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SKILLS4WATER

REPORT ON DESIGNED LEARNING ACTIVITIES

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List of Abbreviations and Acronyms

Abbreviation/Acronym	Meaning
ACEEU	Accreditation Council for Entrepreneurial and Engaged Universities
CBHE	Capacity Building in Higher Education
EACEA	Education, Audiovisual and Culture Executive Agency
EC	European Commission
EQF	European Qualifications Framework
EU	European Union
H2O-People B.V.	Personal development organisation
HE	Higher Education
HEI	Higher Education Institution
IPS	Interpersonal skills
LA	Learning activities
LLL	Lifelong learning
MOOC	Massive online open courses
PES	Personal skills
SG	Serious games
SIS	Situational skills
SOS	Soft skills
UCA	University of Cádiz
UDL	Universal Design for Learning
UGAL	“Dunarea de Jos” University of Galati
UNI	University of Niš
VR	Virtual reality
WP	Work Package
WRM	Water Resources Management

Executive Summary

The water industry requires a highly skilled workforce capable of adapting to the evolving market and societal needs, which includes appropriate training in soft skills. To tackle future challenges, the European Commission (EC) aims to upskill the workforce to address skill shortages, prompting research projects like Skills4Water. This project focuses on integrating soft skills training into higher education curricula bridging the gap between academic training and the water industry demands.

The project's Work Package 3 aims to upscale and improve the higher education curricula for water management with soft skills, by offering custom-tailored learning activities to be incorporated in classes. Additionally, this WP pursues pilot testing and validation of the framework and guidelines developed in the WP2 (D2.2. and D2.3.). These specific objectives contribute to the overall objective of the Skills4Water project to upscale the soft skills and competencies of young water professionals in water higher education curricula. Based on the expected results from the WP2, especially the developed framework for incorporating soft skills in water management curricula, the team members prepared the report on designed learning activities (D3.1.) to include in classes.

The report on designed learning activities was produced throughout three phases. Initially, the D2.2. *Standardized framework for integrating soft skills into the higher education curricula* and D2.3. *Practical guidance for implementing the framework* were evaluated to create a suitable framework for the acquisition of the defined soft skills throughout adjusted learning activities. Then, a comprehensive literature review of existing learning activities in the water sector (primarily, but also in similar sectors) was conducted to summarize the appropriate learning activities. Finally, the D2.1. *Evaluation report of soft skills in the European water sector* was used as a guidance document, providing valuable insights for the most desirable learning activities, expressed from the different stakeholder's standpoints (HEI, Industry, Regulatory bodies, Other).

The report on designed learning activities will serve as an important input for incorporating the designed soft skills in HEI's curricula (Activity A3.2.). By designing learning activities that are specifically tailored to the acquisition of selected soft skills in water higher education, WP3 will ensure that these soft skills are integrated into water HEI coherently and effectively. This approach will help to prepare students for the labour market by providing them with the essential soft skills that they will need to succeed in their careers.

By implementing designed learning activities, the Skills4Water project aims to provide HEI students with a more comprehensive education that goes beyond technical knowledge and helps develop their future career, targeting the acquisition of the selected soft skills (personal, interpersonal and situational), and will provide guidance on how to incorporate them into the curricula of HEIs.

1. Introduction

Today, higher education is facing major socio-technological, but also economic, and social challenges. First of all, it is necessary to ensure that new generations of students have modern, professional, and technologically based knowledge, but also multicultural competencies and skills that are needed in modern conditions in the digital and knowledge era. The task of higher education, as a centre of creation and accumulation of knowledge, to perceive different needs and problems in the local and wider sense, and the global environment and find scientific and technological solutions for the same problem, becomes ever more demanding with global changes in the sphere of ecology, demography, technology, healthcare, water resources, etc., leading to the fact that higher education also acquires a soft skill character.

Many teaching activities require students to learn and reproduce information given to them. Of course, students have to master the important content of the domain. However, learning alone does not provide students with the critical thinking and reasoning skills they will need to succeed in higher education and knowledge-based organizations. With information readily available through the Internet and other sources, employees must be able to integrate and evaluate information to use it productively in their work. Increasingly, most minimum wage jobs require higher levels of knowledge than was the case in the past, as well as the ability to apply knowledge to new situations and new problems. Knowledge-enhancing activities require students to generate ideas and understandings that are new to them. Students can do this through interpretation, analysis, synthesis, or evaluation. Upgrading knowledge is the basic condition of learning activities (Laurillard, 2012).

The most prominent activities require students to apply the knowledge they have built up across different contexts, helping them to further deepen their understanding and connect information and ideas they have acquired through two or more academic disciplines.

Knowledge upgrading occurs when students do more than simply reproduce what they have learned: when they push the boundaries of reproduction to generate ideas and understandings that are new to them. "Critical thinking" is often considered a knowledge-building skill. Knowledge-enhancing activities ask students to interpret, analyse, synthesize, or evaluate information or ideas.

For example, students design and perform a procedure to test tap water at their faculty. Once they have the accurate data, they will use that information to determine which water filtration system will work best for the school. Students apply their knowledge gained from designing and performing water quality testing to select the appropriate filtration system, which will force them to look at what they have learned in a new way and deepen and extend their knowledge. On the other hand, students can redesign a procedure to test the quality of tap water in their faculty with more focus on team-work and responsibility. They test the water and redo the design process until they get the data right. Although students apply their knowledge acquired during previous attempts to perfect the procedure, they only apply the knowledge within one (repeated) context. They deepen their knowledge, but do not extend it to a new type of application. The organization and design of learning activities are the key to deepening and expanding knowledge (Biggs, 2003).

Do learning activities require solving authentic real-world problems? Are the students' solutions applicable to the real world? Today's workplace is full of tasks that require problem-solving. Whether it is finding new ways to conquer global markets or redesigning products to take advantage of new materials, successful workers must be adept at generating and testing creative ideas to solve problems with a realistic set of requirements and constraints. Learning activities that require problem-solving do not provide students with all the information they need to complete the task or specify the complete procedure they must follow to arrive at a solution. Often, problem-solving tasks require students to do some or all of the following:

- examine the parameters of the problem to inform their approach;
- generate ideas and alternatives;
- devise their own approach or explore several possible procedures that may fit the solution;
- design a coherent solution;
- test the solution and iterate improvements to meet the requirements of the problem.

To count towards this direction, problem-solving must be the main requirement of the learning activity. Real-world problems are authentic situations and needs that exist outside the scientific context. Problems in the real world have all the above characteristics: they happen to real people (Cheng, 2015).

Additionally, there are increasing pressures on the efficiency of higher education, and hence, innovative organizations are needed, as well as technological solutions that will help meet these challenges. Finally, the social discourse of "individual empowerment" that advocates placing the student in the centre of education, requires a more individualized approach to teaching and a far greater degree of soft skills exposure to meet the demands of students (Boys, 2015).

The water industry sector necessitates a highly skilled workforce capable of learning and adapting to the ever-evolving needs of the market and society at large. Presently, the sector is facing a growing gap between the demand for labour and the availability of sufficiently trained professionals. Although the need for training in hard skills has been extensively addressed (e.g., Skills4EU), the significance of soft skills is receiving increased attention and recognition.

According to the Skills4Water project findings primarily obtained throughout activity A2.1. *Evaluation of soft skills in the European water sector*, the most important soft skills identified are shown in Table 1.

Table 1. Most important soft skills derived from the survey and focus groups conducted during A2.1

PERSONAL	INTERPERSONAL	SITUATIONAL
Responsibility	Teamwork	Problem-solving
Motivation	Communication	Flexibility/Adaptability

The main objective of the Skills4Water project is to equip students and young water professionals with essential soft skills, integrate them into higher education curricula, promote innovation and leadership in the European water industry, and disseminate related best practices across Europe.

