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Innovative Training Approach in the Technology Assisted Environment for Water Management

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1. TRAINING OF TRAINERS

This activity enables both teachers and content developers to improve their teaching skills, standardize methodologies, and share teaching methods, pedagogical approaches and tools among both teachers and content developers. The intention was to improve students' perception of the unified team using a rigorous work methodology.

1.1 Forming basic competencies for delivering digital content

This activity was aimed at developing a tool to enable trainers to form essential competencies and the motivation to contribute to the improvement of skills as trainers. In line with the European Training Strategy in the frame of the Erasmus+ Youth in Action programme the ToT-course considers the following 6 competencies to be essential when working as a non-formal education trainer:

- The competence to understand and facilitate individual and group learning processes.
- The competence to design educational programmes.
- The competence to direct one´s own learning (Learning to Learn)
- The competence to co-operate successfully in teams.
- The competence to communicate meaningfully with others.
- Intercultural competence.

These various learning demands are meant to be able to be identified and pursued by the educational strategy used in this ToT material.

The concepts discussed below can be studied by anyone working on a master's degree as a stand-alone text that can direct thinking and action when educating young people for any career at the vocational level. The purpose is to provide readers with a chance to consider their own practise and to enhance it by learning from what others have done successfully..

1.1.1 The competence to facilitate individual and group learning processes.

Teaching relationships

- It is widely admitted that teachers' commitments to their learners – the relationships they develop with their learners and the range of roles that teachers take – are crucial components in HE as well as in any other educational environment at all levels.

- Teaching relationships refer to the relationships teachers develop with their learners as well as how learners relate to each other. The tutor-learner relationships are identified as 'the most important link in the learning process', (TLRP, 2006). A meta-analysis of learner-centered teacher-learner relationships confirmed its importance. It seems that positive teacher-learner relationships are associated with optimal, holistic learning with above-average mean correlations when compared with other educational innovations for cognitive and behavioural outcomes (Cornelius-White, 2007).

• The way in which a teacher interacts with learners sets the scene for the subsequent learning to take place. Teachers felt that their relationships with learners were of prime importance for the teaching and learning to be effective. The features of effective teacher relationships included:

Getting to know learners, knowing which learners need more attention

Good rapport – listening, high expectations Building trust

Humour – used appropriately and never descending to sarcasm

Relaxed atmosphere – relaxed learning with elements of fun

Mutual respect – respect of other people's opinions

Behaviour management – so that all of the group have the chance to learn.

Active learning, while carrying out assignments or projects, for instance, gives many opportunities for teachers to build relationships with learners. The teacher's role during this activity can take various forms: demonstrator, organiser, coach, mentor, facilitator, reflector and even co-learner. A relationship of trust between the teacher and learners is likely to develop while working together and discussing issues at various stages of the assignment so that the teacher becomes an 'accomplice' in the learning process rather than the knowledge base.

1.1.2 The competence to design educational programmes.

Those involved in designing new educational programes need to have a good understang of the models commonly used in developing learning programmes. The way in which teaching takes place is strongly influenced by a series of circumstantial and educational factors. Models are prescribed structured sequences, which are designed to elicit a particular type of thinking or responses, to achieve specific learning outcomes. However, it is very useful for teachers to understand the concept of a teaching model and to comprehend the main features of the many existing models.

Teaching models are derived from theories about teaching and learning. Each model can be described as a structured sequence, which is designed to elicit a particular type of thinking or response, to achieve specific learning outcomes. The choice or use of the appropriate model, or combination of models, is influenced by the type of learning objective and nature of the learner as well as other factors such as teaching strategies and teaching skills. A strong body of research and practice suggests that the consistent use of specific models can make learning more effective (DfES, 2004, Hattie, 2009 and Marzano, 1998).

The term 'teaching model' has been used to describe many other approaches. In different documents a number of terms appear to be used interchangeably – models, strategies, approaches, techniques, and methods name just a few. Teaching models are not the 'real world' but merely a way of helping us understand and think about teaching. There are a vast number of teaching models – some are variations of others – and they come in many shapes, sizes, and

styles. Some terms, such as 'demonstration', can be used for both a teaching model and also a strategy or method. To draw the distinction between a teaching strategy and a teaching model, the definition of a used teaching model has two distinctive features. The first distinctive feature is the nature of the learning objective and outcome required and whether the learning is related to:

- Acquiring and learning skills, procedures, knowledge, and the like, or
- Processing information, building concepts and rules, generating and testing hypotheses and thinking creatively, or
- Collaboration and learning together to construct new knowledge and understand concepts.

The second distinctive feature is the structured sequence of steps or phases (the syntax) used to achieve that particular type of learning objective. In teaching models, it is the tight linkage between these two aspects that defines a teaching model. Strategies do not have the same linkage and may be deployed more widely, as an essential part of a teachers' repertoire to achieve a range of learning outcomes.

- The term teaching model is also used in vocational teaching and learning to describe other different concepts. If these concepts lack the distinctive linkage between the two particular features above, then they are not what is mean here by a teaching model.
- In developing teaching models in the vocational context, it is useful to compare teaching models to find the similarities and differences between the models. This could then serve as a guideline to teachers when selecting or adapting a teaching model or combination of models. The work of Ji-Ping and Collis (1995) offers suggestions for comparing models using a set of appropriate questions to answer against each teaching model. With adaptation, this could provide a useful basis for further work in vocational learning. There are four aspects suggested: teacher aspects, learner aspects, the degree of flexibility or adaptability of the models and aspects related to effective theoretical and technological supports. The following are some specific questions for each aspect that can be used in a comparison of teaching models.

1. **Teacher Aspects**

    a) How easily can the average vocational teacher manage the model?

    b) To what extent does the model save teaching time (including preparation time for the lesson)?

    c) How likely is it that the model will be accepted and used by the average teacher?

    d) To what extent does the model give full play to the teacher's professional knowledge or skill?

2. **Learner Aspects**

    a) How much initiative is given to learners within the model?

    b) How adaptable is the model to individual differences in the learners?

    c) How well can the model be adapted for learners of different ages?

    d) How well can the model be adapted for different sorts of learning goals?

3. **Flexibility and adaptability**

    a) How easily can the model be adapted to the present organisational system in the vocational area and to the current standards for learner assessment?

    b) Can the model be well adapted to a variety of vocational areas?

    c) How easily can the model be combined with other models?

    d) To what extent is the model adaptable to cultural expectations for learner and teacher behaviour?

4. **Theoretical and Technological Supports**

    a) Was the model developed using an appropriate theory?

    b) How much research and evidence are available to show the model is internally valid?

    c) In what ways might the model be well supported by technologies and media?

    d) Are the technologies and media most suitable to the model readily available?

This structure for the analysis of models could offer a good starting point to begin to identify which teaching models are most appropriate for education and to identify the relevant aspect of each of the teaching models.

1.1.3 The competence to direct learning

Direct teaching, one of the 'classical' ways of teaching is particularly effective in enabling learners to acquire skills. It is a very structured approach involving a high level of interactivity which is teacher-directed and involves direct communication usually with a whole class, although it might be undertaken with an individual or a small group of learners. Direct teaching has the highest level of effect among the range of teaching strategies, though this may be in part because 'Direct Instruction' is a 'Russian Doll' that includes many other strategies such as active learning, reviews, and homework, so there is an additive effect (Petty, 2009). This model usually involves direct input from the teacher together with a strategy of modelling or demonstration and clear instructions to the learners. The teacher then checks the learners' skills or understanding, provides guided practice and ultimately the learners undertake independent practice.

Programmed learning is a self-paced, self-administered programme (computer-based for example) presented in a logical sequence and with many repetitions of concepts or skills.

- The sequence of Activities (syntax)
- The lesson starts with the learners all at the same stage and the teacher employs direct teaching.
- **Phase 1** – In the first session, the teacher logs on to the computer with the screen visible to the learners on the wall and the learners log on to their computers. The teacher draws the square first, as it's the easiest. The teacher clicks on the line tool and tells the learners to find and click on the line tool. The teacher draws a line of a given length, 45mm. As she demonstrates, she describes what she is doing.
- **Phase 2** – The learners select the tool and draw the line of 45mm and then draw a square.
- **Phase 3** – The teacher questions the learners and checks their progress, guiding them as required.
- **Phase 4** – Once they are confident, learners practise by drawing squares of different sizes on their own.

The teacher demonstrates the tools necessary to draw a circle and the cycle of phases repeats. The session proceeds step-by-step until all the tools and skills have been covered. When an individual learner is stuck, the teacher sits next to the learner, takes the mouse, demonstrates and describes what to do, and then asks the learner to do exactly the same. If the learner makes a mistake, the teacher explains what is wrong and makes the learner repeat the task correctly. The learner practices until the skill is established and the teacher does not take the mouse again but might point to the main screen or question and prompt the learner if required.

Direct teaching using physical guidance

In a design session, the teacher provides direct teaching with physical guidance to help learners acquire the learning objective of mastering the skill of modelling. In terms of context, the session takes place in a workshop. The teacher is also concerned with his relationship with the learner. He is very aware of the issues of personal contact and invading personal space so ensures that he has the learner's consent for physical contact. The teacher guides the learner and progressively removes his support, a process described as 'scaffold' learning.

- The sequence of activities (syntax)
- The teacher had previously demonstrated modelling.
- **Phase 1** – The teacher asks the learner if he minds if he guides his hands; the learner agrees. (The teacher points out that if the learner had objected, he would not have done so.)
- **Phase 2** – The teacher holds both of the learner's hands as he starts to model because the learner does not yet have the fine motor skills.
- **Phase 3** – The teacher tells the learner that she is slowly going to take her hands away and she wants the learner to carry on. (She explains that if she had just removed her hands without warning, the learner's hands would have gone up).

- **Phase 4** – The teacher removes her hands and the learner continues to model unaided. The teacher comments that it is a contentious technique but it is an effective way of teaching someone to model. She points out that often they hold the mould too far away from the work. Teaching them the right distance is important, as the learner needs to operate safely. 'If you tell them to go closer they might go too close and then the model could dip into the pool and splash.'

Direct teaching using demonstration

There are a number of ways of implementing the direct teaching model. The model presented here is known as the 'PAR' model: 'Present, Apply and Review', which is a structured-skills version that could be suitable for many vocational areas.

- There are three stages:
    1. Present new material
    2. Apply this new learning (learner activity)
    3. Review the skills learned in this lesson.

The teacher in this session uses the teaching model of direct teaching and the strategy of demonstration as the tool, in this case, to present new material and achieve the learning objective of acquiring the skill of technical drawing.

- The sequence of activities (syntax)
- **Phase 1** – The teacher sketches a drawing on the whiteboard. This is done in stages, to teach the learners how to do a technical drawing.
- **Phase 2** – The learners copy the drawings stage by stage, as the teacher does them.
- **Phase 3** – Once the learners have completed their drawings, the teacher talks about what they have copied, goes around to each learner and provides feedback, praising good drawings and indicating where they need to improve.

The teacher points out the importance of being able to draw so the customer can see exactly what the technical specialist is intending to do…' this is why tradespeople should be able to express themselves not only in the written word but in sketches.'

1.1.4 The competence to co-operate successfully in teams.

Strategies for group and individual learning

Teachers use their skills in deciding how to manage the learning process. This section includes activity-based learning using the strategies of working in pairs or with a peer, small-group work, whole-group work, and individual work. Many of the strategies described could be used within teaching models that focus on group and cooperative learning and belong to the 'social' group of teaching models. Group work and cooperative learning can shift the responsibility for learning from teacher to learner.

Pairs

Working in pairs is a valuable way of promoting good learning experiences operating along with a set of other ways of learning. Pairings can be learner-chosen, friend-orientated, random or chosen by the teacher related to abilities – both similar and diverse. For a role-playing session, the teacher picks the pairings having a good knowledge of the learners and enables effective pairings.

Pairing can be used to promote the development of communication and social skills as well as group cohesion as in this example of a plumbing session. Sometimes pairing a more able learner with a less able learner can benefit both, as can two learners that have complementary skills being paired.

Pairing can also be used to enable the development of other aspects of learning, such as attention to appropriate detail in planning. Peer explanation reinforces understanding of learning both for the recipient and the person explaining. It can really help some learners as a supplement to the teacher's information.

Peer help can also act as a role model in showing that something can be done – it provides motivation for others.

Small-group work

Splitting the whole group into smaller clusters can happen in many ways and is prevalent in vocational education. Apart from the curriculum learning aspects of group work there is also the valuable social interaction and motivation associated with working together. Small-group activities include:

- Production of a presentation with each person playing a part
- Putting together a piece of work, such as a questionnaire, or building something through group discussion to formulate ideas, decisions or content for pieces of work
- Groups competing against each other via quizzes, for instance, to promote learning during assessment
- Carousel activity where learners move from table to table
- Individuals coming together to complete a piece of work as a group
- Group work on a project followed by individuals then taking their version forward
- At the end of a session, reinforced learning via questions and answers.
  This example illustrates the use of small-group work to make sure that everyone has all the information they need and interest and concentration is maintained.
- Role-play in small groups can be a useful learning tool to reinforce learning as explained in the example below. Role-play can also be used in a larger group with some observing and some playing their parts.

Whole-group work

Whole group activity can take many forms and includes:

- Discussion on a particular topic facilitated by the teacher, perhaps following a presentation or demonstration
- Debate carried out in formal debate mode or more informally

- Games (such as the domino illustration below)
- Whole group activity following individual, paired or small group activity to bring a topic/activity together: this might be individual research, for instance, followed by a whole- group debate activity where groups move around a space, for instance, moving to different corners of the room to answer questions or vote on a particular topic.

Carrying out a whole group activity can have advantages and disadvantages, as illustrated in the The following example. Since all learners are working at more or less the same pace, it is easier to keep track of them and easier to control the group, but then some of the group may be relying on others and it is harder to ensure that all have understood. The following example involves a game of dominos with each learner having one card carrying a word and a description of a different word. The idea is to link the dominos so that words and their descriptions are next to each other.

Individual work

Individuals carrying out learning on their own are often a part of many other ways of learning. For group learning, part of it will be a learner writing, carrying out research or reading. There might be individual work that is then swapped with another for paired work. Learners might complete an audit sheet as they carry out an individual task, such as installing software onto a computer.

Individual work can also replicate working in the industry by carrying out a task alone. Learning carried out outside the classroom/workshop at home or in the library is often an individual task.

An example would be a computer-aided design (CAD) session where the learners work on their own to become familiar and expert at using CAD for drawing diagrams for construction. Although there would be some collaboration, it is essentially a solo task. Although links with employers can be a group activity, it is also something that learners can complete on their own. This enriches the learning and provides experience of working outside the classroom as well as offering an insight into how the industry works. In this example, an employer wants a website designed and the teacher encourages the learner(s) to take the 'job' from start to finish, including the initial contact.

Constructivism, group investigation

Group investigation attempts to recreate a democratic atmosphere in the classroom where the learners work together to solve a problem. The contribution of each member of the group makes the outcome better than if individuals do it. Group investigation puts the learners in charge of the learning and allows them to investigate what interests them most. (Sharan and Sharan, 1989).

- Group investigation goes beyond cooperative learning and follows the following six steps:
- Learners are given a problem
- They discuss ways to solve it
- They plan how to carry out the investigation in a group and assign roles
- They work together and independently
- They analyse progress and report findings, and the process is evaluated (Abordo and Gaikwad, 2005).

The example that follows, while not strictly adhering to the model, demonstrates certain constructivist learning and group inquiry components. The ability to pinpoint the nation and time

period where a specific water and environmental management object is located in the learning target. In the history of design lesson, the teacher aids students in building their understanding of water management. The instructor begins by referring to the students' prior knowledge and experiences. Next, after introducing both well-known and new water management principles, he or she sets up a series of assignments to let students build their understanding of the time and place these concepts were formed. By asking the learners to produce displays, the teacher could assess the learners' new knowledge by seeing what they had found and by asking them questions.

- The sequence of activities (syntax)
- **Phase 1** – To introduce the topic, the teacher provides the learners with a sheet giving an overview of pieces of water and environmental management and their location in time and space. She then leads a discussion by picking out one of the destinations and asking who has seen similar pieces. The discussion is split between European and worldwide attractions and includes water and environmental management such as the thrones of different monarchs – objects with which learners are familiar, even if they have not seen one.
- **Phase 2** – The teacher shows a short video of a water and environmental management – the rocking chair of Churchill – and indicates where it is located.
- **Phase 3** – The teacher gives the learners an A4 copy of the map of the world and lots of water and environmental management brochures and magazines. The task is to find pictures in the brochures of as many famous water and environmental management artefacts as possible, to indicate on the world map where these objects are located, and to make a display on a large sheet of paper. The learners look at the Atlas to identify the locations and the year.
- **Phase 4** – The learners have to research two interesting facts about each water and environmental management piece to add to their displays. They also have a water and environmental management design guide that they can use.

Using debate in groups

In this case, the teacher used a learning activity in the form of a debate to enable learners to develop their concepts and understanding of the differences between two different types of tools. There was a subsidiary learning objective to this activity, developing the skills necessary for a debate. The functional skills of communication and listening were thus embedded in the activity.

- The sequence of activities (syntax)
- **Phase 1** – The teacher gives each group of learners' specifications of different carving tools together with the advantages of each.
- **Phase 2** – Each group has to decide how to present the advantages of the carving tool.
- **Phase 3** – The teacher explains and writes up the rules for the debate: listening, not butting in, keeping eye contact etc.
- **Phase 4** – Each group has 5 minutes to decide how to use their tool and the others then have to work out what the advantages and disadvantages of it might be.

• Phase 5 – The teacher chairs and opens the debate to the floor for questions. The teacher then employs teaching skills to ensure that every learner contributes.

Cooperative learning using scenarios

In cooperative learning, groups of learners work in small groups to maximise their own and each-others' learning. Derived from the work of Slaving (1995), the elements in the cooperative learning teaching model are: clear and positive interdependence between learners, face-to-face interaction, individual accountability, an emphasis on interpersonal and small-group skills, and group review to improve effectiveness.

The teaching model in this example has elements of cooperative learning and the strategy employed is the use of a scenario. The learning objective of the session is, for example, to use the information provided in a scenario to produce a typical risk assessment. As part of the context for this session, the learners are employed and the activity requires them to draw on their experience to identify the hazards in a water and environmental management workshop.

The sequence of activities (syntax)

- **Phase 1** – The teacher introduces the session and provides a scenario of a workshop hosting a series of tools and machines in which there are many hazards.
- **Phase 2** – In groups of three the learners complete the first two columns of a chart – identifying what the hazards are, who might be harmed, and how. They draw on their own knowledge and experience to do this.
- **Phase 3** – Each group presents their findings in turn and they are all merged into a single composite document. By the end of the session, they have all contributed – each group providing something different or a new slant on things and the whole class has a detailed document.

The teacher's role in this model is to set up the scenario and environment, then to guide the learners, who then take responsibility for working together and for each others' learning.

Role-play

Role-play is a model that focuses on social interaction, improving social skills and developing a personal understanding of values and behaviour. Located in Joyce's social family, the role-play model has its roots in both the social and personal dimensions of learning. The purpose of role-playing is to assist learners to understand an issue from different points of view by acting it out, either taking different roles or observing. It allows learners to look at a situation through someone else's eyes, to take a different perspective and empathise. Role-play offers an effective way of exploring feelings, attitudes, values and solving problems. It actively involves learners' and draws on their experiences.

There are nine stages in role play, as defined by Shaftel (1970): (a) warming up the group, (b) selecting participants, (c) setting the stage, (d) preparing observers, (e) enacting the role play, (f) discussing and evaluating, (g) re-enacting, (h) further discussion, and (i) sharing experiences/ generalisation. Each of these stages has a specific purpose that contributes to the richness and

focus of the learning activity. According to Joyce et al (2000), role-playing provides an opportunity for 'acting out' conflicts, collecting information about social issues, learning to take on the roles of others, and improving learners' social skills. The teaching model of role-play emphasises both intellectual and emotional aspects. The analysis and discussion following the role-play are as important as the role-playing itself.

The teaching model of role-play could be found in all occupational areas; however, the model tends to be less employed in traditional water and environmental management workshops. The learning objective in the session used as an example below is to find out about quality assurance and the teacher uses the teaching model of role-play.

- The sequence of activities (syntax)
- **Phase 1** – The teacher uses PowerPoint slides to introduce the topic of quality assurance and the benefits of quality assurance followed by questions and answers.
- **Phase 2** – The teacher pairs the learners and gives them a card with a scenario on carrying out the quality assurance of a product. The scenario requires one of the learners to be the employee and the other to be the customer. The teacher explains why the process is important and also the importance of writing things down formally. She defines what the roles are for the two people taking part in the role-play and gives clear instructions about who should be asking the questions and that the feedback they provide should be constructive. The teacher shows another PowerPoint slide with the rules for quality assurance – that it should be motivational, positive and so on.
- **Phase 3** – All the learners carry out the role-play in pairs.
- **Phase 4** – The teacher gives a handout containing a quality assurance role-play checklist. There are two columns to it – one column involves questions for the employee and one for the customer. They include questions such as, 'Did the customer check the quality of the product?' 'Did you feel satisfied?' 'Why?'
- **Phase 5** – The teacher asks the learners about the role-play, including how they felt about it.
- **Phase 6** – The teacher recaps the session.

