry Level:	No prior experience required
Unit 1 Name:	Understanding Research Funding Policy Context
Unit 1 Learning Outcomes:	Candidates should be able to: - 1.1 Explain the main policy context related to Europe and the marine sector - 1.2 Classify the different types of EU funding mechanisms
Unit 2 Name:	Identification of suitable funding opportunities
Unit 2 Learning Outcomes:	Candidates should be able to: - 2.1 Identify and appraise funding opportunities relevant to their field of work - 2.2 Explain the different stages in the lifecycle of a project from application to implementation - 2.3 Assess suitability of calls and determine competitiveness - 2.4 Explain the policy lifecycles that have generated funding calls
Unit 3 Name:	Generating leads to form or join a consortia
Unit 3 Learning Outcomes:	Candidates should be able to: - 3.1 Identify opportunities to network and meet potential project partners (generating leads) - 3.2 Identify opportunities to upskill and increase the candidate's competitiveness

Course Outline Template: Successful Career

(©Aqualabs Project)

This template is intended to outline the course (part of Aqualabs Project) before using the VALLA tool to fully define the course.

Course Designer:	AquaTT + Stirling (support)
Course Title:	Networking - key for a successful career
Course Description:	The aim of the course is to enable candidates to communicate, interact and build professional relationships effectively with colleagues in the work place (one on one and in group settings), when networking nationally and internationally and when making oral presentations. The course is made up of four units; Unit 1: Networking skills, Unit 2: team working skills, Unit 3: Oral presentation skills and Unit 4: Effective behaviour in the workplace.
Entry Level:	NA
Unit 1 Name:	Networking skills
Unit 1 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - Understand the strengths and weaknesses of your “networking type” - Understand the characteristics of a successful networker - Understand factors that influence the ability to network successfully (personality traits, cultural differences, cross sectoral/stakeholder differences etc) - Understand the different approaches that can be used to network - Design a personal networking strategy - Be able to demonstrate successful networking in a variety of different networking settings (scientific conference, trade show, on a stand, in a social setting)
Unit 2 Name:	Team working skills
Unit 2 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - Understand the different types of team that exist and the different roles in a team <ul style="list-style-type: none"> • Understand how teams grow and evolve • Understand how to enhance collaboration and cooperation • Know how to contribute to the creative problem solving process • Express their views with constructive criticism • Know how to make <u>teams</u> more cohesive and unified • Know how to build trust • Know how to make effective team decisions and plans • Know how to become more involved and have more impact in the team environment - Understand different conflict resolution methods
Unit 3 Name:	Oral presentation skills
Unit 3 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - Understand the principles of a good oral presentation - Design a presentation using standard presentation software - Present an effective oral presentation to different audiences (peers, funders, public) - Engage with the audience - Understand and successfully respond to questions from the audience
Unit 4 Name:	Effective behaviour in the workplace
Unit 4 Learning Outcomes:	Candidates should be able to: <ul style="list-style-type: none"> - Explain why effective workplace behaviour is important

- | | |
|--|--|
| | <ul style="list-style-type: none">- Identify difficult behaviour in the workplace- Compare their own behaviour patterns with methods shown to be effective- Demonstrate skills which will improve their effectiveness in the workplace |
|--|--|

Course Outline Template: Statistical analysis
(©Aqualabs Project)

This template is intended to outline the course (part of Aqualabs Project) before using the VALLA tool to fully define the course.

Course Designer:	University of Aberdeen
Course Title:	Statistical analysis
Course Description:	The aim of the course is to enable candidates to understand the principles of statistical analysis relevant to aquaculture.
Entry Level:	Some basic understanding of mathematics and aquaculture is essential, also computer literacy and familiarity with SPSS or equivalent software.
Unit 1 Name:	Basic concepts in statistics
Unit 1 Learning Outcomes:	On completion of this unit, learners will be able to: <ul style="list-style-type: none"> - Understand why statistics are important, - Understand the scientific method, - Distinguish between different types of data.
Unit 2 Name:	Principles of data analysis
Unit 2 Learning Outcomes:	On completion of this unit, learners will be able to: <ul style="list-style-type: none"> - Conduct a basic data exploration, - Understand hypothesis testing, - Identify different distribution of the data, - Understand experimental design.
Unit 3 Name:	Selecting a statistical test
Unit 3 Learning Outcomes:	On completion of this unit, learners will be able to: <ul style="list-style-type: none"> - Select the right statistical test(s), - Conduct data screening (outliers, type of distribution, variance, linear relationship), - Distinguish and choose between parametric and non-parametric tests.
Unit 4 Name:	Statistical analysis and interpretation of data
Unit 4 Learning Outcomes:	On completion of this unit, learners will be able to: <ul style="list-style-type: none"> - Conduct data exploration, - Apply different statistical tests - Read statistical outputs; evaluating and interpreting results, including recognition of signs that a test or model was inappropriate.



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