The project's work package 3 (WP3), aims to upscale and improve the higher education curricula for water management with soft skills, by offering custom-tailored learning activities to be incorporated in classes. Additionally, this WP pursues pilot testing and validation of the framework and guidelines developed in the WP2 (D2.2. and D2.3.). These specific objectives contribute to the overall objective of the Skills4Water project to upscale the soft skills and competencies of young water professionals in water higher education curricula.

To accomplish the specific objectives of WP3, the following complementary activities are envisaged.

A3.1. Designing learning activities in the class for the acquisition of the defined soft skills

Three basic principles (interactivity, purposefulness, and operability) will be obeyed during the designing of learning activities based on defined soft skills. The following steps will be applied: analysing needs for implementing an active learning strategy, identifying topics and questions, identifying learning objectives and outcomes, planning and designing the activity, identifying the sequence of learning events, and evaluation and assessment.

A3.2. Incorporating designed soft skills in HEI's curricula

The designed soft skills connected with the WP4 (A4.1, A4.3) and supported by A4.2 and A4.4 will be incorporated in 3 HEI's curricula for water.

A3.3. Evaluation of the acquired competencies

By designing learning activities that are specifically tailored to the acquisition of soft skills in water higher education, deliverables of the WP3 will be able to ensure that these skills are integrated into water higher education (HE) coherently and effectively. This will help to prepare students for the labour market by providing them with the essential soft skills that they will need to succeed in their careers.

2. Methodology

The methodology for designing learning activities in class for the acquisition of defined soft skills primarily consists of the steps already defined in the activity description: analysing needs for implementing an active learning strategy, identifying topics and questions, identifying learning objectives and outcomes, planning and designing the activity, identifying the sequence of learning events, and evaluating and assessing as well as the principles on which designed learning activities must be based (interactivity, purposefulness, and operability).

In the andragogical-methodical sense, the organization of learning activities leads to the skills that students should develop:

- cooperation,
- updating knowledge,
- self-regulation,
- solving real problems and finding innovations,
- using information and communication technologies in learning,
- ability to effectively communicate.

When it comes to traditional education, in most countries students solve tasks independently and receive grades for their work. This model does not prepare them well for the workplace, where they are likely to work in teams with others to accomplish tasks that are too complex for individuals to complete independently. In today's connected business world, real project work often requires collaboration across companies or with people in different parts of the world. This type of work requires a strong ability to cooperate in order to work productively in a team and integrate knowledge and ideas of individuals into a coherent solution (Garrison, 2011).

At higher levels, students have joint responsibility for their work, and the learning activity is designed to require students to make substantive decisions together. These functions help students learn important skills such as negotiation, conflict resolution, agreeing on what needs to be done, dividing tasks, listening to the ideas of others, and integrating ideas into a coherent whole. The most prominent learning activities are designed so that students work is interdependent, requiring all students to contribute to the team's success (Abeysekera, 2015).

Students often work together when an activity requires them to work in pairs or groups to: discuss a problem, solve a problem, do some experiment, or create a product. For instance, students have to plan what they are going to do, when they are going to do it, what tools they are going to use, and what the roles and responsibilities of the people on the team are. Students must make fundamental design decisions that affect the nature and usability of their product. Students prepare for a debate in

teams and have to decide in favour of which problem they will speak. This is a content decision that will shape their work together and they must negotiate their ideas. Teams of students carry out a research project and have to decide on their work plan and team roles. Students have to plan the process of their work, etc. (Yeoman, 2019).

In most of the tasks set in this way, the focus is on the goals or the achievement of the tasks, while not enough attention is paid to the process of cooperation and the implementation, and therefore the need to adapt-redesign learning activities so that they contain more soft skill elements.

Knowledge upgrading occurs when students generate ideas and understandings that are new to them through interpretation, analysis, synthesis, or evaluation. A learning activity requires students to use information and communication technologies in ways that support the upgrading of knowledge - either directly or indirectly. Information and communication technologies support knowledge upgrading when students use information and communication technologies directly for part of the learning activity that deals with knowledge upgrading.

In the complex world we live in today, we need self-regulating thinkers and students who can take responsibility for their own life, work, and current learning. Individuals are needed to monitor their own work and incorporate feedback to develop and improve their work products. In most traditional classrooms, teachers construct the work for students, directing them exactly what to do and monitoring compliance. To create opportunities for students to learn effectively and monitor their own progress, rather than work with them, teachers can guide and encourage students in ways that help them take increasing responsibility for their own learning—both individually and in groups. In turn, students are supported to function in a 21st century workplace where employees are expected to work with minimal supervision, plan their own work, design their own products, and incorporate feedback to improve the quality of those products. Learning activities, which provide students with opportunities to acquire self-regulation skills, must last long enough to allow students to plan their work over time, as well as offer insight into clear learning objectives and success criteria that students can use to plan and monitor their own work. Self-regulation includes a spectrum of skills that are refined over time during their development (Sweller, 2011).

When students plan their own work, they make decisions about the schedule and steps they will follow to complete the task. Planning their own work may include the following:

- Deciding on method: students break down a complex task into smaller subtasks or choose which tool to use.
- Time decision: students create a schedule for their work and set deadlines.
- Decision on the responsible person: the group of students decides how they will distribute the work among themselves.
- Decision on the place: the students decide which part of the work will be done in the school building or outside it or on which school day.

- Effective feedback: specifically tells the students what they are doing well and offers them specific guidelines that will help them improve their learning.

In the 21st century, evolving technologies have created new opportunities for spoken, written, visual, or multimodal communication – in print or digital, with greater reach and fewer barriers than ever before. In modern communication, the active process of communication is often as important as the final product. In addition, the digital recording and publication of even informal conversations means that these products last longer and spread further than ever before. As a result, the need for effective communication is no longer limited to language classes and careers in journalism. It is important that students in all areas of academic studies, as well as in future professions - from office worker to lawyer to scientist - can communicate clearly and convincingly with different audiences and subjects (Biggs, 2003).

In parallel, contemporary learning theories are based on constructivist theory, whose basic premise is that the student should construct and reconstruct knowledge for effective learning. Learning is most effective when the student constructs a meaningful product through experience. In higher education, constructivism is applied to the concept of constructive harmonization of three important segments of teaching: planned learning outcomes, teaching methods that enable the realization of planned outcomes, and methods of assessing the realization of outcomes among students (Laurillard, 2012).

All the aspects of comprehensive education in all spheres, even in the field of water, mentioned and analysed here, include soft skills to a greater or lesser extent, and therefore they must find a suitable place in the modified contents of the course.

As already mentioned, the contemporary framework for designing university learning activities is rooted in educational theories and principles, drawing from cognitive science, instructional design, and educational technology. This approach emphasizes evidence-based practices to enhance learning outcomes and ensure that the activities are engaging, effective, and aligned with the learning objectives.

The design of every university learning activity follows a systematic methodology that can be broken down into phases, procedures, and steps. This methodology ensures a structured and thorough approach to creating meaningful and impactful learning experiences.

For instance, we could observe a university course on Environmental Science. It is important to keep in mind that the process of designing learning activities actually represents the analogue process of designing an entire course only "in miniature" version and that the same phases, steps, and requirements must be followed. The course design follows the contemporary framework:

Analysis Phase: The teacher conducts a needs assessment, identifying a gap in the students' understanding of sustainable practices. A learner analysis reveals diverse backgrounds, with some students having prior knowledge of environmental issues, while others are new to the subject. The context analysis shows that the university XYZ has a robust Learning Management System and access to various environmental data sets.

Design Phase: Learning objectives are established, such as understanding the principles of sustainability and applying them to real-world scenarios. Content is selected, including current research articles, case studies, and interactive simulations. Learning activities include lectures, group discussions, and hands-on projects. Assessment methods are designed, including quizzes, project presentations, and reflective essays.

Development Phase: Materials are developed, including lecture slides, reading lists, and multimedia content. The LMS is set up with discussion forums, assignment submissions, and assessment tools. Pilot testing is conducted with a small group of students to identify any issues and make adjustments.