1.1.5 The competence to communicate meaningfully with others.

Strategies for giving information

Presentation

The presentation encompasses giving information in a number of ways, including:

- Teacher explanation often at the start of a session – 'this is what we are going to do, these are the objectives for the session'
- Giving information/instruction and checking that learners understand by, for instance, use of questioning
- Clearly presenting information at the start of a session and then linking to other teaching strategies – presentation followed by immediate activity
- Guest speaker input – from the relevant vocational sector

• Providing information through different sensory modes: visual, audio, kinaesthetic

• Providing information through a variety of mediums – video, board, paper, work-book, actual demonstration, verbal explanation, questions and answers and practical activity

• Short PowerPoint or other computer-based presentations for information, recapping on a previous session, setting exercises or structuring a session.

Some teachers use PowerPoint presentations as a convenient way of structuring their sessions and as an aide memoire to ensure that they cover everything.

Slides cover the learning objectives for the session and instructions for tasks or activities and can be printed to give to learners during or after the session.

Demonstration

Demonstration has the added dimension of an explanation by example, a display of some sort – often accompanied by verbal explanation, though not always. It is usually important to follow the demonstration with a related activity. A teacher can use a variety of technological aids.

• Demonstration examples include:

• The physical demonstration of a skill such as holding and using a blow torch, or how to decommission and reassemble a computer

• A means of showing how something is done and that the tools being used are adequate for the job.

• Demonstration of an activity, showing how to develop a planning process – for instance, with a sample of what the end result could be like • Using technology such as Moodle and/or Storyboard to show what is required as well as giving information to set the scene, and use of Smart Board to demonstrate tasks such as putting a joint together in construction.

• While showing the way to do something, ensuring that learners understand that there are different ways of doing things and that if the end result is successful then that is alright.

With demonstration, impact is an important factor: the following example as described by a senior manager shows how a simple demonstration can really help the learning process.

Strategies involving technology

Educational technology is the study and practice of facilitating learning and improving performance by creating; using and managing appropriate technological processes and resources.

Use of technology in the delivery of teaching and learning for any vocational area is increasing all the time. It is also one of the ten approaches described by LSIS as effective in promoting effective learning. Examples drawn from the literature include:

• Interactive whiteboards

• Computer(s) in each learning room for various uses

• Web pages for storing and accessing learner work

• Multimedia learning

• H5P: free and open-source content collaboration framework to make it easy for everyone to create, share and reuse interactive HTML5 content: Interactive videos, interactive presentations, quizzes, interactive timelines and more. To use HTML5 ensures that can be

displayed by all LMS (Learing Management Systems) platforms independly of the operative system, device and the navigator.

• Moodle (Modular Object-Oriented Dynamic Learning Environment) providing an organised interface for e-Learning, or learning over the internet

• OPIGNO: Open Source e-learning platform based on Drupal (broad used Content Management System) that allows you to manage your online trainings, and efficiently ensure that student, employee and partner skills remain up to date.

• E-Learning through applied packages and on-line learning

• M-Learning – learning on the move including use of mobile phones

• IT-based packages for self-assessment

• Computer-generated quizzes and games

• Internet research

• Podcasts

• Mobile-phone technology

• Computerised tracking.

Learning organisations are changing at different rates. Some have utilised state-of-the-art technology, which has been useful in the engagement of learners, and some are lagging behind. Funding is one issue here, along with cultural change.

The learning materials developed within PARADOX contain English and Spanish all the training materials developed during this project:

The teacher can take this Platform as supporting tool for his/her teaching activity selecting the more according for his teaching activity.

The Platform supports mobile environments and it is prepared to contain future training materials about water and environmental management.

Strategies for reinforcing learning

Opportunities to practice-repetition

Practice and repetition help to ensure that the learning undertaken is remembered. Opportunities for this can be provided in different ways and include the examples below taken from the observations and interviews:

• Repetition of practice with regard to usage every time learners use computers

• Practice combined with questioning to memorise information about, for instance, 49 countries for a water and environmental management

• Facilitating discussion to ensure that everyone understands what they are doing and how they can go back to an example to assist them if they get stuck

• Learners writing about what they have achieved to show that they understand what they have learned and recognise the importance of being thorough when, for example, writing a plan and being able to follow instructions

• The teacher checking on each learner as they progress: each time there is a repetition task, the learner should need less intervention

• Referencing back to objectives to reinforce learning

- Recapping sessions at the end of lessons to see what knowledge has been retained
- Weekly recapping to make sure of correct understanding – through Moodle, for example by creating crossword questions, automatic marking, and an assessment grid to show individual progress.

Questioning

Effective questioning can be used to reinforce learning and includes a combination of low-level and high-order questions for deeper learning and can be used to keep learners at work and to check their understanding (Redfield and Rousseau, 1981). Examples of questioning drawn from the fieldwork visits include:

- Use at the beginning of a session and throughout to ascertain prior knowledge and links to advance organisers
- Use to check understanding and identify who is not fully engaged with the task
- Use to encourage evaluation by learners of their work and their learning, through the use of appropriate questions applied in a variety of forms; mainly open – and not just superficial but going beyond the initial response to probe deeper
- Use to check understanding by returning to a learner who may not have fully understood previously in response to questions asked: the teacher does not supply the answer, but challenges the learner to work it out – involving other learners to supply the answer if appropriate.

For questioning, it is helpful to involve all learners, not just the assertive and self-confident who want to answer the questions all the time. Sometimes learners will wants not to offer an answer when they may be uncertain. One teacher solved this issue by using learners to nominate someone to answer the next question. Questioning can be used in an elimination strategy so that learners move towards the right answer.

Strategies to develop learning skills

Assisting learners to become more effective learners, to 'learn how to learn', enables them to learn knowledge and skills more efficiently – a valuable skill in itself for life. Active control over the thinking processes involved in learning is referred to as metacognition. Activities such as planning how to approach a given learning task, monitoring comprehension, and evaluating progress toward the completion of a task are metacognitive in nature. Because metacognition plays a critical role in successful learning, it is important for both learners and teachers. Metacognition is often referred to as 'thinking about thinking' and can be used to help learners to 'learn how to learn'. In some interviews, teachers explicitly described their intention to develop higher-order thinking skills. If the culture of the organisation in which learning takes place systematically cultivates habits and attitudes that help learners to be confident of their own learning ability and to be creative, then learners are likely to learn faster, concentrate more, be more resourceful, more imaginative and more collaborative, so learning can become more enjoyable. Activities that encourage effective learning and higher-order thinking include:

- Asking questions that encourages the development of imagination
- Evaluation activities

- Researching to prepare for an assignment, particularly with peers
- Tasks in which learners need to reason and apply learning in a way that requires higher-order thinkingConsidering new information and making sense of it

- Investigative and experimental tasks
- Taking part in role-play sessions – looking at it from another person's point of view
- Simulations to give experience of work situations
- Adopting step-by-step approaches – building one-step at a time cumulatively.

In order for learners to become more effective and develop higher-order thinking they need to be exposed to activities such as research and analysis.

1.2 How to develop digital educational assessment content

Assessment 'of' learning can take a number of forms and may depend on the curriculum design and/or delivery methods. It includes self-assessment, peer assessment and teacher assessment by using questions, paper-based or computer-generated tests, demonstrations, or games. Assessment methods are not always under the control of the teacher as they might be specified by the awarding organisation.

Assessment 'for' learning is recognised as an effective way of assessing that also contributes to learning. Assessment is: 'about assessing progress and analysing and feeding back the outcomes of that assessment positively and constructively to agree actions to help the learner improve and adapt teaching methods to meet the learner's identified needs.' (QIA 2008). Ten principles of assessment for learning have been identified as being: (a) part of effective planning, (b) focused on how learners learn, (c) central to classroom practice, (d) a key professional skill, (e) sensitive and constructive, (f) capable of fostering motivation, (g) a promoter of understanding the goals and criteria, (h) an assistant for learners to know how to improve, (i) a developer of capacities for self-assessment (and peer assessment), and (j) a recogniser of all educational achievement (DfES 2002). It is about the teacher and the learner working together to assess progress and contribute to effective learning.

In practice, teachers tend to use a variety of methods of assessment including:
- Assessment as a learning tool – assessment for learning
- Self-assessment and teacher evaluation/feedback with assignments written on Moodle or OPIGNO, avoiding too much paperwork and automatically generating an achievement grid for learner/teacher assessment of progress, and hence feedback
- Self-assessment of understanding through the traffic-lights method
- Checklists to self-assess
- Peer feedback to provide assessment
- Workbooks
- Mock tests
- Quizzes, crosswords and games as sources of fun
- Learners being empowered to choose their own assessment format.

Different modes of testing keep the learners interested, as does the use of incentives. Teacher reflection Teacher reflection is a three-fold process comprising direct experience, analysis of beliefs, values or knowledge about that experience, and consideration of the options that should lead to action as a result of the analysis.

As work progressed against the framework, it became clear that there was one additional, distinctive feature that in part defined vocational learning and that was the context within which it takes place. Effective teachers are reflective; they constantly review their practice, discuss it with their colleagues, consider their learners' responses and seek to develop new and better ways of teaching. The concept of reflective practice was introduced by Donald Schon (1983) and given currency by Kolb (1984) in his experiential learning theory. It involves thoughtfully considering one's own experiences as one makes the connection between knowledge and practice, under the guidance of an experienced professional within a discipline (Schon, 1996). Moon (1999) defined reflective practice as 'a set of abilities and skills, to indicate the taking of a critical stance, an orientation to problem solving or state of mind.' In essence, it is a readiness to constantly evaluate and review one's practice in the light of new learning (which may arise from within the context of professional practice). After its introduction, many VET organisations started to incorporate reflective practice into their educational and professional development programmes. It was evident from practitioners in this study that reflection was an important and well-established part of their professional practice.

Examples are provided of reflective practice in terms of responding to learner feedback, improving practice through personal reflection and sharing with colleagues to improve practice. Teachers used a number of different ways of developing their repertoire of skills. These included: learning from experience, observation of teaching, as well as learning from the support of colleagues.

Reflective practice

There was considerable evidence from observations and interviews that good teachers are always learning, building their own skills and teaching themselves. They undertake lots of research to inform their planning and delivery. They are self-critical, recognising when things do not go well, trying to understand why, and formulating ideas about how to improve.

Teachers evaluate their practice and reflect on how they might improve aspects of their sessions. They reflect on the way that they teach something so that they do not necessarily just teach it the way they were taught but think about how it might be improved.

Responding to learner feedback

The importance of learner feedback is evident from the literature with examples of teachers sharing practice with colleagues and collecting and using learner feedback:

It is experience really and assistance from my colleagues. You need to exchange practices so you do not stagnate to the same routine. I also give feedback sheets to students. I want to see through their eyes because sometimes as teachers we think of how we want to learn or what we would like but that doesn't mean that this is what the students like. Some approaches might suit me but that doesn't mean that they suit them.

Feedback from students

It is reaction from students that is important. You can walk out of a class and think to yourself: "that was brilliant but the students didn't think it was brilliant, so it's not brilliant". The students are your judges so if students are enjoying it and they're taking part, they're keen, they're answering questions, then you can say it's reasonably successful, you've achieved what you need to achieve. If they're not, then there's an issue and one has to think of other ways. This teacher also reflected on the session from a learner's perspective, asking questions such as: "If I was a learner in that lesson, how would I have assessed it? Would I have enjoyed it? Would I have been interested throughout?"

Teaching context

Teaching context covers a mixture of elements and includes the nature of the vocational subject, the setting where teaching and learning takes place, the objectives and desired outcomes for a session, plus specifications of the qualification, the nature of the learners, their level, and how they learn best – including their learning styles. Context is such an important factor in vocational learning that it warrants separate consideration. Vocational context is largely responsible for defining the nature of the learning that will take place. Consequently this new (fifth) component emerged to add to the Framework.

The literature in this area refers to context and its importance in vocational learning. In a recent publication, the Institute for Learning stated that brilliant teaching and training comes from the combination of a deep understanding of learning and the use of 'learning to learn' strategies applied within the context of a vocational subject and workplace setting (IfL, 2010). Kerka also commented on the importance of context on the effectiveness of learning, 'other key features of knowledge construction are: (a) functional context, (b) social context, and (c) usefulness. The process works most effectively when it is embedded in a context in which knowledge and skills will be used.' (Kerka, 1997). Other research findings support the value of contextualised learning that provides opportunities for knowledge acquisition and construction, practice and reinforcement, in 'natural settings', such as the workplace (Billett, 1993).

The concept of situated learning, developed by Lave and Wenger (1991), that 'knowledge is created and made meaningful by the context in which it is acquired' (Farmer et al., 1992), is deeply embedded in work-based vocational learning and in teaching models derived from constructivism. Two basic principles underlie situated learning. First, knowledge needs to be presented in an authentic context: i.e., in the setting where knowledge would usually be applied. Second, learning requires social interaction and collaboration: context is a broader concept.

In addition to the setting or location where the learning takes place, we include within this context:

-Learning objectives and desired outcomes for a session or part of a session;

-Nature of the learning such as the vocational subject area, and whether is it theoretical or practical;

-Level of the learning;

-Specification and requirements of the qualification or course;

-Nature of the learners: how they learn best, including their learning styles or any particular difficulties they might have in learning;

-Composition and size of the group of learners and the learning environment, including the

resources and facilities available.

Analysis of trainers' needs

VET aims at preparing learners effectively for real workplaces, which means that the acquisition of competences should take into account the requirements of companies and industry. It is now widely accepted at a European level that VET should be competence-based. Competence-Based Education and Training should enable employees not only to increase their knowledge and skills at the workplace, but also to gain nationally accredited certificates for workplace-based learning. The self-paced and flexible structure of CBET programmes should encourage learners to become responsible for their individual learning process. The modular structure allows for individual combinations of competences limited only by certain 'packaging rules', which refer to accredited national vocational qualifications.

The purpose of nationally endorsed competence standards being at the core of CBET is on the one hand to transform the requirements of industry and enterprises into the world of learning. On the other hand, standards provide transparency of competences underlying vocational qualifications.

Competence-Based Education and Training (CBET) is an approach to VET, in which skills, knowledge and attitudes are specified in order to define, steer and help to achieve competence standards, mostly within a national qualifications framework. Deisingler, (2011,p.6) defines CBET as "a way of approaching (vocational) training that places primary emphasis on what a person can do as a result of training (the outcome), and as such represents a shift away from an emphasis on the process involved in training (the inputs). It is concerned with training to industry specific standards rather than an individual's achievement relative to others in the group". Six criteria are currently used to describe the typical structure of CBET programmes. These criteria specify both the micro-structure of CBET (i.e., its learning and assessment dimension), and the macro-structure (i.e., its institutional framework).

Outcome criterion

Persons demonstrating all prescribed competences in an accredited course or training programme should obtain a credential or statement of attainment that is recognised within the national framework. Reports of competences gained should be provided to learners. Reporting may be in terms of completed modules provided that the relationship between competences and modules is understood. The course is recognised to meet national competence standards that have been endorsed by a national authority. In the absence of national standards, course outcomes should be based on the authority's definition of competence and endorsed by industry training boards or by relevant industry parties where industry training board coverage is not appropriate.

Curricular criterion

The curriculum gives learners a clear indication of what is expected of them in terms of performance, conditions and standards. Also, if appropriate, subsequent workplace and off-the-job training and assessment responsibilities should be identified.

Delivery criterion

Delivery is flexible and learners can exercise initiative in the learning process. Learning materials

used by providers indicate the degree to which programme delivery is learner-centred.

Assessment criterion

Assessment should:

- Measure performance demonstrated against a specified competence standard;
- Be available for competences gained outside the course;
- Include workplace or off-the-job components if appropriate.

Reporting / recording criterion

Reports of competences gained should be provided to learners. Reporting may be in terms of completed modules provided that the relationship between competences and modules is understood.

Certification criterion

Persons demonstrating all prescribed competences in an accredited course or training programme should obtain a credential or statement of attainment that is recognised within the national framework.

Teaching and Learning in Schools. London: Institute of Education

FOR FURTHER INFORMATION
www.paradoxproject.eu

Teaching and Learning in Schools. London: Institute of Education

Output 4.A3

IO4A3 - DEVELOPMENT OF ONLINE FOR THE INTERNATIONAL MASTER DEGREE MODULES

WWW.PARADOX.EU
Innovative Training Approach in the Technology Assisted Environment for Water

SUMMERIZE INFO

PROJECT TITLE:

Innovative Training Approach in the Technology Assisted Environment for Water Management-PARADOX

WP REFERENCE:

IO4

TASK REFERENCE:

IO.A3

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DATE:

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DOCUMENT VERSION 7 STATUS:

V.1

TABLE OF CONTENTS

1 PROGRAMME SPECIFICATION

This Programme Specification is correct as of the date given below however, minor amendments may be made throughout the year and will be incorporated in the annual updating process.

1. Awarding Institution:
2. Teaching Institution:
3. Faculty:
4. Department:
5. Final Award: MSc Innovative Training Approach in the Technology Assisted Environment for Water Management-PARADOX
6. Programme Title: Innovative Training Approach in the Technology Assisted Environment for Water Management-PARADOX
7. Accredited by:
8. Length / Mode / Regime: 2 years
9. Language of Study: English
10. Date of Production/Revision:
11. External Reference Points:

This programme has been developed in accordance with the Framework for Higher Education Qualifications (FHEQ) and meets the requirements for level 7. The course allows students to fulfil the requirements of level 7 as set out in the QAA publication Master's degree characteristics:

- a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their academic discipline, field of study or area of professional practice;
- a comprehensive understanding of techniques applicable to their own research or advanced scholarship; originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline;
- conceptual understanding that enables the student:
    o to evaluate critically current research and advanced scholarship in the discipline;
    o to evaluate methodologies and develop critiques of them and, where appropriate,
    o to propose new hypotheses.

Typically, holders of the qualification will be able to:

- deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level;
- continue to advance their knowledge and understanding, and to develop new skills to a high level.

And holders will have:

- the qualities and transferable skills necessary for employment requiring: z the exercise
- of initiative and personal responsibility;
- decision-making in complex and unpredictable situations;
- the independent learning ability required for continuing professional development.

1.1 Potential Student Profile / Criteria for Admission:

The University welcomes applicants with non-standard or no formal qualifications and applicants will be assessed through a recruitment process based on interview, portfolio or other evidence of achievement and ability to benefit from the course.

The standard entry requirements will be an undergraduate degree at second class honour or above from a relevant studies discipline. The course is keen to recruit those working in community or private companies' provision and will consider all applicants from nonstandard backgrounds.

This master's degree programme sets a new standard in offering higher education opportunities for students working in the public and private sectors. Developed with experts from the sector, the programme has been created to utilise the Univertsity's flexible and distributed learning package. This maximises the time spent on relating the issues in the programme to the workplace and minimises time away from work.

Who this programme is aimed at:

- Employees who are currently working in, or have the potential to work in a role where they have responsibilities for managing water
- Individuals who have experience in water management
- Mature applicants who have been out of the education system for some time and who wish to focus on developing a career in the water management
- People capable of studying at Masters level.

1.2 Entry criteria

Students have to have the ability to study and produce work expected at Masters level, as well as have sufficient real experience in order to relate their learning experience to their work experience. For these reasons, the entry criteria have to be flexible, realistic and recognise a range of previous qualifications and experience.

All potential students should have current experience in the field of natural resources, with a recommended minimum of one year. All potential students should have a qualification at HE level, to demonstrate the ability to study in the academic environment.

Whilst the Faculty seeks flexibility in entry requirements to this programme, it is unlikely that applications would be accepted from anyone with no previous environmental management of water experience or suitable academic qualification.

Why students should choose this Award? In order to:

- Gain a qualification at Masters level that is relevant to their professional development.
- Build on previous qualifications and experience in order to gain professional recognition in this field.
- Develop lifelong learning skills.
- Apply academic theory and principles in the water management
- Minimise disruption to work patterns.
- Undertake assessments based around their own workplace activities.

Essential skills are built into the programme to enable students to learn and to demonstrate learning and these will be supported by the Skills Support Staff, Personal Tutors and the Virtual Learning Environment.

1.3   Main Educational Aims of the Programme:

The main educational aims of the International Master's program for Water management and Climate Change are:

    a.   To facilitate independent and self-directed learning and reflective practice in the field of sustainable water management

    b.   To develop professional skills specific to the field of sustainable water management

    c.   To identify and evaluate practical applications in the field of water management

    d.   To develop research skills to support the continued development of sustainable water management

    e.   To exchange ideas and explore the significance of values with other relevant professions in order to develop greater understanding and communication between associated disciplines and cultures.

1.4 Programme Outcomes:

The outcomes for this International Master's program for Water management and Climate Change are:

- To engage in reflective practice in the field of sustainable water management
- To develop competence in environmental recovery
- To design, implement and evaluate practical applications of prevention measures.
- To produce an extended research project in the field of sustainable water management
- To ideas and explore the significance of values with other relevant professions in order to develop greater understanding and communication between associated disciplines and cultures.

1.5 Programme Structures and Requirements:

Course Title: International Master's program for Water management and Climate Change

Mode: PT

Course Code:

Total Credits available for Course: 120 ECTs

Total European Credit Transfer System credits

Module Title:

MODULE 1: GOVERNANCE AND MANAGEMENT OF WATER RESOURCES

MODULE 2: WATER RESOURCES EXPLOITATION IN AN ISLAND CONTEXT

MODULE 3: SUSTAINABILITY REPORTING: WATER MANAGEMENT

MODULE 4: SUSTAINABLE WATER MANAGEMENT INDICATORS

MODULE 5: ECOHYDROLOGICAL AND ECOSYSTEM-BASED APPROACHES AND NATURE-BASED SOLUTIONS

MODULE 6: ENGINEERING HYDROLOGY

1.6 Learning, Teaching and Assessment Methods to Achieve the Learning Outcomes:

The 2-year programme comprises 6 modules, which are designed to provide significant opportunities to apply current theories, concepts and practices to sustainable water management.