Implementation Phase: The course is delivered through a blend of synchronous and asynchronous activities. Lectures may be recorded for flexibility, while live discussions and project collaborations foster interaction. The instructor provides ongoing support and feedback, ensuring resources are accessible to all students.

Evaluation Phase: Formative assessments, such as quizzes and draft submissions, provide continuous feedback. At the end of the course, summative evaluations, including project presentations and final exams, measure overall learning outcomes. Data from these assessments are analysed to identify areas for improvement, informing revisions for future course offerings.

By following this framework, the Environmental Science course ensures that learning activities are well-designed, effectively implemented, and continuously improved to meet the needs of students and achieve the desired educational outcomes.

Similarly, it is necessary to design modified, tailored learning activities that would improve soft skills in the field of water. For example, the analysis phase has already been done in the first phase of the project (D2.1.); this report (D3.1.) represents a dual contribution to the design and development phase, while the implementation and evaluation phase will be carried out in the fall/spring semester of the 2024-2025 academic year.

3. Review of various perspectives encompassing higher education learning activities

Higher education learning activities should be observed from multiple perspectives to encompass a comprehensive understanding of their nature, objectives, and methodologies (de Hei et al, 2016; Jones & Czerniewicz, 2011). Thus, a scientific approach to defining these activities should be seen from various perspectives, namely from:

1. Pedagogical perspective

From the pedagogical perspective, higher education learning activities are structured experiences designed to facilitate the acquisition of knowledge, skills, and attitudes necessary for professional and personal development. These activities are often categorized into:

- **Lectures**: Traditional method where information is presented by an instructor to a large group of students.
- **Seminars**: Smaller, interactive sessions where students discuss topics in-depth, often led by a facilitator.
- **Laboratories**: Hands-on activities in controlled environments where students apply theoretical knowledge to practical experiments.
- **Fieldwork**: Learning experiences conducted outside the classroom in real-world settings to provide practical exposure.
- **Workshops**: Short, intensive programs focusing on specific skills or topics through active participation.
- **Independent study**: Self-directed learning activities where students engage with materials or research topics independently.

2. Cognitive perspective

From the cognitive perspective, higher education learning activities are designed to enhance cognitive processes such as critical thinking, problem-solving, and knowledge retention. Key elements of cognitive perspective include:

- **Active learning**: Techniques such as group discussions, problem-solving sessions, and case studies that require active student engagement.
- **Collaborative learning**: Activities where students work together to achieve learning

objectives, promoting social interaction and cognitive growth.

- **Problem-based learning**: Student-centred pedagogy where students learn about a subject by working in groups to solve an open-ended problem.
- **Metacognitive strategies**: Activities that help students become aware of and regulate their own learning processes, such as self-assessment and reflective journals.

3. Technological perspective

From the technological perspective, higher education learning activities leverage digital tools and platforms to enhance educational experiences. Examples include, but are not limited to:

- **E-learning**: Online courses and modules that provide flexible, accessible learning opportunities.
- **Blended learning**: Combines online digital media with traditional face-to-face classroom methods.
- **Virtual laboratories**: Simulated lab environments where students can conduct experiments and practice skills.
- **Learning Management System**: Platforms like Moodle, Miro, or Blackboard that organize and deliver educational content and track students' progress.
- **Massive Open Online Course (MOOC)**: Free online courses available to a large number of participants worldwide.

4. Sociocultural perspective

From the sociocultural perspective, higher education learning activities are seen as social practices that occur within cultural and community contexts. Key aspects include, but are not limited to:

- **Community-based learning**: Activities that involve partnerships with local organizations to provide real-world learning experiences.
- **Service learning**: Combines academic learning with community service, emphasizing reflection and social responsibility.
- **Cultural competency training**: Activities aimed at increasing students' awareness and understanding of cultural diversity and inclusion.
- **Peer learning**: Students learn from and with each other, often through mentoring programs, study groups, or peer assessment.

5. Assessment perspective

From the assessment perspective, higher education learning activities include methods to evaluate and enhance student learning and educational outcomes. These methods primarily include:

- **Formative assessment**: Ongoing assessments that provide feedback to students and instructors about learning progress (e.g., quizzes, drafts).
- **Summative assessment**: Evaluations at the end of an instructional unit to measure student learning outcomes (e.g., final exams, projects).
- **Authentic assessment**: Tasks that resemble real-world challenges and require the application of knowledge and skills (e.g., portfolios, presentations).
- **Peer assessment**: Students assess each other's work, promoting critical evaluation skills and collaborative learning.

6. Psychological perspective

From the psychological perspective, higher education learning activities are tailored to address different aspects of the student psychology and well-being:

- **Motivation**: Activities designed to enhance intrinsic and extrinsic motivation, such as goal setting, relevance of content, and providing choices.
- **Stress management**: Incorporating techniques to help students manage academic stress, such as mindfulness practices and time management workshops.
- **Emotional intelligence**: Activities that develop students' abilities to recognize and manage their emotions and the emotions of others.
- **Self-efficacy**: Building students' confidence in their abilities to succeed through mastery experiences, social modelling, and positive reinforcement.

Each perspective highlights different aspects of the educational process, contributing to a holistic understanding of how learning occurs in higher education settings.

4. Custom-tailored learning activities to be incorporated into Skills4Water courses

Having in mind that the project's WP3 aims to upscale and improve the higher education curricula for water management with soft skills, by offering **custom-tailored learning activities** to be incorporated in classes, in the next part of the report, certain modifications of traditional learning activities are given, with a focus on soft skills in the water sector, i.e. learning activities to enhance soft skills among water professionals:

1. **Role-playing exercises**: Create scenarios that water professionals commonly encounter, such as negotiating with stakeholders, resolving conflicts, or presenting findings to a non-technical audience. Allow participants to take on different roles and practice their communication, negotiation, and problem-solving skills.

2. **Case studies**: Analyse real-world cases where soft skills played a significant role in the outcome. Discuss what strategies were effective and what could have been done differently. Encourage participants to consider the emotional intelligence and interpersonal dynamics involved.

3. **Team-building activities**: Engage in activities that promote teamwork, collaboration, and trust among water professionals. This could include problem-solving challenges, outdoor activities, or group discussions on team dynamics.

4. **Communication workshops**: Offer workshops focused on effective communication skills, including active listening, giving and receiving feedback, and delivering presentations. Provide opportunities for participants to practice these skills through role-plays and group discussions.

5. **Cross-disciplinary training**: Organize sessions where water professionals can learn from experts in other fields, such as sociology, psychology, or business management. This exposure can broaden their perspectives and help them understand different stakeholder viewpoints.

6. **Emotional intelligence training**: Offer workshops or seminars on emotional intelligence, including self-awareness, self-regulation, empathy, and social skills. These skills are particularly important for building relationships, managing conflicts, and influencing others.

7. **Networking events**: Arrange networking events where water professionals can interact with colleagues, industry experts, and stakeholders from different backgrounds. Encourage them to practice their networking skills, such as initiating conversations, asking insightful questions, and building professional relationships.

8. **Mentorship programs**: Pair less experienced water professionals with mentors who can provide guidance, support, and feedback on developing soft skills. This one-on-one interaction can be invaluable for personal and professional growth.

9. **Feedback sessions**: Create a culture of continuous feedback where water professionals can give and receive constructive feedback on their soft skills development. This could be done through peer evaluations, supervisor feedback, or self-assessment exercises.

10. **Self-reflection activities**: Encourage water professionals to engage in self-reflection activities, such as journaling, mindfulness exercises, or personality assessments. This can help them better understand their strengths, weaknesses, and areas for improvement in terms of soft skills.

Tailoring learning activities to different levels of study can help water professionals develop their soft skills in a progressive and comprehensive manner. Suggestions for each level are listed below, with strong reflection on the European Qualifications Framework (EQF):

Bachelor level:

1. **Group projects**: Assignment of group projects that require collaboration, communication, and problem-solving skills. For example, students could work together to design a rough water management plan for a hypothetical scenario, requiring them to consider various stakeholders' needs and perspectives.

2. **Internships or fieldwork**: Providing opportunities for students to gain practical experience in the field, such as internships with water management organizations or participation in fieldwork projects defined by water industry. This hands-on experience can help students develop interpersonal skills, adaptability, and resilience.

3. **Role-playing exercises**: Organizing role-playing exercises where students simulate real-world scenarios encountered in the water industry, such as negotiating water rights or resolving conflicts between different user groups. This allows them to practice communication, negotiation, conflict resolution, and decision-making skills in a safe environment.

4. **Professional development workshops**: Offering workshops on topics such as resume writing, networking, and interviewing skills. These workshops can help students prepare for their future careers and develop the professional skills necessary to succeed in the water industry.

5. **Service-learning projects**: Engage students in service-learning projects where they apply their academic knowledge to address community water challenges. This allows them to develop empathy, social responsibility, and a deeper understanding of the ethical implications of their work.

Master level:

1. **Case studies and linked simulations**: Using case studies and simulations to challenge master's students to apply their knowledge and skills to complex real-world problems. Encourage them to analyse different perspectives, propose innovative solutions, and communicate their findings effectively.

2. **Cross-disciplinary seminars/guest lectures**: Organizing seminars or guest lectures that explore topics at the intersection of water management and other disciplines, such as economics, sociology, or public policy. This exposes students to diverse viewpoints and helps them develop a holistic understanding of water issues.

3. **Research projects with industry partners**: Collaborating with industry partners to offer master's students the opportunity to conduct research projects that address real-world challenges faced by water professionals. This allows students to develop critical thinking, problem-solving, and project management skills under the guidance of experienced practitioners.

4. **Leadership development programs**: Providing master's students with opportunities to participate in leadership development programs, such as workshops on leadership styles, team dynamics, and conflict resolution. These programs help students develop the skills necessary to lead teams and drive change in the water industry.

5. **Networking events and conferences**: Encouraging master's students to attend networking events and conferences where they can interact with professionals, researchers, and policymakers in the water sector. This helps students build their professional network, gain insights into emerging trends, and explore potential career opportunities.

Doctoral level:

1. **Advanced research projects**: Supporting doctoral students in conducting original research that contributes to the knowledge base of water management and policy. This allows students to develop expertise in their chosen area of study and enhance their research, analytical, and writing skills.

2. **Teaching assistantships**: Offering doctoral students the opportunity to serve as teaching assistants for undergraduate or master's level courses. This provides valuable experience in communication, mentoring, and leadership, as well as opportunities to refine presentation and classroom facilitation skills.

3. **Professional development seminars/workshops**: Providing seminars or workshops specifically tailored to the needs of doctoral students, such as grant writing, academic publishing, and career planning. These sessions help students navigate the transition from graduate level to the professional world and develop the skills needed to succeed in academia or industry.

4. **Interdisciplinary collaboration**: Encouraging doctoral students to collaborate with researchers from other disciplines on interdisciplinary projects related to water management and policy. This fosters creativity, innovation, teamwork, and the ability to work across boundaries, which are essential skills for addressing complex water challenges.

5. **Presentation opportunities**: Providing doctoral students with opportunities to present their

research at conferences, symposiums, and other professional gatherings. This helps students refine their presentation skills, receive feedback from peers and experts, and build their professional reputation within the water community.

By assembling these tailored learning activities into bachelor's, master's, and doctoral programs in water management and related fields, Skills4Water higher educational institutions can help prepare future water professionals to effectively address the multi-sided challenges facing the water industry.

At the same time, it is necessary to keep in mind that the process of designing learning activities must be primarily harmonized with the contents of the subjects selected at each of the HEIs that form the Skills4Water project consortium, as well as with the corresponding theoretical and practical teaching methods. Also, bearing in mind the need to disseminate the results and the viability of the project's outcomes, it is desirable that the designed learning activities have a universal character and can serve to strengthen soft skills in other sectors as well as in different time intervals or geographical areas. After all, in the process of designing learning activities, it is necessary to keep in mind three basic principles: interactivity, purposefulness and operability, which are stated in the Skills4Water project proposal.

In terms of the above-listed principles, in the process of designing learning activities, it is understood that:

- **Interactivity** is a cornerstone of effective learning, particularly within the context of higher education. This principle encompasses a range of interactions among students, teachers, and educational content, all of which contribute to a dynamic and engaging learning environment. The interactivity principle is grounded in several educational theories and research findings that underscore its significance for cognitive, affective, and social dimensions of learning. The already mentioned constructivist theory of learning, advocated by scholars such as Jean Piaget and Lev Vygotsky, posits that learners construct knowledge actively rather than passively receiving information. Interactivity is essential in this process as it allows learners to engage with content, explore concepts, and apply their understanding in varied contexts. Vygotsky emphasizes the role of social interactions in learning, where learners can achieve higher levels of understanding through collaborative efforts and guided assistance from more knowledgeable peers or instructors. In a higher education setting, interactivity facilitates this observational learning by providing opportunities for students to engage in discussions, group work, and peer reviews. These interactions help students to internalize and replicate effective learning strategies and behaviors observed in their peers and instructors. Cognitive load theory focuses on the limitations of working memory during the learning process. Interactivity can help manage the cognitive load by breaking down complex information into manageable parts and providing immediate feedback. Interactive learning activities, such as problem-solving tasks and simulations, allow students to apply concepts in practice, thus enhancing their understanding and retention of information. Effective interactivity between students and teachers is esential for providing guidance, feedback, and motivation. Interactive lectures, where students actively participate through questioning and discussion, create a more engaging learning atmosphere. The use of technology, such as clickers or learning

management systems, can further enhance this interaction by enabling real-time feedback and personalized instruction. Office hours and one-on-one consultations also offer opportunities for meaningful interactions, allowing instructors to address individual student needs and concerns.

- The **purposefulness** principle in learning activities within higher education emphasizes the importance of intentionality and relevance in the educational process. This principle is grounded in the idea that learning experiences should be meaningful and aligned with the broader goals of education, such as developing critical thinking skills, fostering intellectual curiosity, and preparing students for professional and personal success. Purposeful learning activities are designed to engage students deeply, promote active learning, and ensure that the knowledge and skills acquired are applicable beyond the classroom. Purposeful learning activities are those that connect with students' prior knowledge and experiences, making new information more relatable and easier to assimilate. They are designed to be relevant to real-world contexts, ensuring that students can see the practical application of what they are learning. This approach encourages the development of skills and knowledge that are directly transferable to professional and everyday situations, thus enhancing the value and impact of the educational experience. Purposeful learning activities are carefully designed to align with the overarching educational goals of the institution, program, and course. This alignment ensures that each activity contributes meaningfully to the development of the desired knowledge, skills, and attitudes. Clear learning objectives, articulated at the outset, help students understand the purpose of each activity and how it fits into their broader educational journey. Connecting learning activities to real-world applications enhances their purposefulness. Case studies, internships, project-based learning, and service-learning opportunities allow students to apply theoretical knowledge to practical problems, bridging the gap between academia and the professional world. This relevance not only makes learning more engaging but also prepares students for the complexities and challenges they will face in their careers. Purposeful learning activities often integrate interdisciplinary perspectives, reflecting the interconnected nature of knowledge and problem-solving in the real world. By exposing students to diverse viewpoints and encouraging them to draw connections across disciplines, these activities foster a more holistic and nuanced understanding of complex issues. This interdisciplinary approach cultivates critical thinking and creativity, essential skills for addressing multifaceted challenges. Incorporating opportunities for reflection into learning activities enhances their purposefulness by encouraging students to think critically about their experiences and learning processes. Reflective practice helps students make sense of what they have learned, recognize areas for improvement, and connect their educational experiences to their personal and professional goals. Reflection can be facilitated through journals, discussions, and portfolios, providing a structured way for students to integrate and internalize their learning.

- The **operability** principle in learning activities within higher education focuses on the ease with which educational tools and methods can be used effectively by students and instructors. It encompasses the usability, accessibility, and functionality of learning resources, ensuring that both technological and pedagogical tools are intuitive and support the learning process.