Students will be supported by expert tutors in a small number of residential workshops. They will be equipped with the skills necessary to engage in reflective practice.

The vocational relevance of knowledge, skills and assessment are important factors in the teaching and learning methods of this Master's degree. Wherever possible, the links between academic theory and real' outcomes for the individual will be examined and emphasised.

Students will be encouraged to use their individual workplace experiences to enhance the learning experience. This will particularly be the case during the workshops.

The teaching and learning strategy will encompass a diverse range of teaching and learning methods with support material and communication available through the VLE. The delivery of the modules will encourage an investigative approach and students will be expected to consider how theories, principles and concepts impact upon learning and application in the workplace.

Relevant individual tutorials, discussion groups, group tutorials, practical laboratory and gym workshops, live data and direct consultation with industry through guest speakers will inform students and may prove to be useful in generating avenues of discovery and investigation. The programme will include scenario exercises which will require informed and applied decisionmaking.

Students will use a range of established techniques to initiate and undertake analysis of information and to propose solutions to individual case studies. They will be encouraged to communicate information effectively to specialists and non-specialists, and to articulate decisions and information in a variety of forms.

Students will have the opportunity to further develop essential skills that are explicitly assessed on the programme. The essential skills needed during this programme are those that will enable a student to learn and to demonstrate learning through the application of theories and principles of modelling for sustainable water management.

The overall aim is to use innovative teaching, learning and assessment methods to guide students towards becoming confident and competent in the provision of solutions for a Technology Assisted Environment for Water Management

Assessment Strategy

In line with the innovative nature of this Masters programme, the supporting assessment strategy uses a blend of assessment methods. Evidence of the achievement of the learning outcomes will be in the form of:

- written and practical assignments
- participation in discussions and scenario exercises
- the production of a portfolio of case studies
- examination
- a dissertation of around 20,000 words (with 10% tolerance).

Both formative and summative assessment methods will be used throughout this programme. Formative assessment creates a point for both students and tutors from which to appraise development, consolidate learning and to plan ahead. Summative assessment allows recognition for progression to further study, informs those involved of the level of achievement, and validates the learning process.

1.7 Matrix Mapping:

Matrix Mapping

Programme Outcomes to Individual Modules

Programme Learning Core Modules by Level

Outcomes

Note: where particular pathways are required for achievement of Learning Outcomes these should be included.

1.7.1 Work Based Learning / Placements:

- Where applicable, add on as an Appendix to the Programme Specification.

1.7.2 Special Features:

The following areas are covered by the approved University procedures as detailed on the University's web site:

- Assessment Regulations
- Annual Review and Evaluation
- Student Feedback
- Personal Tutoring
- Student Representation

2 STUDENT HANDBOOK

International Master's program for Water management and Climate Change

ESSENTIAL INFORMATION FOR STUDENTS

When you first enrol at the University there will be a lot of information available to you. You should use this Handbook as your first point of reference for any information enquiry. It provides you with details of a range of services and support available to you. It also includes guidance on the procedures that you will need to follow and the regulations with which you will need to be acquainted and to comply. If you need further information it will advise you where to go to get it. From time to time you may receive updated information. The Student Handbook provides you with general information relating to the University and its procedures and regulations. These may be revised during your period of study and you are advised to check that you are following the current procedures at all times.

Please keep this Handbook as a reference to guide you through your studies at the University. Whilst advice and guidance will always be available, please refer to your Handbook in the first instance. Hopefully it will provide you with the answer to your question!

Studying with (Name of the University)

DISCLAIMER

This Handbook is accurate at the time of going to press. Every effort has been made to ensure the information provided is correct. However, (name of the University) reserves the right, at its discretion, and for any reason deemed fitting or necessary, to amend information within this document without prior notice. The University is unable to accept responsibility for any impact on students as a result of legally constituted strike action.

REGULATIONS AND POLICIES YOU NEED TO KNOW

Many of the University's Policies, Rules and Regulations are incorporated into the Formal Documents, which are viewable on the University's Web Pages.

The University is a large institution with many students studying on a wide variety of courses. It is necessary, therefore, that we have regulations and policies that enable us to operate efficiently and fairly for the benefit of all. Some of these regulations you will need to be well acquainted with from the very start, others you may not need to encounter until later in your course. However, it is important that you are aware of all of them; when you register as a student at the University you undertake to comply with its rules and regulations. You will need to read them in order to be able to make that commitment. Throughout your time as a student there may be times when you need to make reference to them, occasionally you will need to initiate some form of action.

There are numerous policies and regulations relating to specific activities. Your Faculty Registrar or your Course Leader will be able to advise you which document is relevant for a particular situation but you should also find the answer in this handbook.

The following is a brief list of the regulations and policies to which you may need to refer to at some stage during your studies. Each has a separate entry in this handbook and you are asked to give close attention to these. There is a brief description of what is covered by each document together with reference to the published document.

- Academic Appeals
- Academic Offences
- Attendance Support
- Code of Conduct / Disciplinary
- Complaints
- Data Protection
- Dyslexia

- Email Policy
- Equal Opportunities
- Intellectual Property
- Race Equality

NB: If the wording used in this handbook differs from the published University Formal Document the wording of the Formal Documentation will be considered to apply. Therefore, it is essential that you refer to the Formal Document published on the University website.

Information for New Students

1. The Masters in International Master's program for Water management and Climate Change is a Postgraduate programme and this is at Level 7 of the EQF

2. Each module is assessed by one or more of the following: presentation, coursework and/or examinations. All pieces of assessment count towards your final mark for the module. Very few students pass modules if they do not submit all pieces of assessment, so it is in your best interests to submit all the required work on time.

3. Students must have a valid ID number to use the on-line Library facilities and also to sit examinations. Contact the Postgraduate Administrator if you lose your card and need a replacement

4. If you have a genuine reason for asking for an extension for handing in a piece of coursework (eg. illness) you should contact the Postgraduate Administrator who will complete an extension request form on your behalf. You may be required to produce hard copy documentary evidence.

5. Coursework must be submitted as specified in the assignment brief. Always keep both a soft and hard copy for yourself.

6. If for personal reasons (illness, bereavement) you are unable to submit some coursework or sit an examination you may apply for mitigating circumstances to be taken into consideration. If these are accepted, the Board of Examiners may give you the opportunity to produce the coursework or sit the examination as a first attempt. Students are not given extra marks as a result of mitigating circumstances.

7. If you change your address, phone number or email address please inform the Postgraduate Administrator immediately. It is important we know where to contact you.

8. Remember - there are lots of people here to help you - just ask!
   - Course Leader
   - Postgraduate Administrator
   - Faculty Registrars
   - Student Advice and Representation Centre (ARC)

A-Z Entries

The rest of this handbook has entries in alphabetical order to make it easier to find information quickly.

Appeals

Refer to Formal Document Academic Appeals - Taught Courses

Following a Board of Examiners your result will be confirmed to you in writing. There may be occasions when you believe that you have been unfairly treated or that a mistake has been made. You are encouraged to discuss your grievance with your Course Leader at the earliest opportunity before submitting an appeal. If you believe that you have appropriate and sufficient grounds and

you wish to appeal then you must ensure that you complete a Notice of Appeal form, and submit this together with supporting documentary evidence to Student & Academic Services within 14 days following the formal notification of your result. This form is available from the Senior Faculty Registrar. You will not be able to submit an appeal that questions the academic judgement of the Examiners. If you have any questions regarding the appeals process, please email the Senior Faculty Registrar.

ARC (Advice & Representation Centre)

The ARC is an independent, impartial information and advice service. It is there that you can find help and advice on issues with which you may be having problems during your time as a student.

If your difficulties are concerned with your academic work, the first source of help should be with your Course Leader. In most other cases the ARC will be the best place to turn to in order to get advice, which is confidential, impartial and free.

Assessment Criteria Matrices

When preparing to undertake the assessment for each module on which you are enrolled you will be able to refer to an assessment criteria matrix. This matrix will guide you in what the tutor/assessor is looking for and how your work will be marked. It is worth checking your work against the matrix before you submit it to ensure that it complies with the requirements for the achievement of a good mark.

Assessment Strategy

Assessment in each module may be by presentation, coursework or examination or a combination of the three. The final grade for a module is approved by the Board of Examiners with reference to the grades achieved in coursework and/or examinations. Each piece of assessment counts towards your grade for the whole module. The percentage weighting for each assessment is detailed on the assignment brief or examination paper. If you do not complete each piece of the module's assessment you are seriously jeopardizing your chances of passing the module. Anonymous marking will be applied to all examinations and this will be specified on the examination paper. You must ensure that you write your correct Bucks ID number on every piece of work you submit. Please do not write your name unless specifically instructed to do so by your Module Tutor.

When preparing to undertake the assessment for each module on which you are enrolled you will be able to refer to the assessment criteria. This will guide you in what the tutor/assessor is looking for and how your work will be marked. It is worth checking your work against the assessment criteria before you submit it to ensure that it complies with the requirements for the achievement of a good mark.

Please note that it is your responsibility to ensure that you keep an electronic copy of all the assignments you submit. The University reserves the right to require you to submit an electronic copy of any piece of assessed coursework. By submitting an assessment, you agree that your work may be submitted to automated software systems for the purpose of detecting similarities with other work.

Assessment - Types of

Assessments are divided into three main categories:

1. Coursework:

Assignment: A task or series of written tasks to be completed in your own time but submitted by a specified date.

Dissertation: At the end of Stage Two, you will be required to complete a Dissertation to demonstrate analytical, critical and research skills. Two copies of the Dissertation must be submitted, printed and bound as specified, plus an electronic copy on CD.

2. Formal Examinations:

Formal examinations will be held during the formal examination periods. They are subject to formal regulations and invigilation. In particular, only those materials authorised on the front of the examination paper will be allowed into the examination room. There are various terms used to describe types of examinations; the most common terms are listed below:

Closed Book: The candidate (student) enters the examination hall with no prior knowledge of the questions which he/she must answer and no reference material is allowed in the examination room.

Open Book: Students are permitted to use prescribed resource materials in the examination room.

Case Study (Open): The candidate has previously been issued with a Case Study and asked to prepare notes (if he/she wishes) as an aid to answering the questions upon the exam paper. The guidance issued with the case study should make clear precisely what will be allowed into the examination. In this case any notes taken into the examination hall must be submitted with the examination script at the end of the examination. Invigilators will check that you are taking in only what has been authorised on the examination paper.

Case Study (Closed): The candidate has previously been issued with a Case Study and asked to prepare him/herself for answering questions which relate wholly or in part to the Case Study. In this case no notes may be taken into the examination hall.

An examination held outside normal examination periods may be called a 'Time Constrained Assessment'. The same rules and regulations as detailed above, will apply.

3. Presentations:

Presentations may be individual or in a group and may be recorded for the purpose of internal and external moderation.

Assignments - Format for Submission Of

With each assignment that you submit you should enclose a fully completed Assignment Submission Form. The Assignment should take the form, wherever possible, of a single Microsoft Word document. Where spreadsheets are used the contents of these should, ideally, be embedded within the Word document. Where it is absolutely necessary to submit a spreadsheet in addition to or in place of a Word document, please ensure that you have clearly identified the worksheets to be printed and have also specified the print areas. Failure to comply with these guidelines may result in an incomplete assignment being considered and marked by the module tutor.

Assignments - Late Submission

If you are late in submitting a piece of coursework your mark for that assignment will be capped at 40% provided that the work is submitted within 10 working days of the deadline. After this time

the work will be formally recorded as a non-submission regardless of whether the work is submitted or not.

NB Assignments will not be accepted via fax. It is up to you to ensure that all assignments are submitted in good time.

Assignments - Return of Marked

Feedback on marked assignments will normally be given to students within three weeks of the submission date, by the module tutors who will also provide you with written feedback for each assignment together with a PROVISIONAL percentage mark for that piece of work.   The mark for every piece of assessed work in a module will contribute towards an overall PROVISIONAL mark for the module, according to the weighting of each piece of work.   Your confirmed percentage mark for the module will not be released until published by the Board of Examiners.

Please note that it is your responsibility to ensure that you keep an electronic copy of all the assignments you submit.

Feedback will be given by your course tutor in conjunction with the original assignment requirements and they may provide help and guidance with your learning. It is in your own interest to take notice of these comments.

Assignments - Submission Of

Each assignment brief will specify exactly when and how you are required to submit the assignment.

Virtual Learning Environment

In order to give students greater access to learning resources, the University operates a virtual learning environment (VLE) available 24 hours a day, where students can read announcements, view and download course material, take part in online discussions and contact tutors and other students via email.

The purpose of this is to provide core and additional online course material and access to relevant websites, as well as to establish a greater sense of a learning and social community by extending the opportunities to keep in touch with tutors and fellow students. It can be viewed from any computer that has Internet access on or off campus.

Books & Reading

This course will require you to assimilate a good deal of information from various sources. Many of these sources will be available online but some, the Core Texts for each module, it is strongly suggested you purchase as you will make extensive use of them.

Cheating, Plagiarism & Collusion

Although we encourage students to discuss set assessments with other students in order to understand any problems they are having, when submitting assessments it should be the student's own work in their own words. You should not submit an assessment which is too similar to that of another student; this is classed as collusion.

You should not present the work of others as if it is your own (plagiarism) or use unfair methods to obtain / present your answers, e.g. copying. The University takes these actions very seriously, and you should ensure you read and understand the appropriate regulations "Academic Misconduct".

Complaints

The University aims to provide you with the best possible service in all areas of its work. There may be times when you believe that the service provided by the University is not what you would expect. Where you consider there to be a legitimate concern you have the right to submit a formal complaint to the Dean of Faculty or to the Head of the Central Service Department.

The complaints procedure may not be used to review or adjudicate on matters of academic judgement. Concerns arising from academic decisions are dealt with under the Academic Appeals Procedure - Refer to Formal Document "Appeals" (see Appeals).

Remember, you can access confidential, free and impartial advice from ARC Office of the Independent Adjudicator (OIA)

The Government has set up an adjudication service, called the Office of the Independent Adjudicator,

for complainants to use once they have followed and completed the internal complaints procedure of the University but remain dissatisfied.

Contacting Academic Staff

Academic staff at the University carry out many duties other than lecturing, so email is usually the best way of contacting them.

Email addresses follow a standard format for all academic and professional service (ie administrative) staff.

Disability Service

The Disability Service (where available) offers a wide range of advice, guidance and continuing support for dyslexia, medical conditions, mental health difficulties or other disabilities. They are happy to discuss your individual needs at any stage. The aim is to ensure you get the most from your experience and provide an inclusive learning environment.

If you do have a disability, it is essential that you register with the service so that they can ensure you get the additional help and support you need. They can also assist with applications for Disabled Students' Allowances. As this can take up to three months it's important you contact them as soon as possible.

European Diploma Supplement

The European Diploma Supplement is a document which is intended to allow transparency of qualifications and academic and professional recognition across the European Union (EU). It has therefore been agreed that the same document format is used throughout the whole EU to produce the Diploma Supplement for students at the end of their courses. Currently these are produced for any student on request following the successful completion of their course.

Examinations

You must ensure that you are available to sit examinations throughout the scheduled periods (including the referral period, if appropriate). The Board of Examiners will not accept an excuse, such as your holiday having been booked in advance. The onus is upon you to attend all examinations.

At each examination you sit you must produce your student card.

NB Students who fail to produce a valid ID card when arriving to sit a particular exam will not be admitted to the Examination Hall and that examination will be recorded as a non-attendance.

Formal examination scripts remain the property of the University and will not be returned to you at any time. However, there are circumstances where it may be possible for you to see your marked examination script under supervised conditions.

You will be notified via VLE of the date, time, duration and location of your examination.

Examinations - Conduct Of / In

Invigilators at examinations will keep a formal record of attendance and of behaviour during each exam. Any student whom the invigilator(s) consider(s) to be guilty of cheating or any other form of misconduct during the examination will have these circumstances noted on the examination report and will be subject to the University's disciplinary procedures.

Examinations - timetables

Examination timetables are published on the website. Follow the link on the front page called Current Students.

Extensions to Submission Dates

If you have a valid reason why you are unable to comply with the published deadline, please, in the first instance, email the Postgraduate Administrator who will complete an Assignment Extension form on your behalf.

In accordance with University policy, extensions for course assignments will only normally be granted under exceptional circumstances, these being:

        a.   Sickness (supported by a medical certificate)
        b.   Bereavement or serious illness (family or close friend)
        c.   Other exceptional circumstances

Please note that all extensions must be supported by documentary evidence; you should not assume that your extension is granted until you have received the authorisation. It is likely that any extension granted will be provisional until we have received in hard copy in the post your documentary evidence.

A request for an extension to the scheduled deadline does not guarantee that the request will be authorised. An authorised extension will not be granted for poor planning and/or poor time management. We do not take your work commitments into consideration either. As future leaders we expect you to manage both your work and study commitments

Extension dates will not normally be granted when the submission date is passed unless the student can produce independent evidence of appropriate extenuating circumstances.

Feedback

During the course you will be asked to provide us with feedback giving the opportunity for you to assess how well the course has met with your expectations and to offer any comments you may have about the modules or their delivery. This is your chance to maintain and improve the standard of the education you and your fellow students are receiving.

The results of the collated feedback will be considered by the Postgraduate Board of Studies.

Feedback from students is considered as part of our Annual Review and Evaluation process. Academic members of staff from outside the faculty will inspect all areas of faculty life and our educational provision. They will produce a formal report to the University to ensure that the quality of our provision is assured. If you have a query, a comment on or a problem with the service we are providing, please tell us. Our aim is to provide you with a complete, wellrounded education. The feedback we receive from you will help us to ensure that our high standards are maintained.

Library

Your ID number allows you to access the library catalogue and databases.

Marking Criteria

Excellent: 70+ Excellent work which demonstrates an authoritative grasp of the concepts, methodology and content appropriate to the subject discipline. Indication of originality in the application of ideas, in synthesis of material or in performance; personal insight reflecting depth and confidence of understanding and real critical analysis. Work is well structured and presented with full referencing.

Very Good: 60-69. Very good work which demonstrates sound level of understanding based on competent grasp of relevant concepts, methodology and content; displays skill in interpreting and analysing complex materials; material well organised.

Good: 50-59. Work that demonstrates a coherent response to the requirements of the assessment task; clear expression of ideas; uses relevant source material; demonstrates some understanding of the concepts; draws relevant conclusions; appropriate organisation of response.

Acceptable: 40-49. Recognisable if limited awareness of requirements of assessment task; evidence of some understanding; some attempt to draw relevant conclusions.

Unacceptable (Marginal Fail): 35-39. Marginal fail. Unsatisfactory but showing some evidence of understanding. May be condonable

Unacceptable (Fail): 0-34. Little evidence of understanding or application. Not normally condonable.

Mitigating Circumstances Definition:

An unforeseeable or unavoidable serious disruption of studies caused by circumstances which occurred during a period of examinations, or exceptionally when coursework submission was due, or affected a scheduled revision period.

The following are examples of Mitigating Circumstances:

      a.   Serious illness of the student or a member of their immediate family
      b.   Death of a family member or close friend
      c.   Severe personal/psychological problems

Please note that all applications for mitigating circumstances to be considered must be submitted within 10 working days of the event to which they relate and be supported by documentary evidence. No-one else may claim mitigating circumstances on your behalf. You should not assume that your application has been successful until you have received notification from the Mitigating Circumstances Panel (where available).

It should be borne in mind that University regulations concerning Mitigating Circumstances have been drawn up to protect those students who have a genuine claim and are therefore very strict. If you suffer a bereavement you will be asked to produce a copy of the death certificate. A fraudulent claim for Mitigating Circumstances to be considered may result in disciplinary action by the University.

NB As general guidance, you should apply for an assignment extension when you know in advance of the assignment deadline that short-term personal circumstances will prevent submission of the coursework by the due date. An application for Mitigating Circumstances should only be made when the event concerned could not be anticipated prior to the deadline or date of examination. For example:

Event	Form to be completed
Serious illness of self or close family member	Mitigating Circumstances
Attendance at a funeral	Assignment Extension Form
Personal short-term medical condition (affecting Assignment)	Assignment Extension Form
Personal short-term medical condition (affecting TCA, presentation or Examination)	Mitigating Circumstances
Personal long-term medical condition	Suspension of Studies Form (see below)

NB Short-term difficulties with computing or printing equipment are not normally considered acceptable grounds for either assessment extensions or mitigating circumstances. Thus, you should aim to have completed and printed your assignments ready for submission at least one full day before the submission deadline.

A claim for Mitigating Circumstances of a very personal or confidential nature may be submitted in a sealed envelope clearly marked "CONFIDENTIAL". The Chair of the Mitigating Circumstances Panel will consider these circumstances only if the student has failed the module. However, if the module is passed then the envelope will be returned to the student unopened.

In no case will mitigating circumstances take the place of the required assessment or increase the grade awarded.

Modules

The MSc part time programme comprises 10 taught modules and a dissertation. A brief summary description of each module is given below.

Core Modules

Stage 1

MODULE 1: GOVERNANCE AND MANAGEMENT OF WATER RESOURCES

MODULE 2: WATER RESOURCES EXPLOITATION IN AN ISLAND CONTEXT

MODULE 3: SUSTAINABILITY REPORTING: WATER MANAGEMENT

MODULE 4: SUSTAINABLE WATER MANAGEMENT INDICATORS

MODULE 5: ECOHYDROLOGICAL AND ECOSYSTEM-BASED APPROACHES AND NATURE-BASED SOLUTIONS

MODULE 6: ENGINEERING HYDROLOGY

Stage 2

Dissertation

This module aims to develop students' academic, and research skills in order to help prepare them for their careers. There are a number of important assessments for students to demonstrate their abilities and be given feedback for their further development. Finally, students are required to submit a Dissertation, as the culmination of this development process, from which students are awarded the mark for this module. They will all be allocated a Personal Tutor, to support them through this development process, who may also act as their Dissertation Supervisor.

The skill assessed include development of Masters level Analysis, Synthesis and Evaluation skills, together with the ability to present a written argument supporting their conclusions and recommendations.

Students are expected to work on their dissertation progressively, starting in the first semester of the taught course through to submission at the end of the year. Students will be given instruction in research methods, to equip them to conduct management related research and to develop the knowledge and skills required for successful completion of the dissertation.

Personal Tutors

Your Course Leader, Dr.xxx, will act as your Personal Tutor. Should you have a problem, please do not hesitate to contact them. They will be able to offer you academic and pastoral support.

Programme Specification

You will be given a Programme Specification via VLE. The Programme Specification is the definitive, up to date document giving details of this programme.

The Programme Specification contains useful information on the course, such as the syllabus of modules to be undertaken, what the course is designed to achieve ie the knowledge and skills a graduate of the course should be able to offer to an employer, how the teaching and learning will be conducted, what assessments will be given and any special features of the course. A Programme Specification is therefore a valuable document and you should download it from the website and keep it in a safe place.

Referencing - Guide To (University's approved referencing system)

WHAT IS REFERENCING?

When writing an academic assignment, you will inevitably encounter other peoples' ideas, theories or data, to which you will want to refer in your own work. Referring to others is termed citing. The list of these authors' works should be given at the end of your text in the form of a reference list.

The process of citing authors and composing the reference list can be done in one of two main styles - e.g Harvard or the Numeric. This guide describes the Referencing System: this is the (University name) standard system, although you are advised to consult Faculty staff for guidance on specific faculty procedures.

THE DIFFERENCE BETWEEN A REFERENCE LIST AND A BIBLIOGRAPHY

The reference list is used to cite all the items you have made direct reference to in your text (by the author's name and year of publication). The list is organised alphabetically by the names of the authors (or originators) of the work.

During the course of your reading you may have used material for extending your knowledge of the subject, but from which you do not make specific reference. A bibliography lists all these items, again alphabetically by author. This is generally included after the reference list. It is not always essential to include a bibliography

CITING AUTHORS

E.G in Harvard System (sometimes called the 'name and date system') uses the name of the author of the work and the date it was published. These are incorporated into your text each time you refer to that person's ideas:

E.G. …Lesk (1997) maintains that digital libraries are going to change the social system by which information is collected and transferred.

Alternatively, the name and date can be in brackets, separated by a comma:

E.G. …Digital libraries are going to change the social system by which information is collected and transferred (Leski, 1997).

MULTIPLE AUTHORS

If there are two authors the names of both should be given in the text and in the reference list, in the order in which they appear on the title page. If there are more than two authors, record the first, followed by et al. (in italics and punctuated with a full stop).

The information required for the reference list can usually be found on the title page (or reverse title page) of the book or document that you are citing. You should cite the first named place of publication, which is the city not the country. Remember that a reprint is not a new edition: the copyright sign will often indicate the date of publication. The edition number is only mentioned if other than first. Everything that you cite in your text should be listed alphabetically by author (or originator) and year. To distinguish between different works cited by the same author written within the same year, lower case letters a,b,c etc. are used with the date in the text and the reference list:

BOOKS:

The first letter of the first word of the title is in upper case - subsequent words, other than proper nouns, commence with lower case.

Author/editor surname, initials. (Year) Title: subtitle. Edition. Place of publication: Publisher.

EG: Misesciene, M. (1994) Developing professional knowledge and competence. London: Falmer.

Epuran, S. and Gintis, H. (1976) Schooling in capitalist America. London: Routledge & Kegan Paul.

Thorley, L. and Gregory, R. (1994) Using group-based learning in higher education. London: Kogan Page.

Forsyth, I. (1999) Evaluating a course: practical strategies for teachers, lecturers and trainers. 2nd ed. London: Kogan Page.

CITING EDITORS

In the reference list you should indicate editorship using (ed.) for a single editor, or (eds.) for multiple editors:

EG: Smith, L. (ed.) (1987) Statistics for engineers. London: Helman.

REFERRING TO A PART OR CHAPTER OF AN EDITED BOOK

An edited book will often have a number of authors for different chapters. To refer to a specific author's ideas, from one chapter, cite their name in the text, and not the editors. In your reference list, indicate the chapter details and the book details from which it was published, using 'In:' to link the chapter to the book. The year of publication is given only once:

EG: Race, P. (1999) Why assess innovatively? In: Brown, S. and Glasner, A. (eds.) Assessment matters in higher education. Buckingham: Open University. pp. 57-70.

CITING AN AUTHOR THAT SOMEONE ELSE HAS CITED

A journal article or book that someone else cites, but which you have not seen, is called a secondary source. Ideally, you should try and find this source for yourself and cite it in the normal way. If you cannot locate the secondary source, you may cite it in your text using the reference that is provided in your primary source, linking the two items with 'Cited in'. Only the primary source title is italicised and both years are included:

EG: Smalley, B. (1973) The Becket conflict and the schools. Oxford: 1973. Cited in Russell, C. (1993) Academic freedom. London: Routledge.

USING QUOTATIONS

Quotes within the text should be kept short (normally no more than one sentence long), and include quotation marks. To direct your reader to a specific page or quotation you can quote the page number within the text:

EG: It has been argued that 'the World Wide Web offers opportunities for disabled learners to access aspects of the curriculum that are difficult or impossible to achieve otherwise' (Eisenstadt and Vincent, 1998, p.45).

It is not necessary to indicate the page number in the reference list. Longer quotes should be

- Preceded by a colon
- Indented from the main text
- Single spaced
- Not have quotation marks
- Cite author, year and page number

EG: Porat (1978, p.5) noted that:

The first category includes those workers whose output as primary activity is producing and selling knowledge. Included here are scientists, inventors, teachers, librarians, journalists, and authors.

JOURNAL ARTICLES:

The journal name is italicised, not the article title. The journal volume is in bold.

Author surname, initials. (Year) Title of article. Journal name. Volume number (issue or part number), first-last page numbers.

EG: Webb, G. (1996a) Theories of staff development: development and understanding. International Journal for Academic Development. 1 (1), 63-69.

Webb, G. (1996b) Theories of staff development: progress and power. International Journal for Academic Development. 1 (2), 59-66.

NEWSPAPERS

The name of the newspaper is italicised. If the article does not attribute an author the newspaper name is used in the text, and instead of the author in the reference list.

Journalist name, initial. (Year) Title of article. Name of newspaper. Date. Page number. EG: Peters, R. (1992) Picking up Maxwell's bills. Independent. 4 June, p 28. Guardian (1995) 'Lottery' for breast cancer help. Guardian. 21 March, p 10.

GOVERNMENT PUBLICATIONS:

Available data may vary, but where possible include the following:

Government Department/Institute. Subdivision of department/institute (if known). (Year) Title of document. (Name of chairperson if it is a committee). Place of publication: Publisher.

CONFERENCE PAPERS

Conference papers are often published in book form or as a special issue of a journal. It is necessary to include the name, place and date of the conference:

Author, Initial. (Year) Title of conference paper. In: conference proceedings title, including date. Place of publication: Publisher.

EG: Webb, N.L. (1993) Mathematics education reform in California. In: Science and mathematics education in the United States: proceedings of a conference, Paris, 1991. Paris: OECD.

LEGISLATION

Law reports

Dates are given in square brackets.

Name of parties involved in case. [Year] Volume number/Abbreviated name of law report/Page number on which report starts. EG: Holgatev   Duke   [1984] 2   All   ER   660 Statutes. The usual method of citing an Act of Parliament is to cite its title in your text.   The format is: Title of statute, year of statute. Place of publication: publisher.

EG: Data Protection Act 1998. London: Stationery Office.

For statutes of countries other than the UK, the country of origin is regarded as the author. Statutory Instruments

Again, if the country of origin is not the UK, it should be cited as the author. Otherwise, the format is: Short title of statutory instrument. Year (SI year: number). Place of publication: Publisher. EG: Lobster pots (size regulations). 1989 (SI 1989: 1201). London: HMSO.

THESES

Author, initials. (Year) Thesis title. Level of thesis. Awarding institution.

EG: Trim, M. (1998) A changing hero: the relevance of Bunyan's Pilgrim and The Pilgrim's Progress through three centuries of children's literature. Ph.D. Thesis, Loughborough University.

PATENTS

The format starts with the patent applicant and should include the country, patent number and full date.

Patent applicant. (Year) Title of patent. Name of author/inventor. Country of patent, serial number. Date of application.

EG: Mitsui Toatsu Chemicals Inc. Dyeing by acid dyes. Author: F. Fujii. Japan patent application 6988, 3951969. 2 October 1972.

BRITISH STANDARDS

Corporate author. (Year) Title of standard. Number of standard. Place: Publisher. EG: British Standards Institute. (1989)

CORPORATE AUTHORS

Sometimes it is impossible to find a named individual as an author or editor. This is often because there is a shared, or 'corporate' responsibility for the production of the material. Therefore the 'corporate name' becomes the author, and appears in the text, reference list and bibliography in the usual way. Corporate authors can be government bodies, companies, professional associations, international organisations etc.

EG: Institute of Waste Management (1995) Ways to improve recycling. Northampton: Institute of Waste Management.

UNKNOWN PUBLICATION DETAILS

Occasionally documents lack basic publication details.   In this case, it is necessary to indicate that these are not available. A series of abbreviations are generally accepted for this purpose:

- Author/corporate author not given use   [Anon.]
- No date use [n.d.]
- No place (sine loco) use [s.l.]
- No publisher (sine nomine) use [s.n.]
- Not known use [n.k.]

For journal articles without authors the journal title becomes both author and cited journal title.

UNPUBLISHED MATERIALS

Some printed materials are not produced by recognisable publishers and may not be widely available. In this case it is necessary to indicate this, and if the document is archival, such as a manuscript or personal letter, its location should be included.

VIDEOTAPE

For off-air recordings use:

Broadcast company (Year) Title of programme. Off-air recording. Transmission date. Format. EG: Channel Four (1992) J'accuse: Sigmund Freud. Off-air recording. 10th June, 1992. In your text refer to: (Channel Four, 1992).

For an off-air recording of a film, use:

Title (Year) Person or body responsible for production. Off-air recording. Format. EG: The Graduate (1969) Directed by Mike Nichols. Off-air recording. Videotape. In your text refer to: (The Graduate, 1969).

FILM

Title. (Year) Person or body responsible for production. Running time.   Production   company. Place of production or publication (if known). Format.

EG: The Apartment (1960) Directed by Billy Wilder. 124 mins. United Artists. Videotape. In your text refer to: (The Apartment, 1960).

ELECTRONIC SOURCES

World Wide Web

Author/editor, initials. (Year) Title [online]. (Edition).   Publisher (if ascertainable). Available from: URL [Accessed date].

EG: American Civil Liberties Union (1997) Fahrenheit 451.2: Is cyberspace burning?   [online]. ACLU.   Available from: http://www.aclu.org/issues/cyber/ burning.html [Accessed   17 September 1997].

When citing the URL of a document it should be split at the end of a line only after the forward slashes in the address.   No further punctuation such as hyphens should be added, nor should the case of any characters be altered.   The 'accessed date' is the date on which you viewed or downloaded the document.   It may be subject to changes or updating and this allows for the possibility. Keeping a copy of the document as you used it (if permissible) is recommended.

Often organisations put information on the Web without citing a specific author. In this case, ascribe authorship to the smallest identifiable organisational unit.

Electronic journals

These should be cited in the same way as hard copy journals, with the added inclusion of [online], Available from: URL, and the date accessed.

Author, initials. (Year) Title of article. Journal title. [online]. Volume (issue), page no. Available from: URL. [Accessed date].

Smith, Alastair G. (1997) Testing the surf: Criteria for evaluating Internet information resources.

Public Access Computer   Systems Review [online]. 8(3).   Available   from: http://info.lib.uh.edu/pr/v8/n3/smit8n3.html [Accessed 29 September 1997].

CD ROM (full text)

This format is for full-text CD ROM. If your reference is a bibliographic reference only you should try to find the full version of the article and refer to that.

Author/editor, initials. (Year) Title. Title of full text database. [CD ROM], volume, date, page.

EG: Lascalles, D. (1995) Oil's troubled waters. Financial Times. [CD ROM], 11th January, p. 18. Other electronic sources

There are a variety of other electronic sources that can be cited, e.g.

Mailbase/Listserve e-mail lists

Personal electronic communications (email)

The Web site at Bournemouth University gives full explanations on how to cite these references correctly.

Acknowledgements

This guide makes considerable use of the Referencing Guide to the Harvard System produced by Learning Resources Services at the University of Northampton, for whose permission we are very grateful.

Referral / Deferral Work

At the Board of Examiners you may be Referred or Deferred in one or more modules. This means that you will be asked to retake a form of assessment for that module. The referral/deferral assessment will not necessarily take the same form as the original assessment ie a series of assignments might be replaced by a single referral/deferral examination, if the Board considers this appropriate.   You are reminded that you must be available to complete this work. Holidays and employment are not considered acceptable reasons for not attending examinations. If you require any further information, please email your Personal Tutor or the Faculty Registrar.

NB As a general rule:

Referral work is undertaken by those students who have not yet passed a module and have not had an application for Mitigating Circumstances to be considered being accepted by the Faculty. Module marks are capped at a maximum mark of 40.

Please note that if you fail your referral work you will not normally be permitted to be referred for a second time. This means that you fail the module.

Deferral work is undertaken by those students who have not yet passed a module and whose application for Mitigating Circumstances to be considered has been accepted by the Faculty. The resubmitted coursework or re-sat examination is marked as a first attempt and thus the mark for that component of the module's assessment is uncapped.

If you fail the deferral work you may be permitted to be referred and retake the assessment again. This work is, however, capped at 40% as explained above.

Results Letters & Transcripts

Results letters and formal transcripts will be sent to all students following the Boards of Examiners. The transcript of module marks gives the overall grade for each module taken, and will also indicate the number of attempts at each individual module if applicable. The results you achieve for coursework and/or examinations cannot be given to you by the Postgraduate Administrator or over the phone.

Suspension Of Studies

If you are likely to be suffering from a long-term medical condition or long-term personal difficulties you might wish to consider suspending your studies for a period, usually for one year.

Should you wish to consider this option, please contact with your Course Leader or the Senior Faculty Registrar

UNIVERSITY EMPLOYABILITY AUDIT

Definition of Employability

"A set of achievements, understandings and personal attributes that make individuals more likely to move successfully into and within the labour markets, to realise their potential and to operate self-sufficiently to achieve sustainable employment"

(Adapted from Employability definitions in HEA publications in the Employability series One & Two)

- Faculty and School...
- Course being audited: MSc Environmental Security and Management Audit undertaken by: ...
- Date: ...
- Dean name: ...
- Date:...

1. Graduate employment: Audit point has not been seriously considered at all (0), very limited evidence (1), partial evidence (2), Score satisfactory evidence (3), substantial evidence (4)

   a. Do academic staff know who actually employs your graduates?
   b. Has graduate employment destination data been circulated to academic staff within the last 2 years?
   c. Do current students know who employs graduates from this course?
   d. Do recent graduates visit to talk about their current jobs? (It is envisaged a few full-time students may return to address students after they complete the course.)
   e. Are students made aware of where they can obtain information on graduate destinations in employment?
   f. Are students aware at an early stage of the employment opportunities open to them?

2. Career-path development: Audit point has not been seriously considered at all (0), very limited evidence (1), partial evidence (2), Score satisfactory evidence (3), substantial evidence (4)

   a. Are guest/visiting lecturers encouraged to reveal their own career paths?
   b. Are graduate career profiles available to students?
   c. Do recent graduates visit to talk about their career paths?
   d. Do more senior graduates visit to talk about their career paths?

3. Career Management Skills: Audit point has not been seriously considered at all (0), very limited evidence (1), partial evidence (2), Score satisfactory evidence (3), substantial evidence (4)

   a. Are students explicitly taught career management skills?
   b. Do students critically engage with theories of career development and self - assessment?
   c. Do students identify and analyse personal skills necessary for success in future career or course choice?
   d. Do students construct a graduate level CV relevant to one of the following: appropriate level opportunities in an industry related to their area of study; a specified graduate training scheme; post graduate study? (It is envisaged most students will already be in employment).

e. Do students critically and effectively examine current labour market trends in a vocational area relevant to study or career aspiration?

f. Do students determine the range of options available to themselves through personal research?

g. Do students market themselves effectively to employers/training providers? (This has yet to be determined with the first intake of students)

4. Relationships with employers: Audit point has not been seriously considered at all (0), very limited evidence (1), partial evidence Score (2), satisfactory evidence (3), substantial evidence (4)

a. Have you made potential employers aware of the skills your students develop?
b. Is your institution/course on the list of favoured institutions with relevant employers?
c. Do you know what employers perceive to be the strengths and weaknesses of your students?
d. Do students have the opportunity to visit local employers?
e. Do you have good communication with employers of your graduates?
f. Do employers visit your course/curriculum area to give talks about employment opportunities?
g. Do employers attend any student final year project presentations?
h. Do you know what skills, knowledge and attitudes your employers see as becoming more important in the next 4 years?

5. Options for work experience: Audit point has not been seriously considered at all (0), very limited evidence (1), partial evidence Score (2), satisfactory evidence (3), substantial evidence (4)

a. Are work experience opportunities provided/encouraged during vacations?
b. Most student will already be in employment. Are sandwich placements provided/encouraged as part of the course?
c. Are overseas placements/study experiences possible and encouraged for students?
d. Are realistic simulations used to give experience of real work situations?
e. Do students carry out course project work in real settings with employers?
f. Are work placements available in areas not involving your specific discipline?
g. What proportion of students on your course have obtained work experience before graduation? (0 = don't know; 1 = <5%; 2 = 5-20%; 3 =20-50%; 4 =>50%)
h. Are students on work placements supported by a process which encourages reflection
i. No work placements and emphasises breadth of learning opportunities?

6. Does your curriculum promote employability? Audit point has not been seriously considered at all (0), very limited evidence Score (1), partial evidence (2), satisfactory evidence (3), substantial evidence (4)

a. Are academic staff aware of what employers are looking for in graduates?
b. Do employers review your curriculum and provide feedback on its content?
c. Are generic skills (e.g. communication, group working, IT) explicitly taught?
d. Are generic skills assessed?
e. Do students complete a skills matrix?
f. Are subject-specific skills taught and practiced?
g. Are subject-specific skills assessed?
h. Do academic staff identify students who are not numerate?
i. Do academic staff assess students' ability to write clear, concise, correct English?
j. Are key skills and employability issues in the relevant QAA benchmarking statement incorporated in your curriculum?

k. Are students given a choice of modules or choice of work areas within a module so they can tailor the content of their course to their perceived needs/interests?
l. Are appropriate professional attitudes developed and discussed with students?
m. Have work related learning activities taken place in the course and are these made explicit to students?
n. New Course have opportunities to increase work related learning in the course been identified and taken?
o. Are all students given a basic grounding in ethics within the discipline field?

7. Extra-curricula activity: Audit point has not been seriously considered at all (0), very limited evidence (1), partial evidence (2), Score satisfactory evidence (3), substantial evidence (4)

a. Is the contribution of extra-curricula activity to CV and skills development explained to students early in the course?
b. Are extra-curricula activities and responsibilities recorded by your students?
c. Are extra-curricula activities known to staff (e.g. personal tutors)?
d. Are arrangements in place to encourage voluntary work by students?
e. Most of these students will already be employed Are students made aware of and encouraged to enroll on the optional Module?
f. Are students made aware of and encouraged to participate in the Enterprise Week activities?

8. General: Audit point has not been seriously considered at all (0), very limited evidence (1), partial evidence (2), satisfactory evidence   Score (3), substantial evidence (4)

a. Is there an effective relationship between the course team and your Careers & Employment Service? (Where available)
b. Are students explicitly guided in the course to make contact with the Careers & Employment Service?
c. Are students encouraged to have confidence and high aspirations?
d. Do staff generally have access to full information about a student's in course and extra-curricula performance (e.g. student's CV) when writing references?

FOLLOW UP TO AUDIT:

Module pro-forma used to define the course content (example)

Module Title:	Climate Change Impacts and Adaptation		
Short Name:	FP		
Module Code:		Module Type (UG / PG):	PG
University Responsible:		Level (4, 5, 6, 7):	7
Valid From:	2021	Credit Points (normally 30):	20
Expected Length (normally 30 wks):	10	Semester (1, 2, 1 or 2 or year long):	1 or 2

Brief Description and Indicative Content

This module has been developed to enable participants to specialise in the field of resources management, prevention and monitoring. The module aims to develop their knowledge, expertise and understanding in the specific areas of resources, risk assessment, hazards risk key. The module will equip practitioners an essential working knowledge of the fuel combustion which may require referral to an exercise programme. Students will develop an understanding of the risk factor assessment process for environmental security and appreciate when to initiate effective communication with an organisation responsible for environment security management.