The operability principle is vital in facilitating a seamless educational experience, reducing barriers in the learning process, and enhancing the overall efficiency and effectiveness of educational activities. Usability theory, often applied in the context of human-computer interaction, provides a framework for understanding how users interact with technological systems. Jakob Nielsen's heuristics for usability, such as simplicity, consistency, and feedback, are directly applicable to educational tools and platforms. In a learning environment, operability ensures that these tools are user-friendly, minimizing cognitive load and allowing students and teachers to focus on the educational content rather than struggling with the technology. In line with this, cognitive load theory highlights the limitations of working memory during the learning process. Operable learning activities and tools are designed to minimize extraneous cognitive load, which is the mental effort required to use the tools themselves. By ensuring that educational technologies and methods are intuitive and easy to use, cognitive resources can be directed toward understanding and mastering the subject matter. The principles of Universal Design for Learning (UDL) emphasize creating educational environments that accommodate diverse learning needs. Operability within the UDL framework involves ensuring that learning activities and tools are accessible to all students, including those with disabilities. This means providing multiple means of representation, engagement, and expression, allowing all students to participate fully and effectively in the learning process. Implementing the operability principle in higher education can be very challenging, particularly with the rapid advancement of educational technologies. Instructors and institutions must continually evaluate and update their tools and methods to ensure they remain user-friendly and accessible. Additionally, there may be a need for ongoing professional development and training to help educators effectively integrate new technologies and pedagogical strategies into their teaching.

Bearing in mind the essence of the principles stated here, as well as the analysed subjects (content and teaching methods) given in D2.2. *Standardized framework for integrating soft skills into the higher education curricula for water management*, as well as the explained EQF but also the results of the survey conducted at the beginning of the project implementation (D2.1. *Evaluation report of soft skills in the European water sector*), in the continuation of this report, concepts for the development of learning activities, suitable for the project consortium as well as a wider audience, are given in Table 2. Particular regard was given to the most important soft skills identified, namely: responsibility and motivation (personal), teamwork and communication (interpersonal), and problem-solving and flexibility/adaptability (situational). Bearing in mind the similarities between the Bachelor and Master study levels, the similar learning activities were created for them, while additional activities were created for the PhD level of study. Of course, it is always necessary to keep in mind that the list of learning activities defined here is not final either in terms of the number of activities or in terms of the modifications that make them "tailored".

Table 2. The conceptual framework for designing learning activities in the class for the acquisition/upscaling of selected soft skills

Goal	Level	Teaching methods	Tailored activities	Learning outcomes
Acquisition/upscaling of soft skills	BSc	Seminars	Collaborative seminar organization	Improved motivation and responsibility
		Workshops	Random assignment of roles and rules/Using real cases as examples	Improved teamwork and communication/motivation
		Case studies	Topic selection	Improved responsibility and problem-solving
		Practical exercises	Collaborative tasks	Improved teamwork and problem-solving
		Theoretical lessons	Pre-lecture preparation by students/ Using real cases as examples	Improved responsibility and communication/motivation
		Group projects	Random assignment of roles and rules	Improved flexibility/adaptability
	MSc	Seminars	Collaborative seminar organization	Improved motivation and responsibility
		Workshops	Random assignment of roles and rules	Improved teamwork and communication
		Case studies	Topic selection	Improved responsibility and problem-solving
		Practical exercises	Collaborative tasks	Improved teamwork and problem-solving
		Theoretical lessons	Pre-lecture preparation	Improved responsibility and communication
		Group projects	Random assignment of roles and rules	Improved flexibility/adaptability
		Field trip	Mutual organization	Improved responsibility and flexibility/adaptability
	PhD	Seminars	Defining the scope, structure, and outcome	Improved motivation and communication
		Collaborative works	Defining roles, contributions, and responsibilities	Improved responsibility and flexibility/adaptability
		Case studies	Conceptualization	Improved motivation and responsibility
		Fieldwork	Adjustments and occupational safety and health measures	Improved responsibility and flexibility/adaptability
		Laboratory work	Adjustments and occupational safety and health measures	Improved responsibility and communication
		Leadership programs	Initiative in proposing topics	Improved motivation
		Research projects	Independent definition of the topic	Improved responsibility and problem-solving

Based on the proposed conceptual framework for designing learning activities in the class for the acquisition/upscaling of selected soft skills, as well as on Deliverable D2.3 the following learning activities could be implemented in the selected courses at the 3 consortium HEIs, as presented in Table 3.

Table 3. Tailored activities design

Targeted soft skills	Tailored activities	Activity design
Motivation	Initiative in proposing topics for leadership programs	The process of initiating proposals for topics in leadership programs at higher education institutions represents a critical exercise in developing and demonstrating students' motivation. This process is not just about generating ideas only, it also involves a deep engagement with the concepts of leadership, an understanding of the needs of peers and the broader community, particlulary water-oriented. At the outset, students in leadership programs are often encouraged to engage in the process of proposing new topics that reflect emerging trends, address existing gaps, or explore innovative approaches to leadership. This encouragement stems from an educational philosophy that views students not merely as passive recipients of knowledge, but as active contributors to the learning environment. In this sense, to effectively manage water resources related issues, leaders must communicate openly not only about successes but also about the challenges and difficulties involved in water management filed. They should adapt their motivation style to suit the audience, situation, or specific needs of the individuals they are engaging with. In this kind of tailored learning acitivity all participants are asked to take an initiative role in the leadership programs by proposing topics for water-related issues to be discussed by other participants. Each entry is asked to stay within their allowed time to convey their topic so that all participants may participate equally. Participants are invited to consider the leadership program objective and impact in terms of inspiring and motivating actions by other participants. This is particularly importmant since in water management different conflicts may arise, and leaders need to have the motivation to mediate and resolve these conflicts. Also, strong communication skills are essential for navigating these difficult conversations and guiding teams towards solutions that ensure effective and sustainable water management. With no less importance is the fact that students who are highly motivated are more likely to take the initiative to propose topics that are not only innovative but also aligned with their personal goals and the needs of the academic community. Their motivation is often fueled by a desire to influence the direction of their education, contribute to the collective knowledge base, and prepare themselves for future leadership roles. Motivated students often seek feedback from faculty members, mentors, and peers to refine their ideas. These consultations provide an opportunity to test the viability of the proposed topic, gain new perspectives, and further develop their proposals. This interaction is a testament to their motivation, as it shows a willingness to invest time and effort in improving their ideas.
Motivation and responsibility	Collaborative seminar organization	The first step in organizing a seminar in collaborative way is to mutually establish clear educational objectives that emphasize the development of motivation and responsibility. The seminar should

		aim to enhance students' personal motivation to engage with the local water-related content and their sense of accountability in collaborative settings. Objectives might include fostering self-motivation, promoting responsible behaviour in group work, and encouraging students to take ownership of their learning and contributions to the collaborative seminar. The topic of the seminar should be chosen carefully in order to naturally invoke motivation and require responsibility. It should be relevant to the students' academic interests and future water-related professional goals, as relevance is a key driver of self motivation. Additionally, the topic should represent water-related challenges that require students to manage tasks, collaborate effectively, and assume responsibility for their contributions. For instance, a seminar on sustainable water supply development might require students to address real-world environmental challenges, fostering both motivation and a sense of ethical responsibility. The seminar's design should facilitate active participation and accountability. Groups should be formed strategically, considering diversity in skills, perspectives, and backgrounds to enhance collaborative learning and ensure that all students have an opportunity to contribute meaningfully. Also, assignment of seminar tasks should require collaborative effort, with clear roles and responsibilities for each participant. This promotes a sense of responsibility as students rely on each other to achieve the seminar's objectives. The teacher should encourage student-led discussions and problem-solving, intervening only when necessary to steer the group or address issues. This approach empowers students to take responsibility for their learning. With no less importance is that teacher should offer resources, such as academic articles, data, or expert opinions, to stimulate engagement and motivation. However, students should be responsible for synthesizing this information and applying it to their work. At the end, seminar assessment should be multidimensional, evaluating both the academic content and the development of soft skills like motivation and responsibility. This may include, but not limited to approach where students assess each other's contributions, which promotes responsibility and provides insights into how responsibility is perceived within the group or approach where students reflect on their motivation, participation, and adherence to seminar responsibilities, fostering self-awareness and personal soft skills growth.
	Case study conceptualization	The first step in case study conceptualization is to clearly define the case study educational objectives. This involves determining what knowledge, skills (particularly soft skills), or competencies students should acquire upon completing the case study. These objectives should align with the broader curriculum goals and learning outcomes of the study program. For instance, the case study might aim to enhance critical thinking in water management, problem-solving approaches, or the application of theoretical knowledge to real-world scenarios. From the soft skills perspective

		initial step in case study conceptualization involves setting clear educational objectives, explicitly including the development of motivation and responsibility. For example, the objectives might include fostering intrinsic motivation to engage with complex water-related problems, encouraging a sense of responsibility over learning tasks, and developing the ability to work independently and responsibly within a group setting. Conducting a literature review is essential to understand how case studies have been used in the past to develop soft skills like motivation and responsibility. For instance, incorporating elements that require students to make decisions under uncertainty can enhance their sense of responsibility. The selection of the case is probably most important and should be made with an eye toward scenarios that naturally evoke and challenge students' motivation and sense of responsibility. Cases that involve ethical dilemmas, project management, or long-term strategic decisions are particularly effective. For instance, a case involving the management of a public utility water project or a business undergoing a significant transformation can require students to take initiative, demonstrate motivation, and manage responsibilities effectively. The design phase focuses on structuring the case study to provide opportunities for students to develop and demonstrate motivation and responsibility. For instance, allowing students to make key decisions about how to approach the case, which fosters intrinsic motivation or incorporating reflective activities where students assess their own level of responsibility and motivation throughout the case study process. The case study implementation strategy should create an environment that encourages self-driven learning and accountability. For instance, allowing students to choose their own research paths or methods of solving the case, increases their sense of ownership and responsibility. Assigning group projects where students must rely on each other and take on roles that require them to motivate their peers and manage collective responsibilities. Shifting the instructor's role from a traditional lecturer to a facilitator who guides, rather than directs, the learning process, thereby encouraging students to take more responsibility for their learning. Assessment should be designed to measure not only the academic outcomes of the case study but also the development of motivation and responsibility, among other things, because of the goals of the S4W project, where one of them is the improvement of soft skills, which implies certain measurement and assessment. Some of the approaches that can be applied are encouraging students to evaluate their own and their peers' contributions, which fosters a sense of responsibility or assessing students based on their behavior during the case study, such as their punctuality, participation, and consistency in meeting deadlines, which are all indicators of responsibility. After the case study is completed, feedback should specifically address how well students demonstrated motivation and

		responsibility. This feedback can be formative, providing guidance on how to further develop these skills in future tasks. The final step involves continuously improving the case study design based on the outcomes related to motivation and responsibility. This could involve revising case complexity, adjusting the balance between guidance and autonomy, or refining assessment methods to better capture the development of motivation and responsibility as soft skills.
Motivation and communication	Defining the seminar scope, structure, and outcome	The seminar should aim to foster inherent motivation by selecting topics that are relevant to students' academic and professional interests. Objectives might include enhancing students' curiosity, encouraging self-directed learning, and developing a sense of purpose in their studies. Objectives should also focus on improving students' ability to articulate their ideas clearly, engage in constructive dialogue, and present information effectively. This could involve developing both oral and written communication skills, as well as interpersonal communication abilities within group settings. Before defining the seminar scope, it is essential to conduct a needs assessment to understand students' interests, prior knowledge, and communication abilities. This can be done through surveys, interviews, or focus groups. Understanding what motivates students can guide the selection of seminar topics that are both engaging and relevant. Assessing the current communication skills of students helps in designing seminar activities that address their specific needs, whether in public speaking, group discussions, or written communication. Defining this scope with a focus on motivation and communication involves several considerations, namely seminar should cover topics that are aligned with students' academic programs and future career paths. This relevance enhances indigenous motivation by making the content meaningful and applicable. Incorporating interdisciplinary perspectives in water management can broaden the seminar's appeal and motivate students from diverse academic backgrounds. It also fosters communication across different fields of study, encouraging students to explain complex ideas to peers with different expertise. The structure of the seminar is essential in maintaining motivation and facilitating communication. This may include decisions on the seminar format, sequence of topics, and methods of interaction. For example, structuring the seminar to be highly interactive encourages active participation, which is essential for both motivation and communication. The sequence in which topics are presented should be logical and build progressively on prior knowledge. Starting with foundational concepts and moving towards more complex ideas keeps students motivated by giving them a sense of progress and achievement. Also, incorporating peer review sessions where students provide feedback on each other's work, enhances communication skills and motivates students to produce higher-quality work. To maintain motivation, the seminar should include a variety of activities, such as debates,

		presentations, and role-plays. These activities reflects to different learning styles and keep students engaged.
	Using real cases as examples	During the theoretical lessons and workshops, the lecturer will use real cases as examples of the direct application of the subject to the profession and/or everyday life. This could be done using short-duration videos during the lectures. The videos should be carefully selected to show common situations related to particular topics within the subject to make students aware that Physics can explain numerous quotidian situations and specific events related to their discipline. The selected videos should be played at the beginning of the lesson in a Flipped Classroom style and then students should be asked to explain what they saw. After a few minutes, the lecturer should clarify what the video was exhibiting from a Physics point of view and proceed to illustrate the pertinent laws and equations.
Responsibility and communication	Pre-lecture preparation by students	Pre-lecture preparation by students in higher education, with a focus on developing responsibility and communication as soft skills, is a process that involves structured activities designed to engage students actively before the lecture begins. This preparation not only enhances their understanding of the teaching material but also fosters a sense of responsibility over their learning and improves their ability to communicate effectively with other students and teachers. The first step in promoting responsibility and communication through pre-lecture preparation is to establish clear learning objectives. Students should understand the purpose of the pre-lecture activities and how these tasks contribute to their overall learning. This clarity helps students take responsibility for their preparation. Teachers should communicate expectations regarding the extent and depth of the preparation, the materials to be reviewed, and how this preparation will be used in the upcoming lecture. Teachers should provide structured pre-lecture materials that guide students in their preparation. A detailed outline of the upcoming lecture should be provided, highlighting the main topics, key concepts, and questions that will be addressed. This helps students focus their preparation on areas that will be most relevant. Also, pre-lecture assignments can significantly enhance responsibility and communication. These assignments might include student's brief summaries or reflections on the reading materials, which helps them process the information and identify key points. This activity requires students to take responsibility for their understanding of the material. In line with this, short quizzes on the pre-lecture materials can motivate students to complete their preparation and assess their understanding. Quizzes also encourage responsibility, as students must account for their own learning. Collaboration among students during pre-lecture preparation can enhance responsibility, teamwork and communication. This process can be facilitated through study groups where students discuss the pre-lecture materials, share insights, and clarify doubts. These groups require students to take responsibility for contributing to the group's understanding and to communicate