Intended Learning Outcomes

(no modification permitted until <enter date>)

On successful completion of the module, the student will be able to:

1. Interpret, evaluate and utilise research and specialist guidelines to inform practice, and instigate relevant conditions that support environmental hazards start.
2. Apply knowledge of wood fuel combustion likeness
3. Apply a comprehensive knowledge of the underlying terrain conditions in supporting likeability of environmental hazards incidence.

Assessment Regime

(*no modification permitted until <enter date>)

% Weighting*: (indicate if pass/fail, essential element or pass mark other than 40%)

The assessment includes a 2500-word essay (CW1) which will link to all 4 of the stated learning outcomes. The student will be asked to critically evaluate an aspect of their professional work in which they have personally been involved. They will be asked to analyse how they provided management recommendations to a client with potential environmental hazards incidence and contrast this with international guidelines and research. Within this scenario all 4 of the learning outcomes will need to be identified and the students understanding demonstrated. The assignment guidelines will make clear these requirements.

Output

IO: INDUSTRY 4.0 LEARNING PLATFORM EVALUATION

WWW.PARADOX.EU
Innovative Training Approach in the Technology Assisted Environment for Water

SUMMERIZE INFO

PROJECT TITLE:

Innovative Training Approach in the Technology Assisted Environment for Water Management-PARADOX

WP REFERENCE:

IO4

TASK REFERENCE:

O4.A4

PARADOX CONTACTS:

viakovoglou@yahoo.com & zaimesg@for.ihu.gr

AUTHORS AND AFFILIATION:

Valasia Iakovoglou & George N. Zaimes – International Hellenic University -GERi Lab

DATE:

December 2022

DOCUMENT VERSION 7 STATUS:

V.1

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1 SUMMARY – INDUSTRY 4.0 LEARNING PLATFORM EVALUATION

The aim of this activity was to design a Monitoring and Evaluation system for all learning contents developed in this project. It will allow partners involved to maintain a reflection upon whether they have met the strategic goals of this International Master Modules Programme. The Monitoring and Evaluation process will keep the project focused on the project beneficiaries and can assess whether they have developed the appropriate learning contents and the training paths.

This was done with a flexible approach allowing adjustments and enhancements in order to maximize the quality of the outcomes and increase the potential of the long-term impact. UNIPA at academic level, EVM, ACIF and EYEBB, at industry level, will evaluate and validate the developed learning content. This means that, any content which has been identified as requiring modifications or improvements will be alerted to the partners who will make the necessary amendments.

In addition, a questionnaire was prepared so the learning platform would be evaluated by member so the industry.

2 PARTICIPANTS OF THE QUESTIONNAIRE

DPE the lead on this intellectual output requested from, each partner to send a list with potential industry people relevant to the water sector that would review and provide feedback on the learning platform. Once the list was compiled the questionnaire was send to people on the list in order to assess it.

3 PARADOX INDUSTRY SURVEY - EVALUATION OF LEARNING COURSES

This report is providing information based on the questionnaire that was completed by stakeholder-representatives for the countries of Greece, Spain and Estonia. The questionnaire was comprised questions provided in table 1. The research outcome initially is presented for Greece, then for Spain, for Estonia as well as for all countries all data combined.

Table I. The related questions that were included at the questioner.

A/A	Questions
	Section A
1	**Type of organisation**
	1) Student, 2) International organisation, 3) Government organisation/ Unesco, 4) Free lancer, 5)VET centre, 6) University, 7)Entrepreneur, 8) Charitable sector, 9) NGO, 10) Government organisation, 11) Public, 12) Companyadministration, 13) SME
2	**Select your country of residence**
	Greece
	Spain
	Estonia
3	**Your expertise**
3.1	Other
3.2	Environment
3.3	Training and research
3.4	Industry
	Section B
4	**Should this subject be at an advanced level or a basic level? (Basic, Advanced)**
4.1	Surface and Ground Water Hydrology: Processes, Measurement and Modelling
4.2	Ecological Status
4.3	Water in Cities and Catchments
4.4	Climate Change Assessment
4.5	Water management Legislation
4.6	Social impact of climate change
4.7	Workplace, leadership & personal effectiveness competences
	Section C
5	**What is your view on any of the following being included in a Master Degree for the water management sector? (Yes, No, Maybe)**
5.1	Quality Assurance and Blockchain algorithms
5.2	Soft skills
5.3	Fundamentals of standards – regulatory and technical
5.4	Fundamentals of health/safety/environment laws/risk management
5.5	Fundamentals of enabling technology applications
5.6	Fundamentals of setting up a business - Entrepreneurship
6	**Please state – any other competence(s) that should be included / or any comments you may have: (None, Safety)**
7	**Do you want to receive more information and updates about our project? (Yes, No)**

3.1 Summary of the responses from the surveys based on the Greek participants

Greek participates

Section A

Following are the results based on stakeholders of Greek citizenship. From those, 30% represented a "Government organization, followed by 20% of NGO and a 20% of university representatives (Figure 1). The rest of the 30% participants (10% each) were from "International organizations", UNESCO" and free lancers. From the participants, 70% indicated that they were experienced in environmental issues and 30% in training and research (Figure 2).
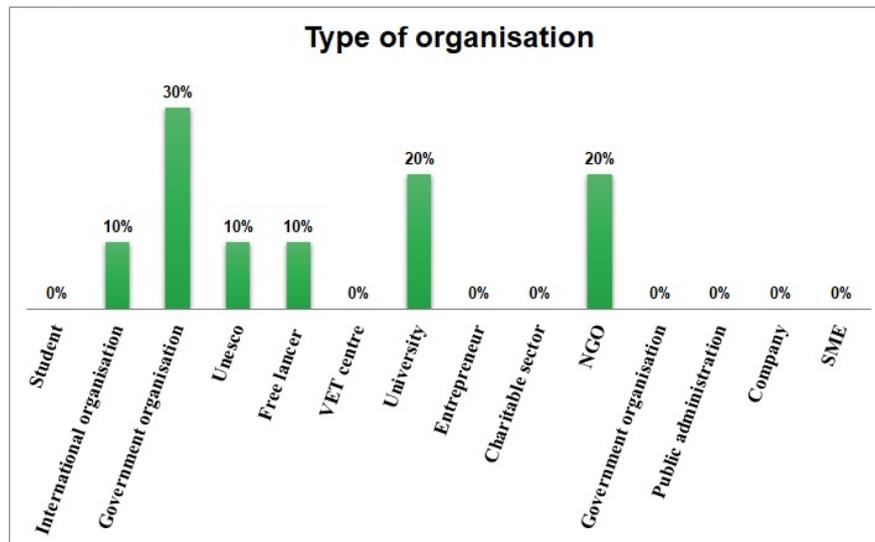

Figure 1. Type of the organization of the participants.

Figure 2. The experience of the participants.

Section B

Based on the evaluation of the stakeholders whether the courses should be offered as "Basic" or "Advanced" level, the results were the following. For the course of "Surface and Ground Water Hydrology: Processes, Measurement and Modelling", 90% indicated that they suggested that it should be considered as "Advanced" and only 10% as "Basic" (Figure 3). For the course of "Ecological Status" showed a 50% that it should be characterized as "Advanced" and a 50 % as "Basic" (Figure 4). For the course of "Water in cities and catchments" there was a 40% that it should be characterised as "Basic", while 60% believes it should be noted as "Advanced" (Figure 5). For the course "Climate Change Assessment", the stakeholders strongly believed that it should be characterized as "Advanced" based on a 90% response (Figure 6). Similar to the course Water in cities and catchments", 60% of the stakeholder responded that the courses "Water management Legislation" and

"Social impact of Climate Change" should be characterized as "Advanced" (Figure 7 and Figure 8, respectively). Finally, the course "Workplace, leadership and personal effectiveness competences" was preferred to be characterized as "Advanced with a 60% response (Figure 9).
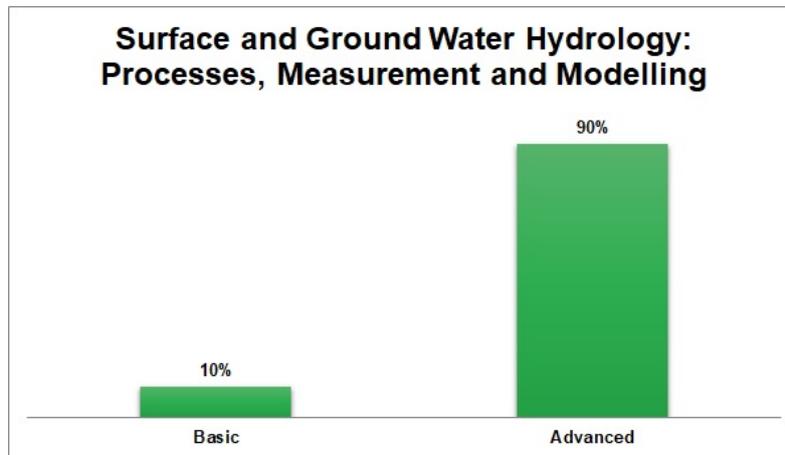
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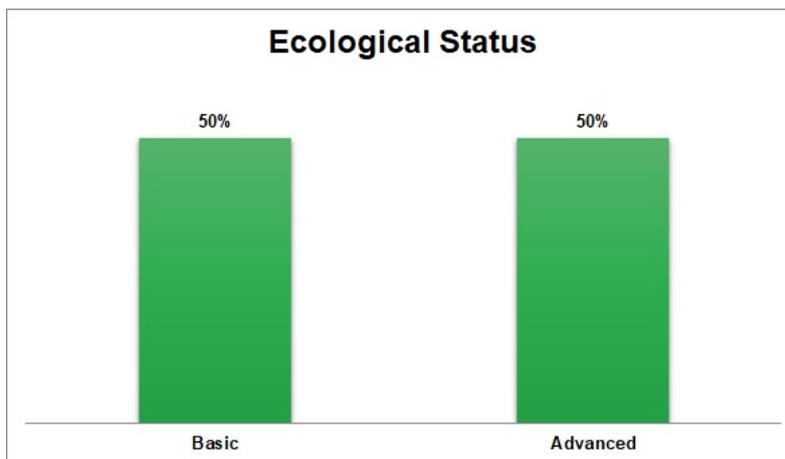
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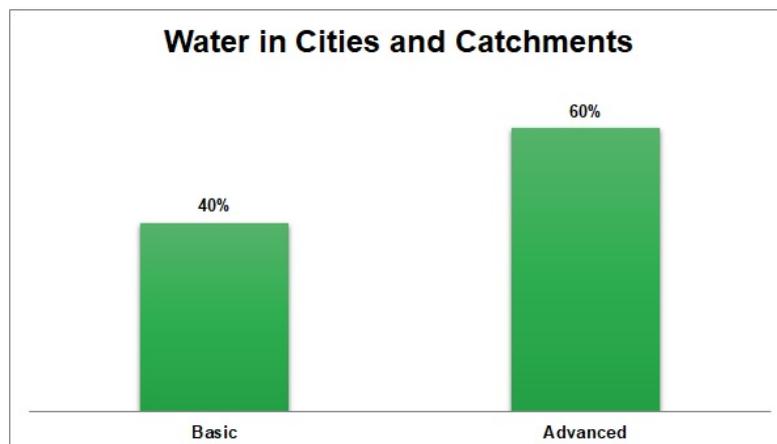
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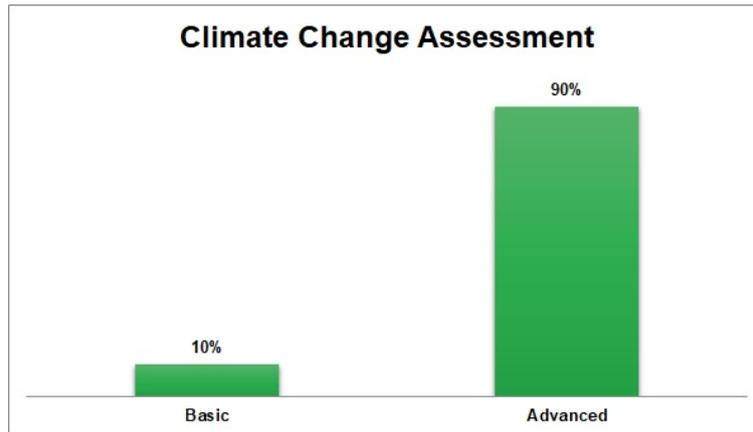
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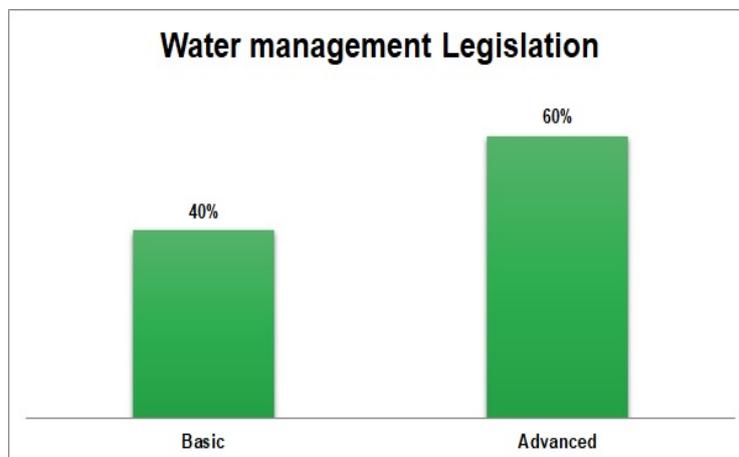
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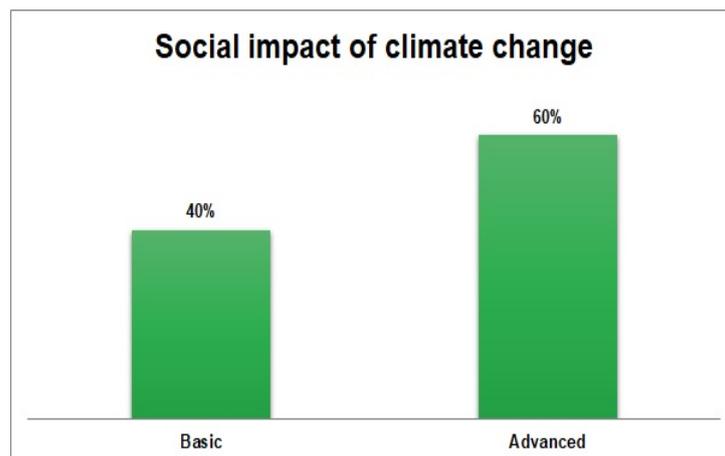

Figure 8. The preference of the stakeholders for the course "Social impact of Climate Change" as "Basic" or "Advanced" course.

Figure 9. The preference of the stakeholders for the course "Workplace, leadership and personal effectiveness competences" as "Basic" or "Advanced" course.

Section C

For this part of the questioner, the participants were asked "What is your view on any of the following being included in a Master Degree for the water management sector?" So based on the suggested topics they expressed their opinion based on "yes", "no" or "maybe" options. Specifically for the topic "Quality Assurance and Blockchain algorithm" the results revealed a 50% that they want this topic and 50% they are not sure (Figure 10). For the topic "Soft skills" a 40% of the participants replied with "yes", a 30% "no" and another 30% "maybe" (Figure 11), while for the topic "Fundamental of standards-regulatory and technical" all participants (100%) replied "yes" (Figure 3). For both the topics "Fundamental of health/safety/environment/laws/risk management" and "Fundamentals of enabling technology applications", the participants wanted those topics with a 90% and only a 10% was not sure (Figure 13 and Figure 14). Finally for the topic "Fundamentals of wetting up a business-Entrepreneurship" a 60% replied "maybe", a 30% "yes" and a 30% "no". The 70% of the participants had no moments to add, while the 30% suggested that a topic related to "safety" should be included (Figure 16). It was great to be noted that all participants wanted to be receive and be informed regarding the progress and the updates of the project (Figure 16).
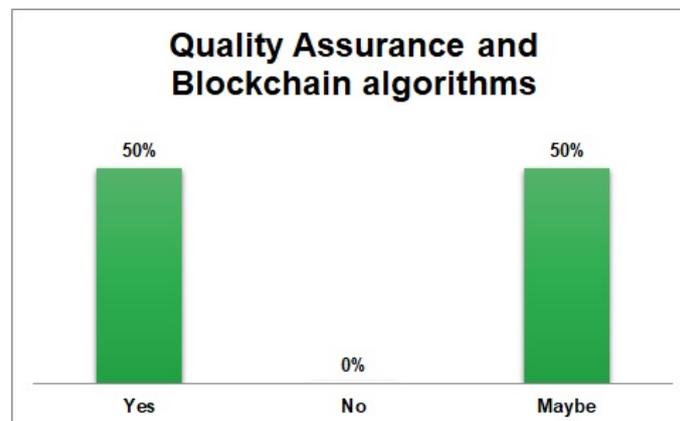
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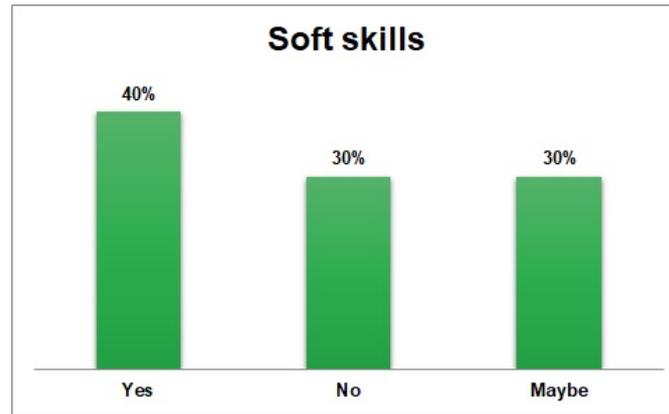
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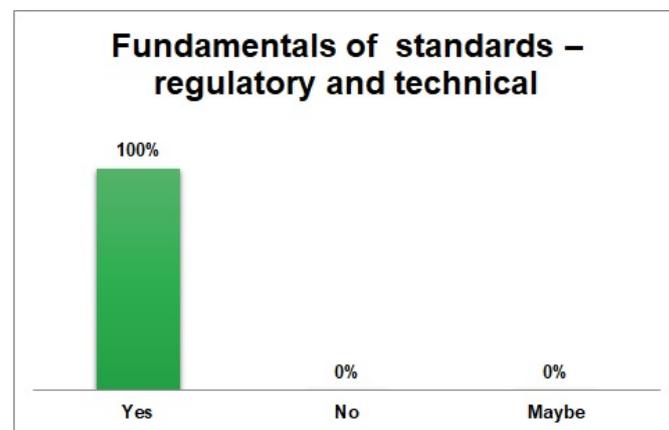
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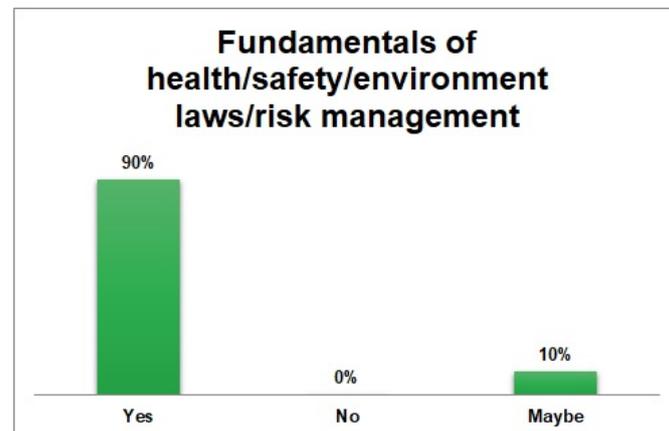
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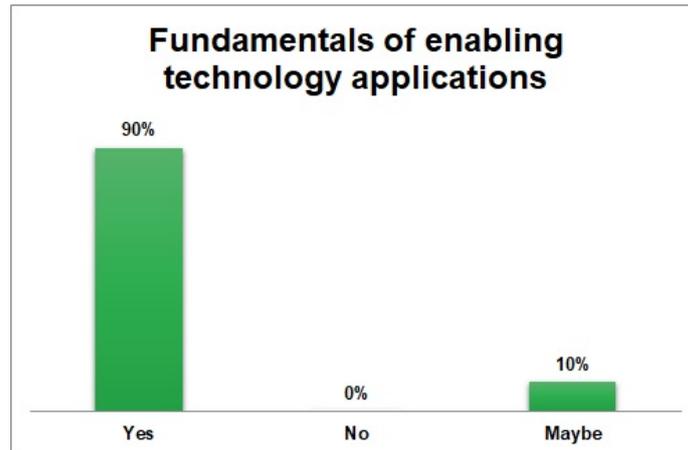
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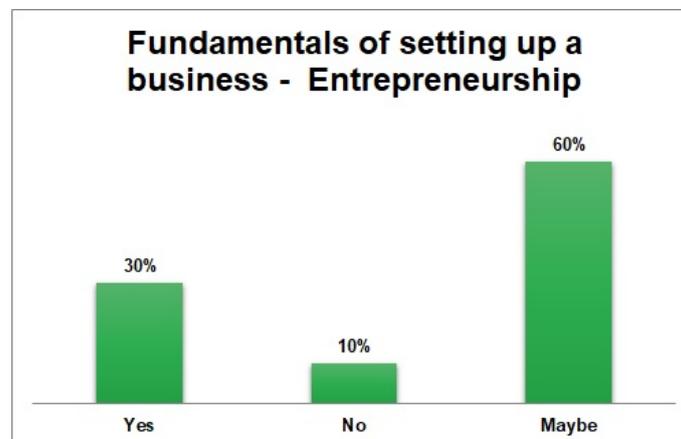
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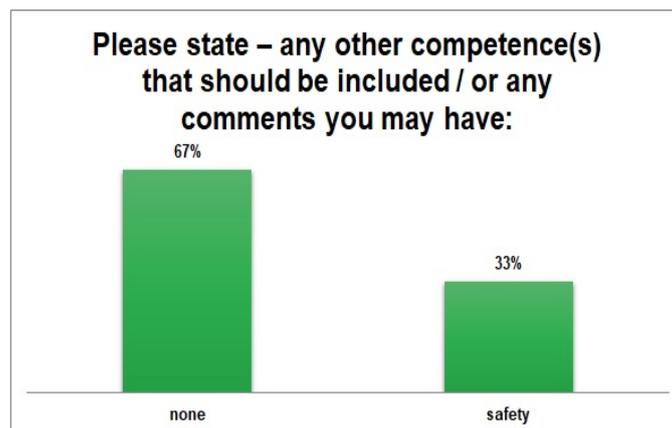
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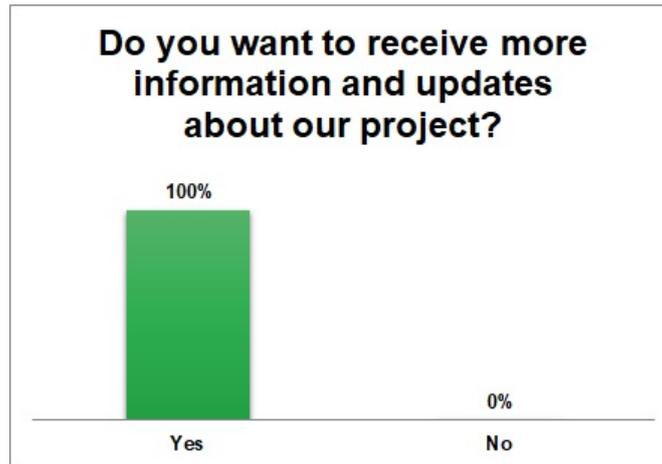
Figure 17. Results based whether the participants want to receive any more information or updates related to the project.