		their ideas clearly. Also, teacher can set up online discussion forums where students post questions, share resources, and engage in discussions about the pre-lecture materials. This platform fosters communication skills, as students must articulate their thoughts in writing and respond constructively to peers. It is especially important to take care that the effectiveness of pre-lecture preparation is amplified when it is closely integrated with the lecture itself. Example is starting the lecture by addressing the questions and issues raised by students during their preparation. This demonstrates that their efforts are valued and encourages continued responsibility and communication. Also, incorporating interactive elements into the lecture, such as polls, discussions, or problem-solving tasks, that directly build on the pre-lecture materials. This approach requires students to actively use what they have prepared, reinforcing the importance of both responsibility and communication.
Responsibility and problem-solving	Independent definition of the research project topic	Defining an independent research project topic in higher education is a vital process that not only sharpens students' academic skills but also cultivates essential soft skills such as responsibility and problem-solving. This process involves guiding students through a series of structured steps that empower them to take ownership of their learning and apply critical thinking to identify, define, and refine a research topic. The first step in the process is to emphasize to students the importance of responsibility and problem-solving in defining a research project topic. Students must understand that they are responsible for their learning and the quality of their research. This responsibility includes managing their time, making informed decisions, and adhering to academic standards. Defining a research topic is ultimately a problem-solving exercise. Students must identify a knowledge gap, formulate a research question, and propose a method to address it. Problem-solving involves critical thinking, creativity, and persistence. Conducting a comprehensive literature review helps students identify existing research, understand the current state of knowledge, and recognize gaps or unanswered questions. This step requires students to engage with complex material, fostering their ability to analyse and synthesize information. Students should be guided by teacher on how to identify gaps in the literature, which often serve as the basis for their research questions. Although independence is highly desired, teacher should provide guidance through structured frameworks or models that help students refine their ideas. This can include brainstorming sessions, conceptual mapping, or research proposal outlines. This involves problem-solving as students must weigh the pros and cons of each topic option, consider resource availability, and anticipate potential challenges. The culmination of the topic definition process is the development of a research proposal where students should prepare a comprehensive research proposal that outlines the research question, literature review, methodology, expected outcomes, and a timeline. This document serves as a formal commitment to their

		research project and requires a high level of responsibility and attention to detail. Once the proposal is submitted, it may require further refinement based on feedback from teachers or other students reviews. Students must take responsibility for making necessary adjustments and ensuring that their research remains on track.
	Case studies topic selection	The first step in the process is to emphasize to students the importance of responsibility and problem-solving in defining a research project topic. Students must understand that they are responsible for their learning and the quality of their research. This responsibility includes managing their time, making informed decisions, and following academic standards. Before students can define their research topic, they need to have a deep understanding of the research context. This means that students must conduct a comprehensive literature review in order to identify existing research, understand the current state of knowledge, and recognize gaps or unanswered questions. This step requires students to engage with complex material, fostering their ability to analyse and synthesize information. Students need to understand the relevance of potential research topics to their field of study, societal issues, or professional interests. This relevance motivates them to take responsibility for their topic choice and ensures that the research has real-world significance. Students should be taught to critically evaluate the feasibility, scope, and significance of potential topics. This involves problem-solving as they must weigh the pros and cons of each option, consider resource availability, and anticipate potential challenges. In some cases, students may be required to formulate a hypothesis that they will test through their research. This step involves creative problem-solving, as students must propose a potential solution or explanation that can be empirically tested. Also, students should be encouraged to anticipate potential challenges or obstacles in their research and develop contingency plans. This aspect of problem-solving is essential for ensuring that the research process remains on track.
Responsibility and flexibility/ adaptability	Fieldwork adjustments and occupational safety and health measures	Defining fieldwork adjustments and implementing occupational safety and health (OSH) measures in higher education involves a detailed and dynamic process that demands a high level of responsibility and flexibility from students. Fieldwork, by its nature, particularly water-related, often presents unpredictable challenges and varied environments, requiring students to not only adhere to safety protocols but also to adapt to evolving circumstances. This process is integral to their academic development, as it builds critical soft skills that are essential for their future professional roles. Students should receive initial training on the specific safety protocols relevant to their fieldwork. This training should cover both general occupational safety and health principles as well as specific measures tailored to the environments they will be working in. Responsibility is emphasized here, as students must internalize these protocols and understand that their safety depends on their strict adherence to them. Also, a comprehensive risk assessment need to be conducted to identify

		potential hazards associated with the fieldwork. This assessment involves evaluating environmental factors, physical risks, and other potential dangers that could impact the safety and success of the project. Students must be involved in this process, learning to critically analyze the risks and contribute to the development of strategies to mitigate them. Once the risks have been identified, students must develop detailed fieldwork plans that incorporate both their research objectives and the necessary safety measures. From the standpoint of flexibility, while the fieldwork plan needs to be thorough, it must also allow for flexibility. Students must anticipate potential changes in the field environment and plan for contingencies. This could involve identifying alternative research sites, developing backup methods for data collection, or preparing additional safety equipment. Flexibility represents a key as rigid plans can quickly become unworkable in the face of unexpected conditions. If field conditions change, students must be prepared to adapt their plans quickly. This might involve altering their methodology, moving to a different location, or even temporarily halting the work if safety is compromised. Flexibility here is about being responsive and resourceful in the face of new challenges. From the standpoint of responsibility students are responsible for ensuring that their fieldwork plan is not only scientifically sound but also safe. This involves double-checking that all necessary safety measures are in place, that they have the appropriate permissions to conduct their work, and that they have the resources to manage any emergencies that might arise. Throughout the fieldwork, students must take personal responsibility for following safety protocols, reporting any hazards, and making decisions that prioritize their well-being and that of their team. This responsibility is not just about individual actions but also about ensuring that the team works cohesively to maintain a safe environment. After the fieldwork is completed, students should be required to reflect on the process and report on both their research findings and the safety measures they implemented. When reporting on their fieldwork, students must accurately document any incidents, near misses, or safety concerns that arose during the process. This documentation is vital for improving future fieldwork practices and ensuring that lessons learned are shared with other students and teachers.
	Collaborative organization of the field trip	Organization of a field trip in higher education study process is a collaborative task that provides students with a unique opportunity to apply their academic knowledge in real-world settings. However, the process is not just about logistical planning. When students are actively involved in organizing a field trip, they learn to navigate complex challenges, manage unexpected changes, and take ownership of their collective learning experience. The first step in organizing a field trip is the initiation phase, where students and teachers work together to define the objectives and scope of the trip. In this stage, students should be encouraged to

		participate in discussions about the goals of the field trip. These goals might be related to specific water-related academic outcomes, such as studying aquatic systems, analysing groundwater, or observing industrial sources of pollution. In this stage, responsibility is emphasized, as students must understand that the success of the trip depends on their active engagement and contribution to planning. To ensure that the field trip meets its educational objectives, students need to undertake preliminary research on potential locations, activities, and logistical considerations. This research requires them to think critically about what they want to achieve and how best to do so, fostering a sense of ownership over the project. Students might be assigned roles such as coordinating transportation, arranging accommodations, managing finances, or liaising with local guides or experts. Each student is responsible for their part of the plan, but they must also remain aware of how their work fits into the broader project. This division of labour teaches them the importance of personal responsibility within a team setting. As students begin to tackle their assigned tasks, they inevitably encounter challenges. Perhaps a chosen venue is unavailable, or budget constraints require adjustments. In these situations, flexibility is key. Students must work together to find solutions, whether that means choosing an alternative location, negotiating costs, or adjusting the itinerary. This collaborative problem-solving fosters adaptability, as students learn to adjust their plans in response to real-world constraints. This also leads to improved communication since students must keep each other and their instructors informed about their progress and any issues that arise. This involves regular meetings, email updates, and possibly the use of project management tools. Clear and consistent communication helps to ensure that everyone is on the same page and that tasks are being completed on time. Students also need to communicate with external parties, such as transportation providers, venue managers, or local experts. This requires them to be professional and clear in their communications, and to be flexible in responding to changes or requests from these partners.
Teamwork and communication	Random assignment of roles and rules in workshops	The random assignment of roles and rules in workshops at higher education institutions represents a carefully designed pedagogical strategy aimed at fostering teamwork and communication among students. This method, while seemingly simple, plays a highly valued role in developing students' ability to collaborate in teamwork manner and communicate clearly, both of which are essential soft skills in academic and professional settings. The process challenges students to adapt to new responsibilities, interact with diverse peers, and navigate group dynamics, all of which contribute to improved soft skills. The decision to assign roles and rules randomly in a workshop setting is grounded in the educational goal of promoting equity and unpredictability in group work. By removing the element of choice, students are placed in positions that they may not have chosen for themselves. Random assignment ensures that all students, regardless of their