3.2 Summary of the responses from the surveys based on the Spanish participants

Section A & B

Following are the results based on stakeholders of Spanish citizens. Specifically, 31% of the participants were working at a public administration post, followed by 23% of stakeholders working at private company and another 23% at an SME. An 8% was reached by participants with "governmental" position, "Environmental engineers" and "university" representatives (figure 11). From the participants 92% were experienced in environmental issues and only 8% were expertise in training and research (Figure 12).
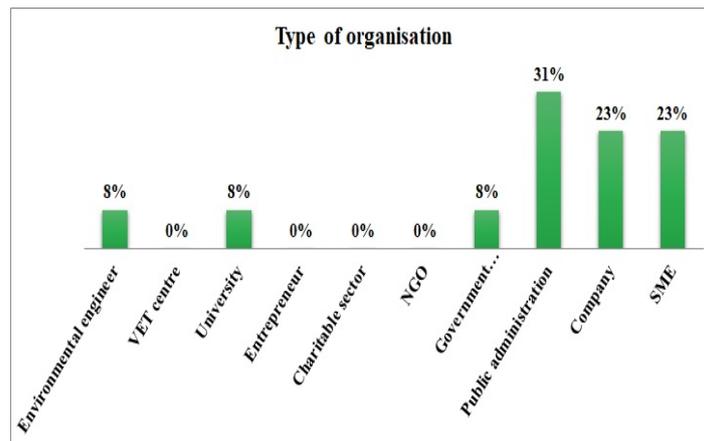
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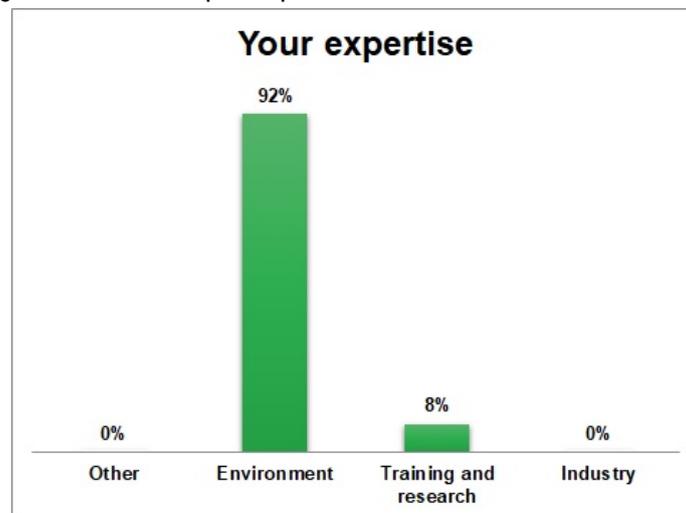
Figure 12. The experience of the participants.

Section B

Based on the evaluation of the stakeholders whether the courses should be offered as "Basic" or "Advanced" level, the results reviled that for the course of "Surface and Ground Water Hydrology: Processes, Measurement and Modelling" all of the participants (100%) indicated that it should be considered as "Advanced" (Figure 13). For the course of "Ecological Status" the result indicated a 92 % that it should be characterized as "Advanced" and only an 8% as "Basic" (Figure 14). For the course of "Water in cities and catchments" 85%of the participants thought that it should be characterised as "Advanced", and the rest 15% that it should be noted as characterized as "Basic" (Figure 15). For the course "Climate Change Assessment", 62% of the stakeholders believed that it should be characterized as "Advanced" and the rest 38% as "Basic" (Figure 16). Further, for the course "Water management Legislation", 54 % thought that it should be a "Basic" course and 46% as "Advanced" (Figure 17). Further, the stakeholder responded with a 70% that the course of "Social impact of Climate Change" should be

"Advanced" (Figure 18). Finally, the course "Workplace, leadership and personal effectiveness competences" was preferred to be characterized as "Advanced with a 54% response (Figure 19).
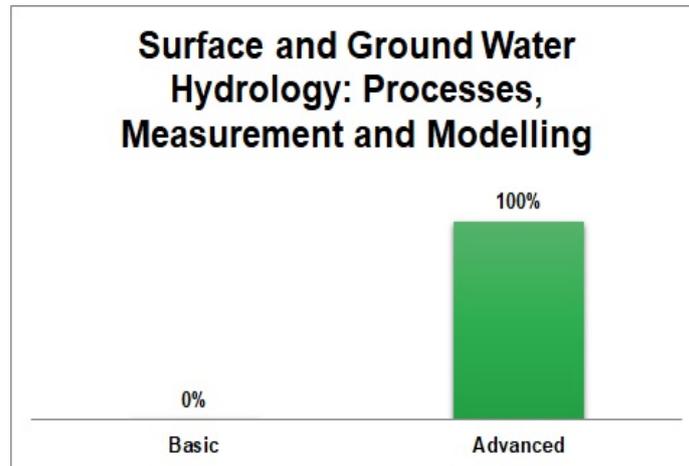
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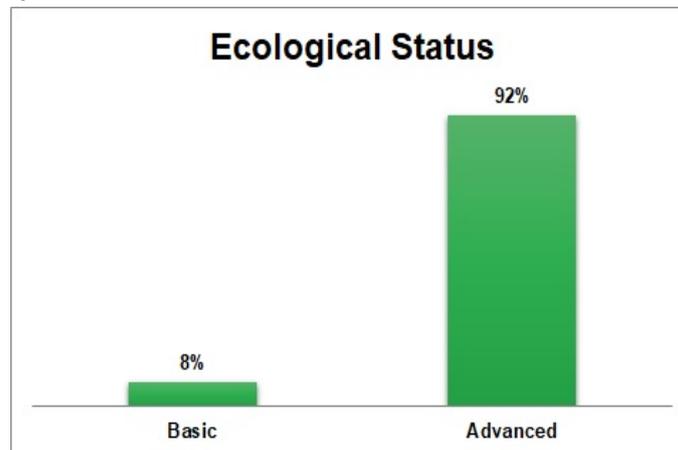
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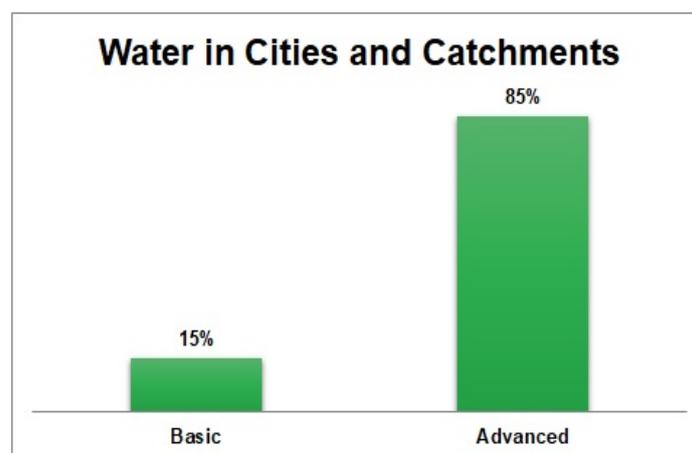
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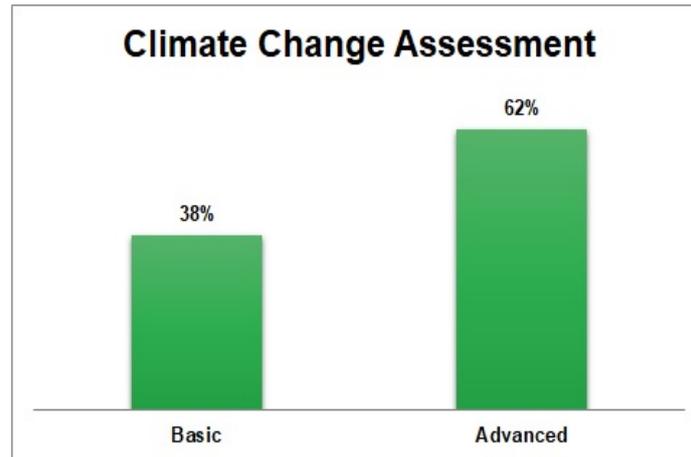
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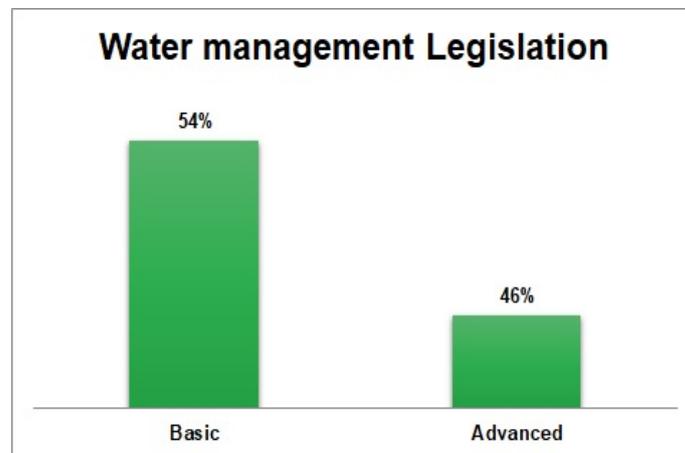
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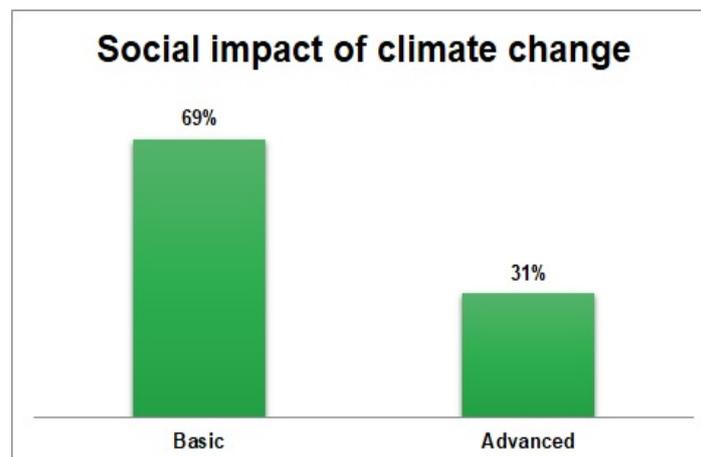
Figure 18. The preference of the stakeholders for the course "Social impact of Climate Change" as "Basic" or "Advanced" course.

Figure 19. The preference of the stakeholders for the course "Workplace, leadership and personal effectiveness competences" as "Basic" or "Advanced" course.

Section C

For this part of the questioner, the participants were asked "What is your view on any of the following being included in a Master Degree for the water management sector?" So based on the suggested topics they expressed their opinion based on "yes", "no" or "maybe" options. Specifically for the topic "Quality Assurance and Blockchain algorithm" the results revealed a 46% that "maybe" they want this topic, 31% they do and 23% they do not want it (Figure 20). For the topic "Soft skills" 69% replied with "yes", a 23% "maybe" and another 8% "no" (Figure 21). Similarly for the topic "Fundamental of standards-regulatory and technical" 77% replied with "yes", a 19% "maybe" and another 8% "no" (Figure 22). For both the topics "Fundamental of health/safety/environment/laws/risk management" and "Fundamentals of enabling technology applications", the participants wanted those topics with an 85% and 69%, respectively saying "yes" and a 15% and 31%, respectively saying "maybe" (Figure 23 and Figure 24). only a 10% was not sure (Figure 13 and Figure 14). Finally for the topic "Fundamentals of setting up a business-Entrepreneurship" a 54% replied "yes" and a 46% "maybe" (Figure 25). All participants (100%) noted that machine learning applied methods to hydrological data analysis should be included (Figure 26). Iin the end, a 54% of the participants noted that would like to receive more information and further updates regarding the progress of the project (Figure 27).
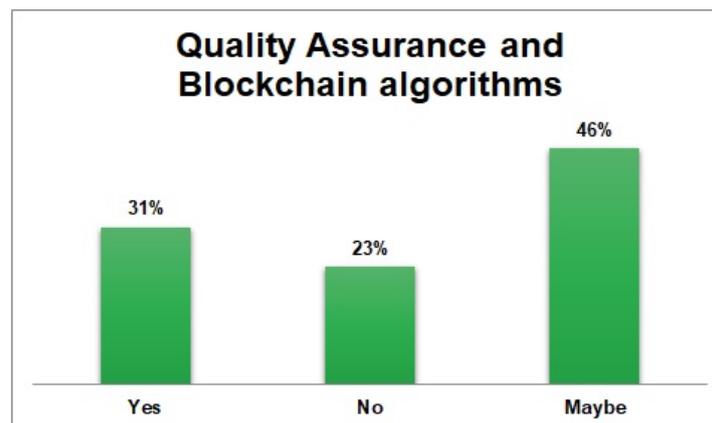
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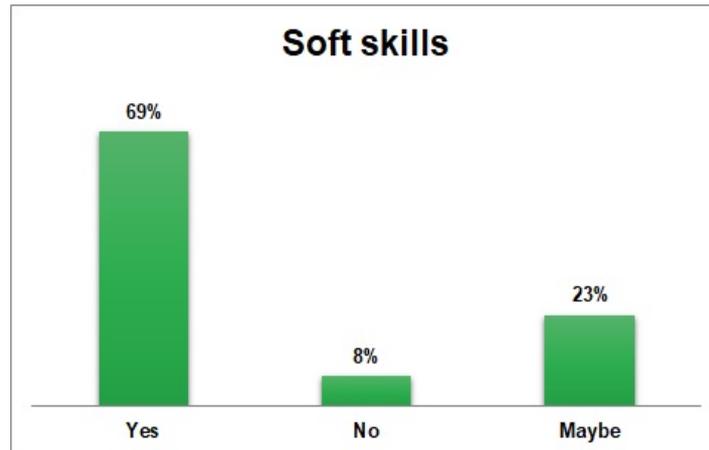
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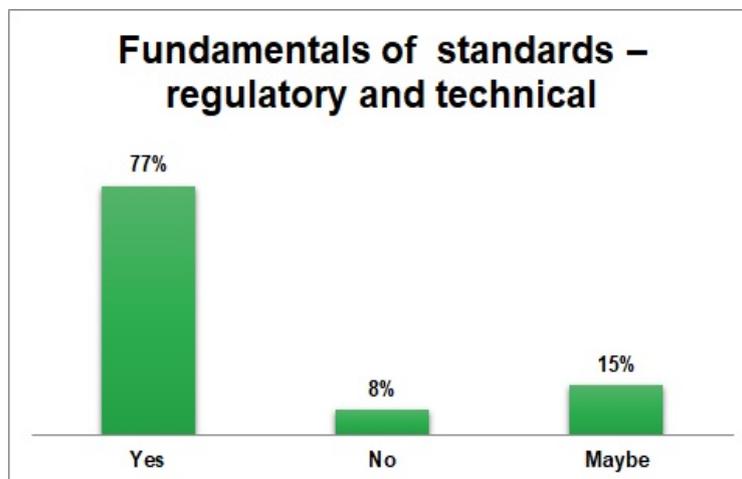
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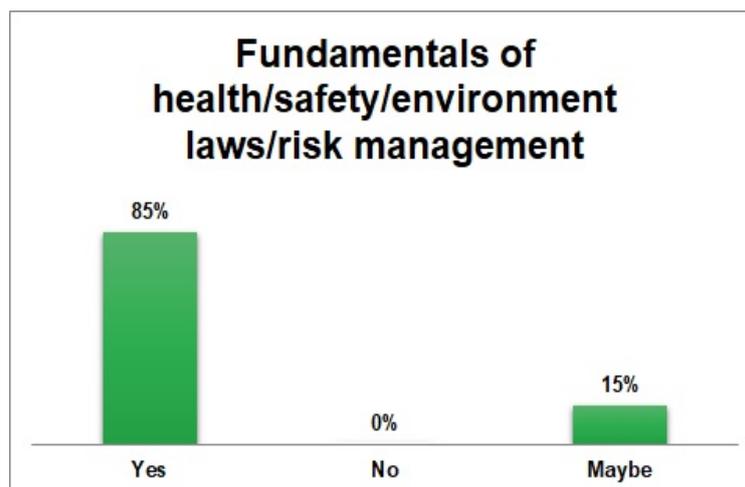
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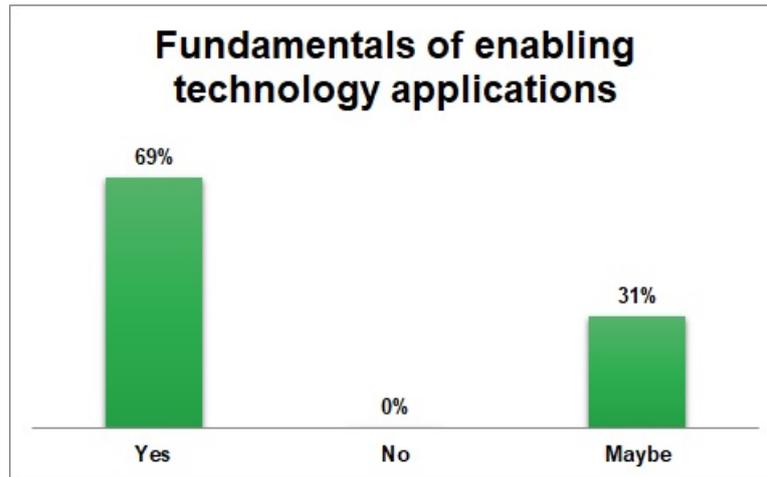
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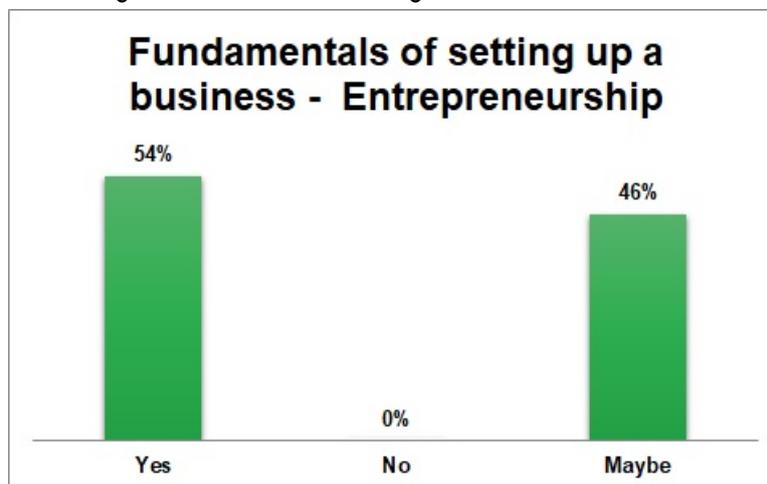
Figure 25. The preference of the participants for the topic "Fundamentals of σsetting up a business-Entrepreneurship" to be included at a water management sector Master Degree.
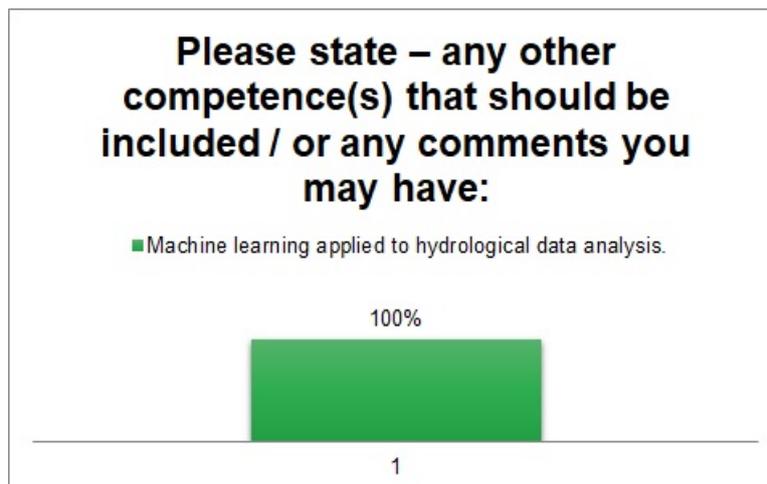
Figure 26. The results on any competence(s) or comments that the participants had based on the questioner.
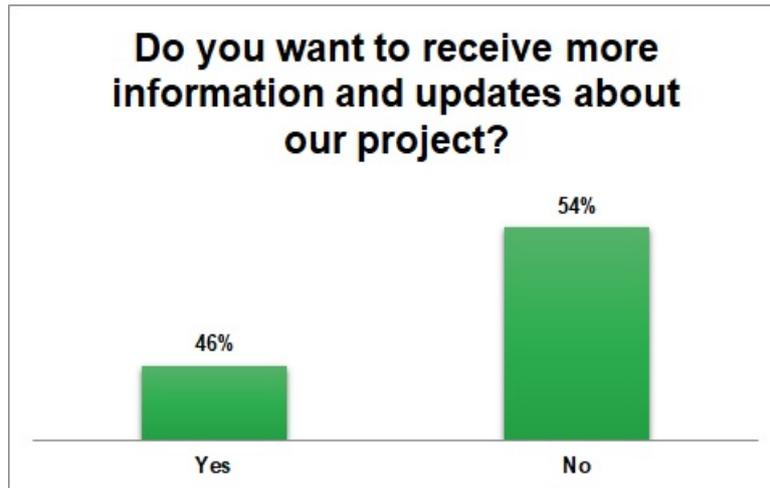
Figure 27. Results based whether the participants want to receive any more information or updates related to the project.