		confidence levels or prior experience, have an equal opportunity to engage in various roles. This method prevents the more assertive students from dominating leadership roles while allowing quieter or less experienced students to step into positions they might otherwise avoid. The unpredictability of random assignments forces students to adapt quickly to their assigned roles and the rules they must follow. This adaptability is a vital component of teamwork as real-world scenarios often require individuals to take on tasks or responsibilities outside their comfort zones. In principle, before the workshop begins, teachers should define the roles and rules that will be randomly assigned. These roles might include positions such as leader, note-taker, timekeeper, or presenter, while the rules could dictate how decisions are made, how conflicts are resolved, or how tasks are divided. Each role should be clearly defined with specific responsibilities and expectations. This clarity is of paramount importance for ensuring that students understand their duties and can fulfil them effectively. Clear communication from the teacher is vital, as it sets the tone for how students will interact with their assigned roles. The rules established for the workshop should be designed to guide the group's interactions and ensure a productive working environment. These rules might involve decision-making processes, communication protocols, or conflict resolution strategies. The rules serve as a framework within which the students must operate, promoting structure and order in the group work. The process of randomly assigning roles and rules can be done in various ways, such as drawing names from a hat, using random number generators, or distributing pre-prepared cards. The key is that the assignment process is transparent and impartial. The randomness of the assignment process is essential for maintaining fairness and preventing any perceptions of bias. This transparency also builds trust among students, as they see that everyone has an equal chance of being assigned any role or rule. As soon as the roles and rules are assigned, students must begin to engage with their new responsibilities. This immediate shift challenges them to quickly assess the situation, understand their role, and start communicating with their peers. Once the roles and rules are established, the workshop moves into the phase where students must collaborate to achieve a common goal. Each student must now fulfil their assigned role to the best of their ability. This often involves stepping outside of their comfort zone, particularly if they have been assigned a role that is new to them. For example, a student who is usually reserved might be assigned the role of group leader, requiring him to develop his leadership and communication skills. Students may initially struggle with their assigned roles, particularly if they are unfamiliar or uncomfortable with the responsibilities. However, this struggle is an integral part of the learning process, particularly in workshop fashion. As they adapt to their roles, students develop teamwork

		and communication, learning to embrace new challenges and find solutions through collaboration.
Teamwork and problem-solving	Collaborative tasks in practical exercises	Collaborative tasks in practical exercises at higher education institutions should serve as a dynamic platform for students to develop soft skills such as teamwork and problem-solving. These exercises are deliberately designed to mirror real-world scenarios, requiring students to pool their collective knowledge, engage in critical thinking, and apply theoretical concepts in a hands-on environment. Through these collaborative efforts, students not only deepen their understanding of the subject matter but also cultivate the ability to work effectively in teams and tackle complex problems. The process of collaborative tasks in practical exercises should begin with an introduction to the concept of teamwork and its significance in the learning process. Teachers need to emphasize the importance of working together to achieve a common goal, highlighting how collaboration enhances learning outcomes. In this sense, teachers should provide a clear explanation of the objectives of the practical exercise, ensuring that students understand the relevance of the task to their overall academic development. This introduction typically includes a discussion on the value of teamwork, where students learn that combining diverse perspectives can lead to more innovative solutions. Often present, although not necessarily, in connection with this is division of students into small groups, often comprising individuals with varied skill sets and backgrounds. This diversity is intentional, as it mirrors the collaborative nature of real-world problem-solving, where team members bring different expertise and viewpoints to the table. Once teams are formed, the next step involves defining roles within the group and allocating tasks. Each student should have assigned a specific role based on their strengths and interests. These roles might include team leader, researcher, data analyst, or presenter. The assignment of roles encourages students to take responsibility for specific aspects of the task, fostering a sense of ownership and accountability. It also helps them develop specialized skills while contributing to the team's overall success. This means that practical exercise is divided into smaller, manageable tasks. The group collaboratively decides how to divide these tasks, ensuring that each member has a clear understanding of their responsibilities. This process requires effective teamwork and problem-solving, as students must agree on how to best leverage their individual strengths to achieve the group's objectives. This collaborative effort allows for a free exchange of ideas, where each member contributes their insights. The diversity of perspectives often leads to creative and innovative approaches to the problem at hand. During these discussions, students learn to listen to one another, respect different viewpoints, and build on each other's ideas. After generating ideas, the group critically evaluates the feasibility of each solution. This analysis involves assessing the pros and cons of different approaches, considering potential obstacles, and selecting the most viable option. Through

		this process, students develop their problem-solving skills, learning to think critically about complex issues and make informed decisions as a team. In some cases, students may be given the opportunity to revise their work based on the feedback received, primarily from the teacher. This iterative process reinforces the importance of learning from mistakes and continuously striving for improvement. It also allows students to apply the insights gained from the exercise to enhance their teamwork and problem-solving abilities in future tasks.
Flexibility/ adaptability	Random assignment of roles and rules in group projects	In teaching methodologies focused on collaborative tasks, one of the most significant challenges lies in ensuring that the learning process is both meaningful and engaging for students. This challenge is particularly pronounced in collaborative learning environments, where the effectiveness of the educational experience is closely tied to students' active participation and their perception of the relevance of the tasks to their personal and academic goals. The random assignment of roles and rules in group projects at higher education institutions is a proven pedagogical approach designed to enhance students' flexibility and adaptability. This method challenges students to adjust quickly to new responsibilities and unfamiliar group dynamics, fostering a learning environment where they must continuously adapt to changing circumstances and expectations. Randomly assigning roles and rules in group projects is based on the educational principles of active learning. These principles emphasize the importance of students engaging with challenging, real-world scenarios where they must apply their knowledge in numerous novel ways. For instance, by removing the predictability of role selection, students are pushed into active participation, as they cannot rely on familiar or comfortable roles. This unpredictability requires them to engage more flexibly with the material and with their peers. Also, random assignments create a learning environment where students learn by doing. They must experiment with new roles and responsibilities, which helps them internalize the learning experience. The methodology for randomly assigning roles and rules involves several key steps, designed to ensure fairness, transparency, and educational value. This process can vary depending on the nature of the project, the goals of the teacher, and the composition of the student group. Various methods can be used to randomize role and rule assignments as previously described in the example of random assignment of roles and rules in workshops.

4. Conclusion

Within the soft skills concept, the Skills4Water project has identified six essential soft skills for the water industry: responsibility, motivation, teamwork capacity, communication, problem-solving, and flexibility and adaptability (Activity A2.1). The project has developed a framework to serve as a basis for implementing these soft skills in the higher education system, with particular regard to the three EQF levels related to university education.

The development and proper application of water-related knowledge is always determined by the quality of human resources. Therefore, questions arise as to whether universities, as institutions of creation and dissemination of knowledge in which this technology is applied, will have an adequate capacity of human resources. Solutions should be sought in systematic, continuous education and training of all human resources engaged in the design, maintenance, and implementation of the research-teaching process in higher education, primarily through strengthening the soft skills of either teachers or students.

Soft skills are essential for water professionals as they often work in interdisciplinary teams, communicate with stakeholders, and navigate complex situations. Tailoring learning activities to different levels of study can help water professionals develop their soft skills in a progressive and comprehensive manner. By incorporating the provided learning activities into bachelor, master, and doctoral programs in water management and related fields, educational institutions can help prepare future water professionals to effectively address the multifaceted challenges facing the industry.

Application of the tailored learning activities enlisted here must be harmonized with the learning outcomes that are applied as a method of increasing quality in higher education in Europe and the world. Learning outcomes are most often defined as clear descriptions of what the student should know, understand, and be able to do upon completion of learning. In accordance with the learning outcomes, study programs, study subjects, lecture hours, exercises, their content, teaching material, teaching methods, learning methods, methods of checking achieved knowledge, etc. are formed. In this sense, learning activities aimed at strengthening the soft skills of professionals in the water sector must be aligned with the learning outcomes.

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