3.3 Summary of the responses from the surveys based on the Esthonian participants

Section A

Based on the results the Estonian stakeholders that filled questioner, 40% were working at a company, 20 % at university, another 20 % at NGOs and another 20% at SME (Figure 28). From the participants 80% noted that they are experts in environmental issues, while the 20% were expertise in training and research (Figure 29).
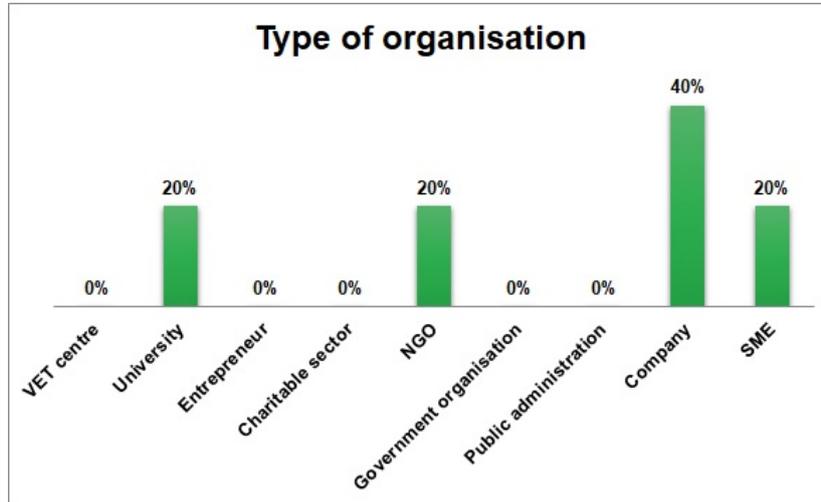
Figure 28. Type of the organization of the participants.

Figure 29. The experience of the participants.

Section B

Based on the evaluation of the stakeholders whether the courses should be offered as "Basic" or "Advanced" level, the results revealed that for the course of "Surface and Ground Water Hydrology: Processes, Measurement and Modelling", the course of "Ecological Status" and "Water in cities and catchments" all of the participants (100%) indicated that they should be considered as "Advanced" (Figure 30, 31, 32). For the course "Climate Change Assessment", 60% of the stakeholders believed that it should be characterized as "Basic" and the rest 40% as "Advanced" (Figure 33). Further, for the course "Water management Legislation", 100 % of the participants thought that it should be an "Advanced" (Figure 34). Further, the stakeholder responded with a 60% that the course of "Social impact of Climate Change" should be "Basic" (Figure 35). Finally, the course "Workplace, leadership and personal effectiveness competences" was preferred to be characterized as "Advanced with a 60% response (Figure 36).
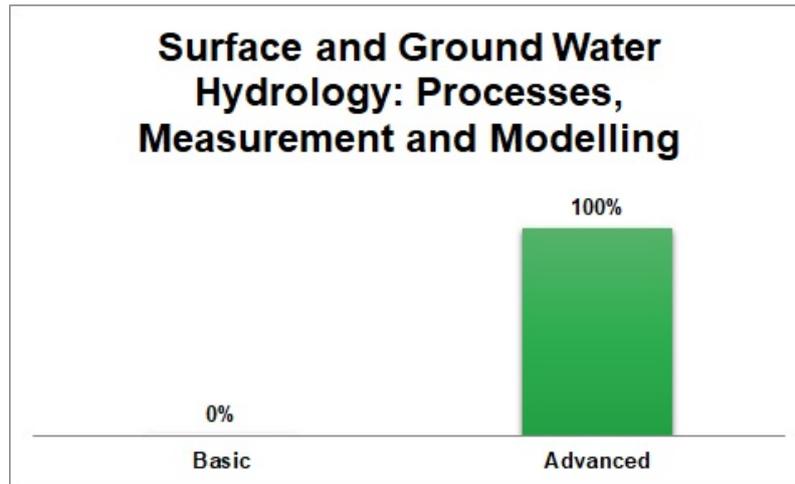
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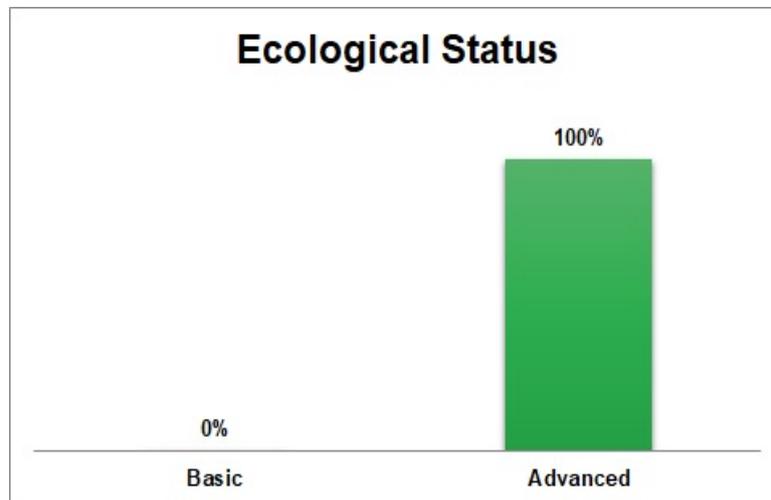
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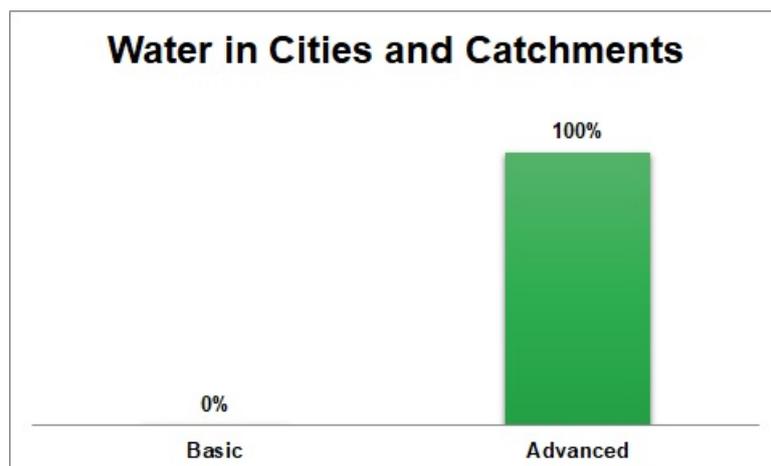
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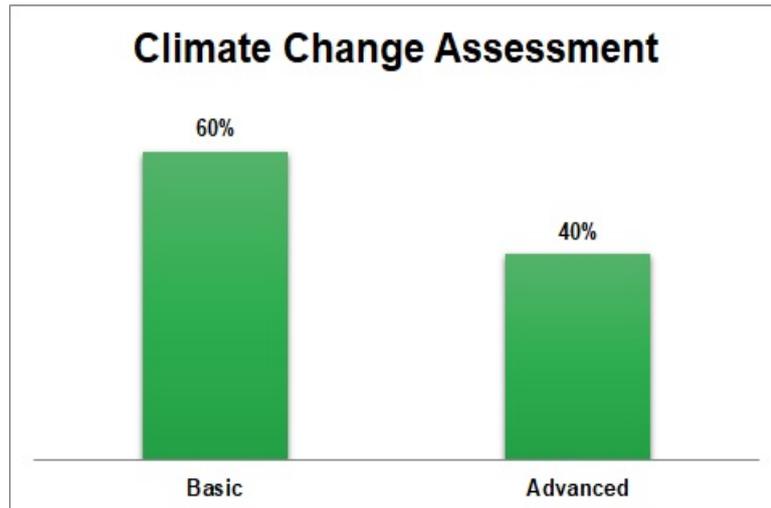
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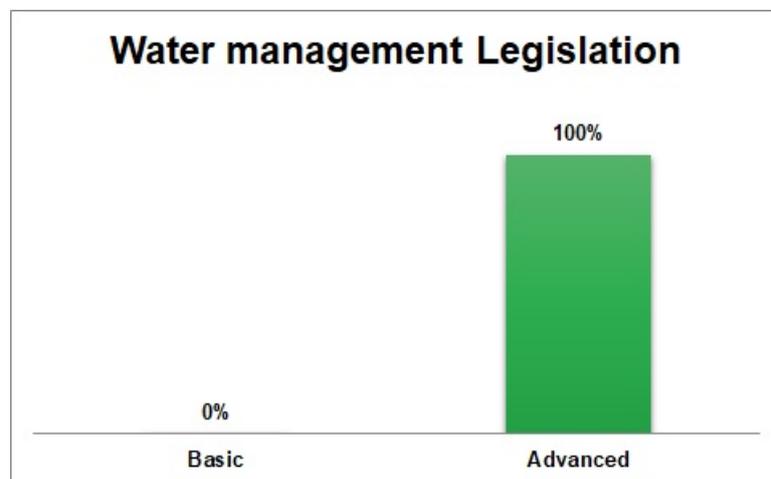
Figure 34. The preference of the stakeholders for the course "Water management Legislation" as "Basic" or "Advanced" course.
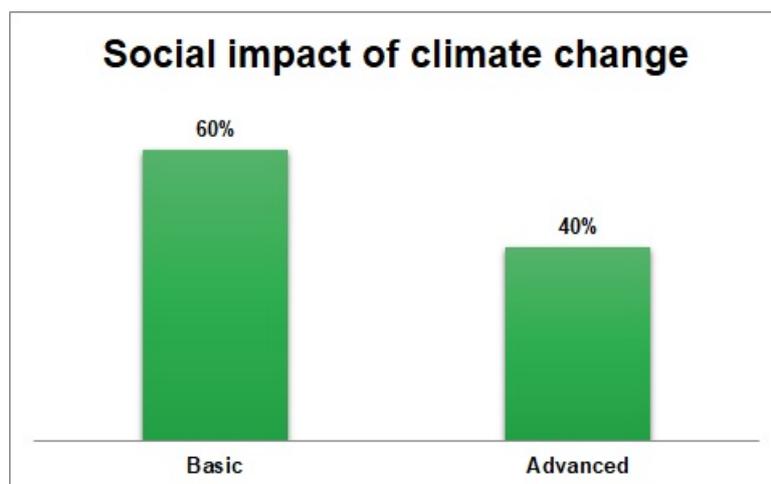
Figure 35. The preference of the stakeholders for the course "Social impact of Climate Change" as "Basic" or "Advanced" course.

Figure 36. The preference of the stakeholders for the course "Workplace, leadership and personal effectiveness competences" as "Basic" or "Advanced" course.

Section C

For this part of the questioner, the participants were asked "What is your view on any of the following being included in a Master Degree for the water management sector?" So based on the suggested topics they expressed their opinion based on "yes", "no" or "maybe" options. Specifically for the topic "Quality Assurance and Blockchain algorithm", the results revealed an 80 % "yes" indicating that they want this topic and 20 % they "maybe" want it (Figure 37). For "Soft skills" 60% replied "yes" and a 40% "maybe" (Figure 38). Further for the topic "Fundamental of standards-regulatory and technical" all participants (100%) replied "yes" (Figure 39). For both the topics "Fundamental of health/safety/environment/laws/risk management" 80% replied that they want it as a course and 20% "maybe" (Figure 40), while for the "Fundamentals of enabling technology applications" all participants (100%) responded with "yes" (Figure 41). Finally, for the topic "Fundamentals of setting up a business-Entrepreneurship" 80 % replied "yes" and a 20% "maybe" (Figure 42). All participants (100%) did not include any competences that should be included (Figure 43), while only 20% replied that they would like to receive more information and further updates regarding the progress of the project (Figure 44).
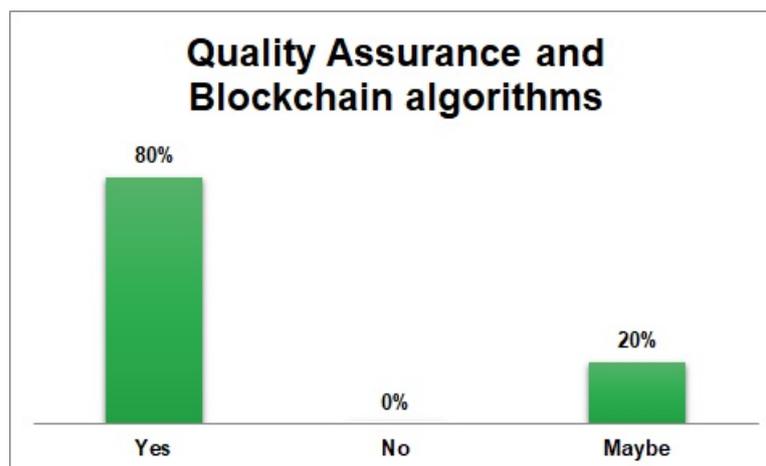
Figure 37. The preference of the participants for the topic "Quality Assurance and Blockchain algorithms" to be included at a water management sector Master Degree.
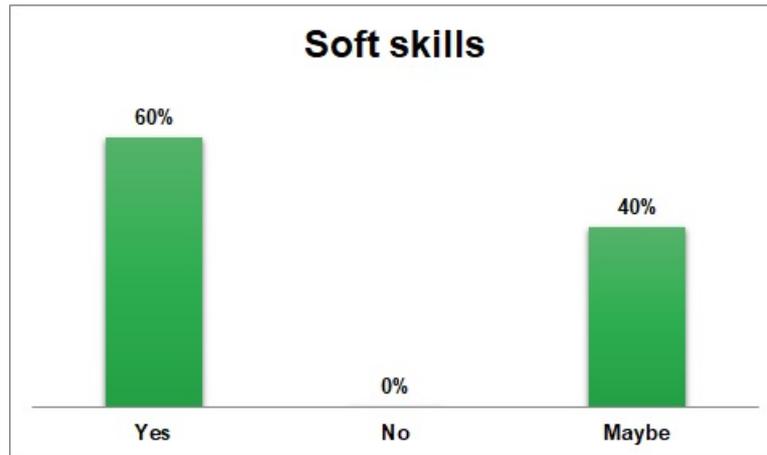
Figure 38. The preference of the participants for the topic "Soft skills" to be included at a water management sector Master Degree.
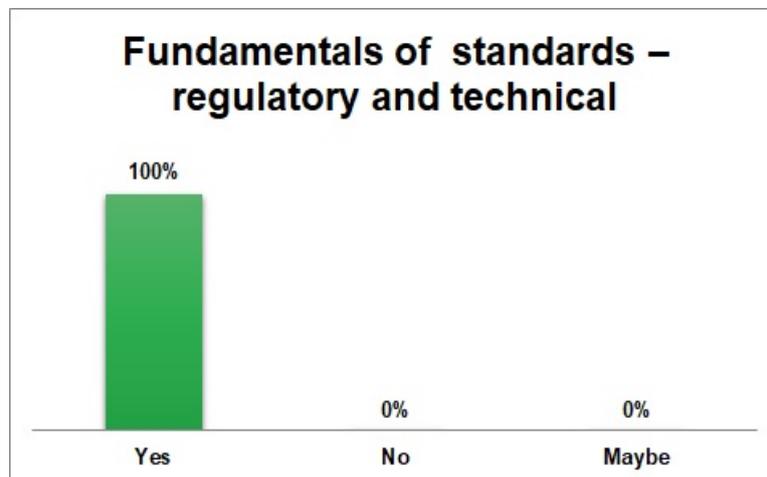
Figure 39. The preference of the participants for the topic "Fundamental of standards-regulatory and technical" to be included at a water management sector Master Degree.
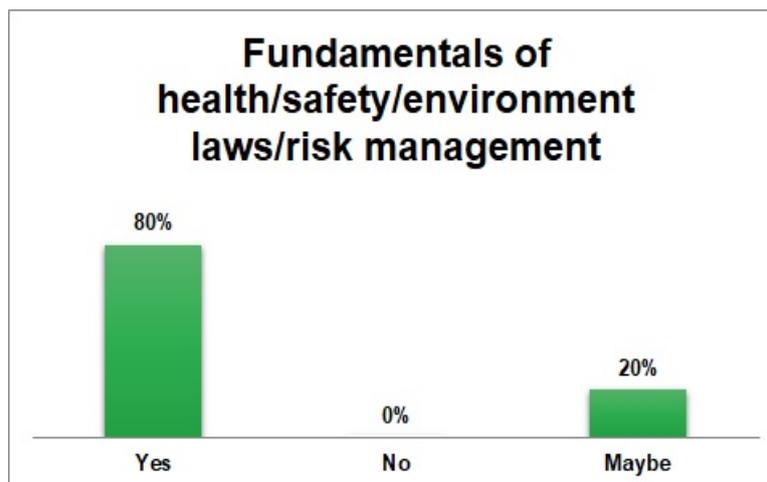

Figure 40. The preference of the participants for the topic "Fundamental of health/safety/environment/laws/risk management" to be included at a water management sector Master Degree.
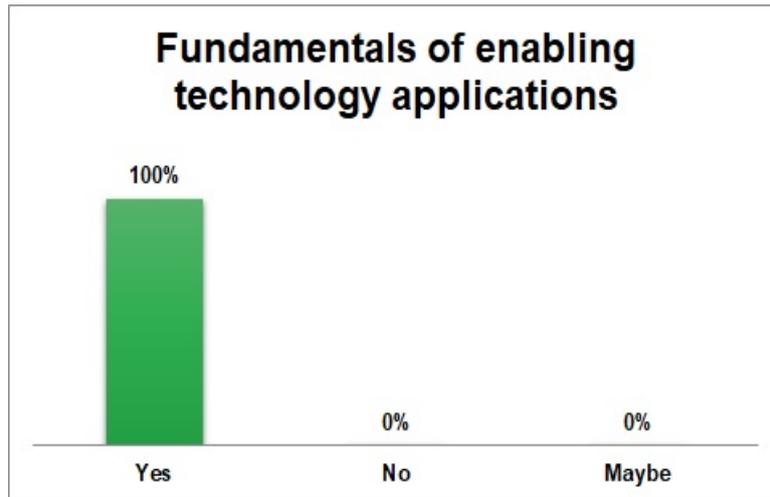
Figure 41. The preference of the participants for the topic "Fundamentals of enabling technology applications" to be included at a water management sector Master Degree.
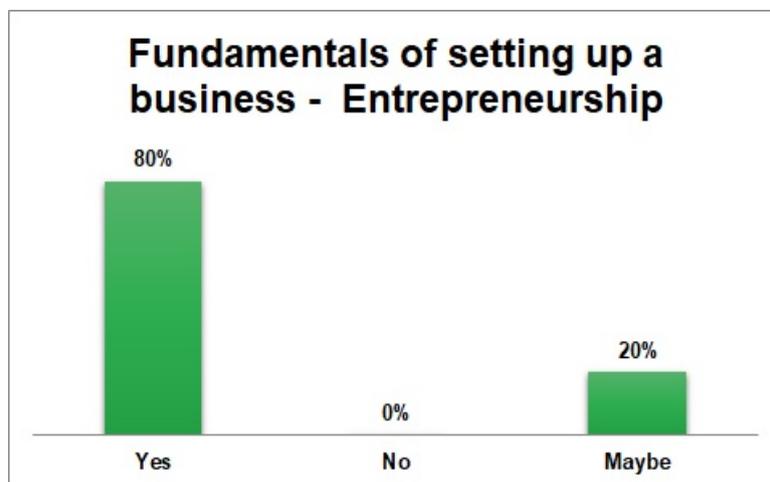
Figure 42. The preference of the participants for the topic "Fundamentals of wetting up a business-Entrepreneurship" to be included at a water management sector Master Degree.
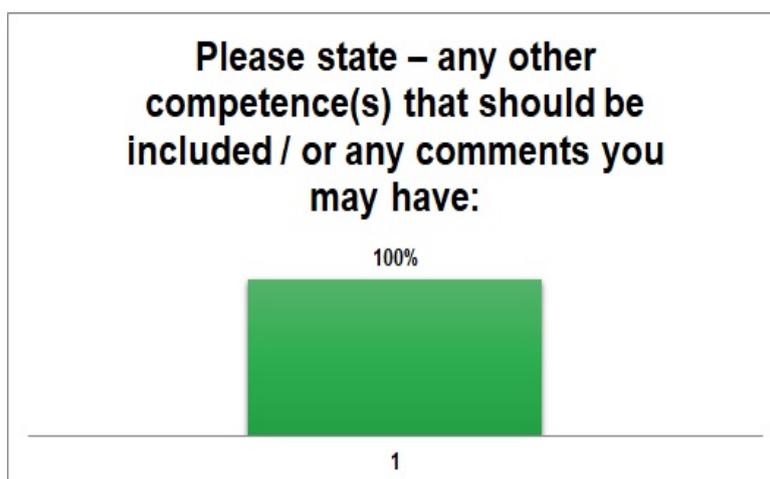
Figure 43. The results on any competence(s) or comments that the participants had based on the questioner.
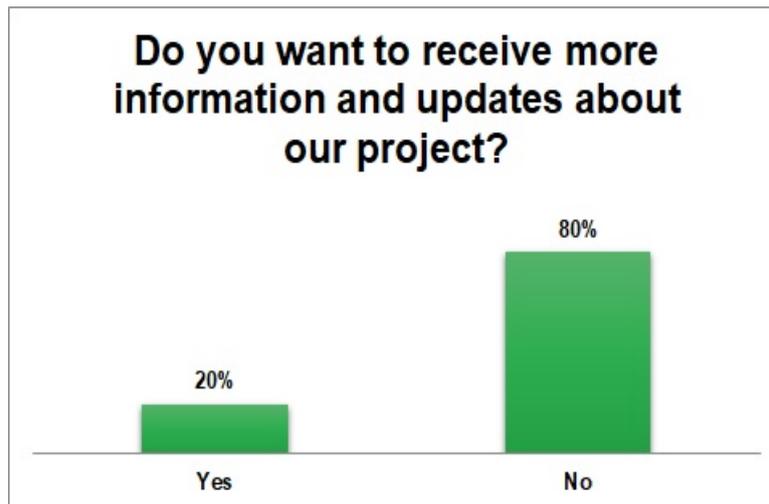
Figure 44. Results based whether the participants want to receive any more information or updates related to the project.

3.4 Summary of the responses from the surveys based on all participants

The countries that participated at this survey were Greece, Spain and Estonia. The percent of each country can be seen in Figure 45. Greece comes first with a 46% that is followed by Spain (25%) and then by Estonia. (18%).
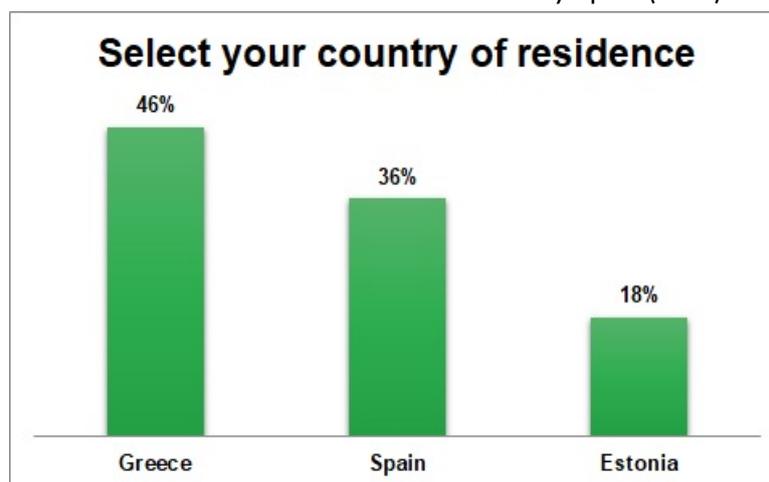
Figure 45. Percent of participants by country.

Section A
Based on the results for all countries (Greece, Spain and Estonia) revealed that 18% of the stakeholders were working at ta company, 14% were from a government organisation, public administration, SME and university professions. An 11% were from an NGO and a 16 % (4%, each) were Environmental Engineers, an international organization, free lancers and UNESCO representatives (Figure 46). From the participants 82% noted that they are experts in environmental issues, while 18% were expertise in training and research (Figure 47).
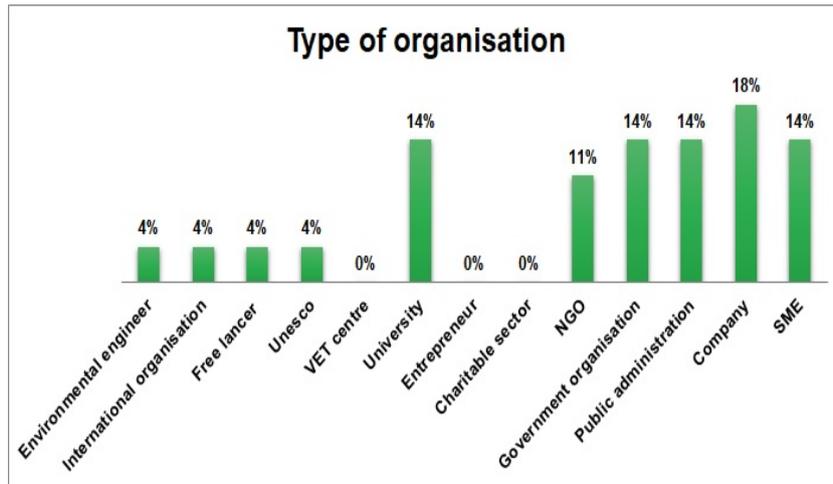
Figure 46. Type of the organization of the participants.

Figure 47. The experience of the participants.

Section B

Based on the evaluation of the stakeholders whether the courses should be offered as "Basic" or "Advanced" level, the results revealed that for the course of "Surface and Ground Water Hydrology: Processes, Measurement and Modelling", 93% considered that it should be "advanced" and only 7% as "basic" (Figure 48). For the "Ecological Status" and "Water in cities and catchments" that precent was also high for the "advanced" preference reaching a 79% and the "basic" a 21% (Figure 49, Figure 50). For the course "Climate Change Assessment" and Water management Legislation", 68% of the stakeholders believed that it should be characterized as "Advanced" and the rest 32% as "Basic" (Figure 51, Figure 52). Further, the stakeholder responded with a 54% that the course of "Social impact of Climate Change" should be "Basic" (Figure 53). Finally, the course "Workplace, leadership and personal effectiveness competences" was preferred to be characterized as "Advanced and "Basic" with a 50% response (Figure 54).
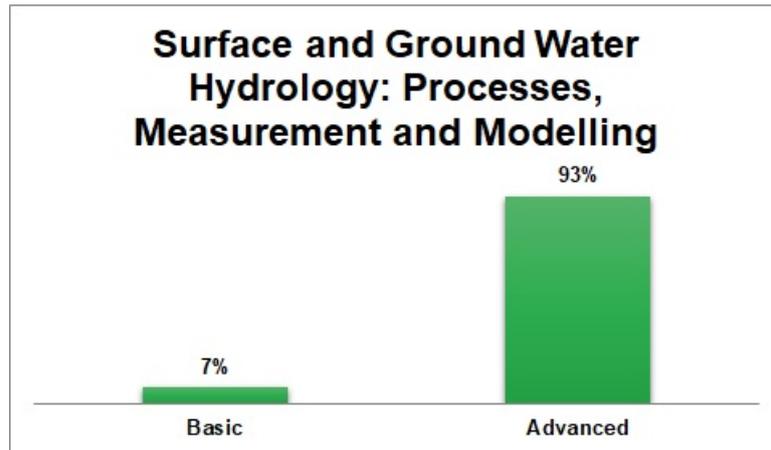
Figure 48. The preference of the stakeholders of the course "Surface and Ground Water Hydrology: Processes, Measurement and Modelling" as "Basic" or "Advanced" level.
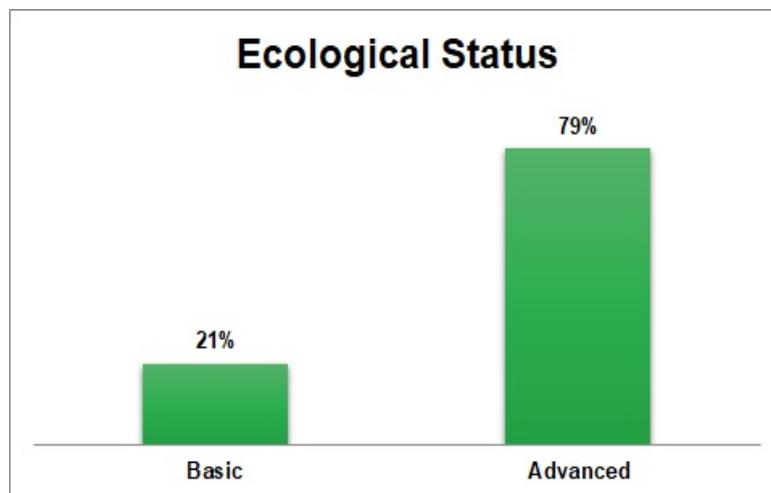

Figure 49. The preference of the stakeholders of the course "Ecological Status" as "Basic" or "Advanced" course.
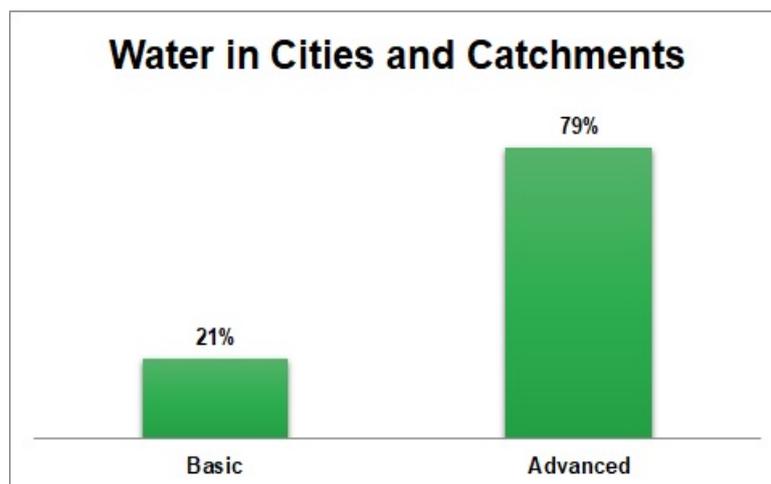

Figure 50. The preference of the stakeholders of the course "Water in cities and catchments" as "Basic" or "Advanced" course.
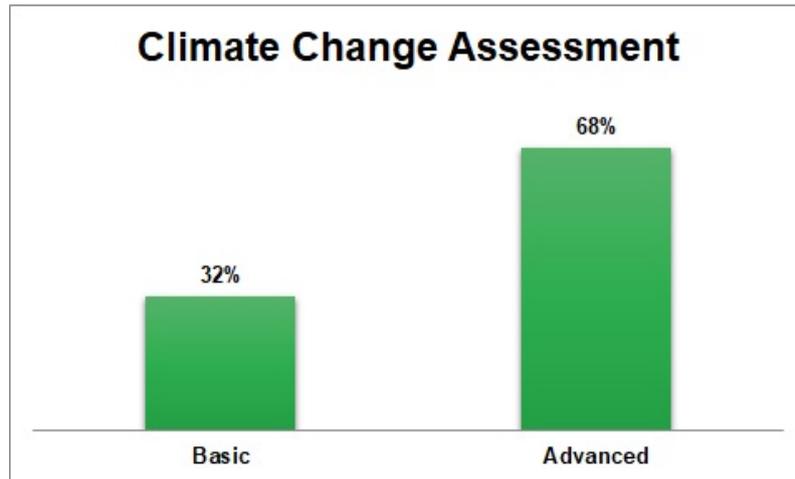
Figure 51. The preference of the stakeholders for the course "Climate Change Assessment" as "Basic" or "Advanced" course.
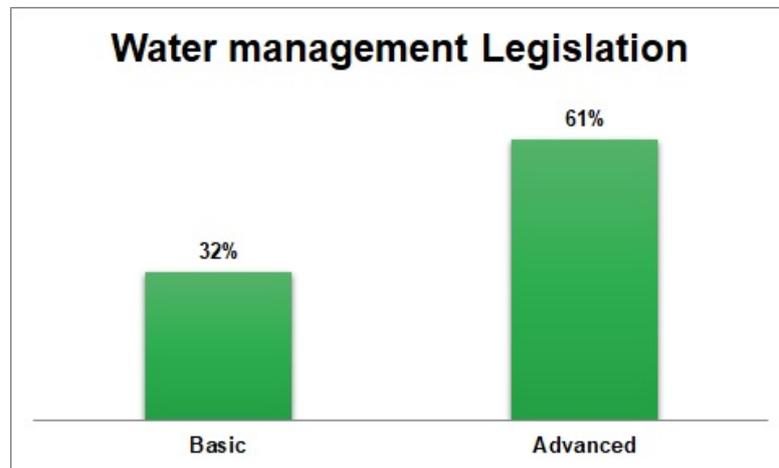

Figure 52. The preference of the stakeholders for the course "Water management Legislation" as "Basic" or "Advanced" course.
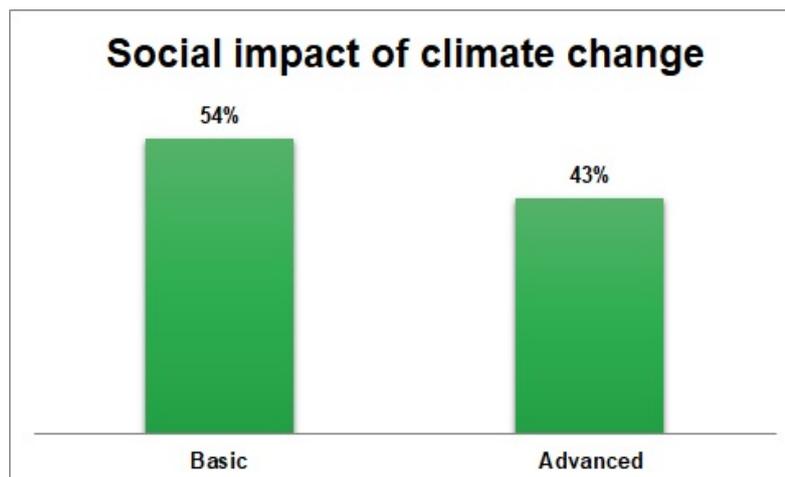

Figure 53. The preference of the stakeholders for the course "Social impact of Climate Change" as "Basic" or "Advanced" course.

Figure 54. The preference of the stakeholders for the course "Workplace, leadership and personal effectiveness competences" as "Basic" or "Advanced" course.

Section C

For this part of the questioner, the participants were asked "What is your view on any of the following being included in a Master Degree for the water management sector?" So based on the suggested topics they expressed their opinion based on "yes", "no" or "maybe" options. Specifically for the topic "Quality Assurance and Blockchain algorithm" the results revealed an 46 % that "maybe" they want this topic, 43 % it isa "yes" and only a 7% is a "no" (Figure 55). For the topic "Soft skills", 57% replied with "yes", a 29% "maybe" and a 7% "no"(Figure 56). Further for the topic "Fundamental of standards-regulatory and technical", 98% of the participants replied "yes" and a 4% "maybe" (Figure 57). For both the topics "Fundamental of health/safety/environment/laws/risk management" 86% replied that they want it as a course and 14% "maybe" (Figure 58), while for the "Fundamentals of enabling technology applications" 82% participants responded with "yes" (Figure 59). Finally for the topic "Fundamentals of setting up a business-Entrepreneurship" 50 % replied "yes", 46% "maybe" and 4% "no" (Figure 60). When the participants were asked if they had any additional competences or any comments of the participants, 40% replied that they had no comments, 20% they suggested Ecology, another 20% Safety and another 20% machine learning (Figure 61). Finally, a 61% replied that they would like to receive more information and further updates regarding the progress of the project (Figure 62).
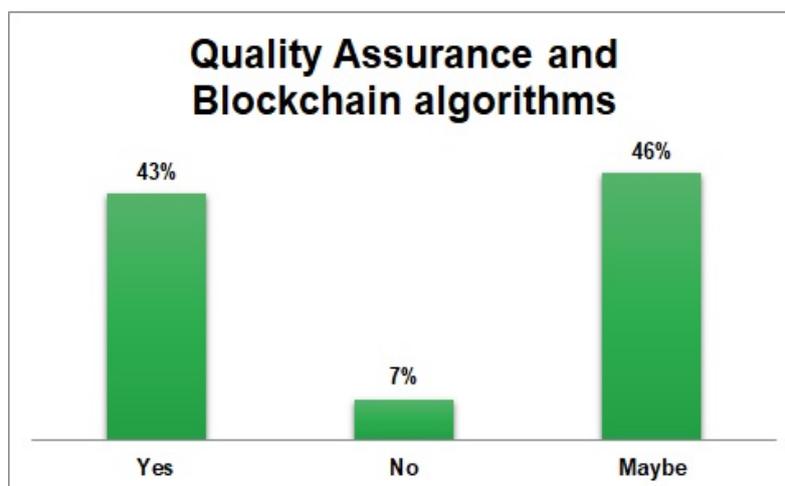

Figure 55. The preference of the participants for the topic "Quality Assurance and Blockchain algorithms" to be included at a water management sector Master Degree.
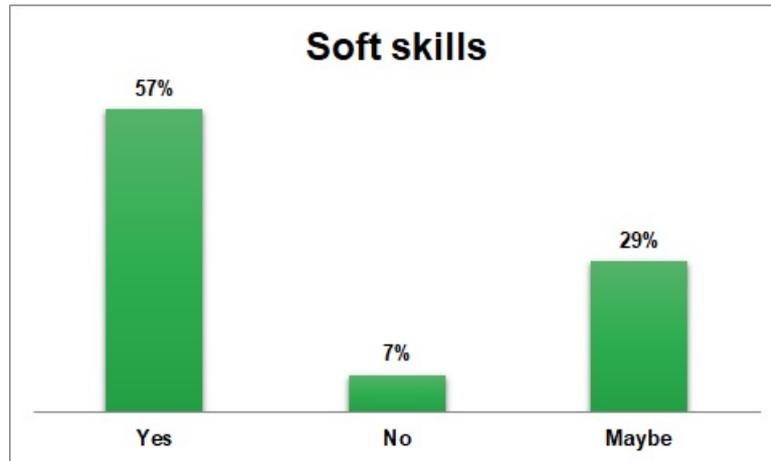
Figure 56. The preference of the participants for the topic "Soft skills" to be included at a water management sector Master Degree.
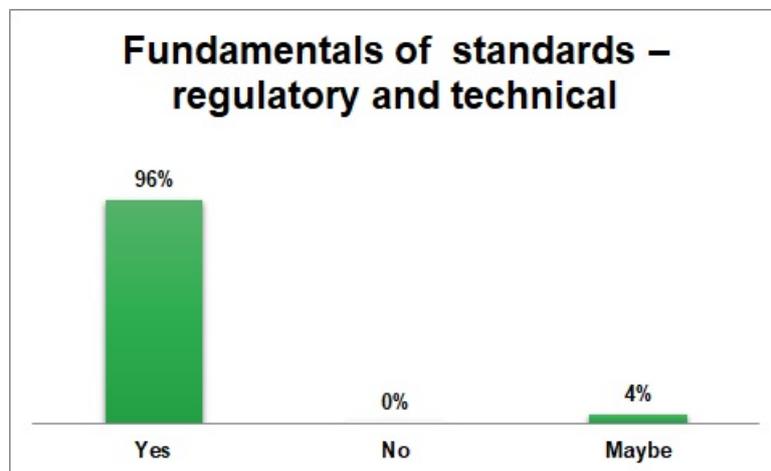

Figure 57. The preference of the participants for the topic "Fundamental of standards-regulatory and technical" to be included at a water management sector Master Degree.
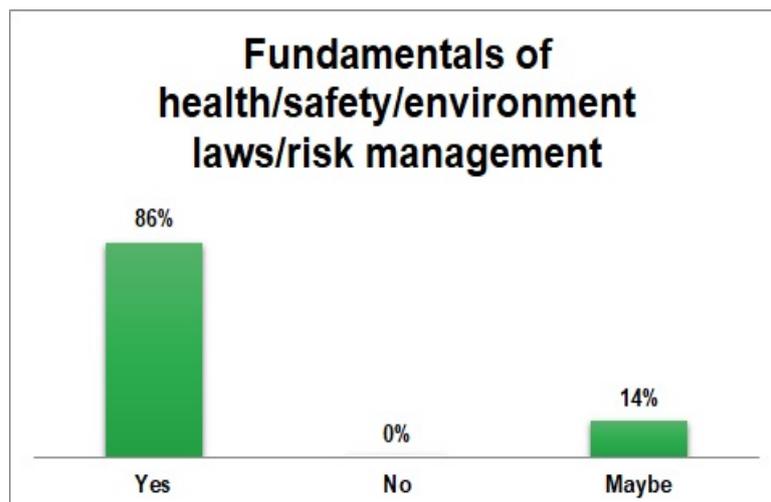

Figure 58. The preference of the participants for the topic "Fundamental of health/safety/environment/laws/risk management" to be included at a water management sector Master Degree.
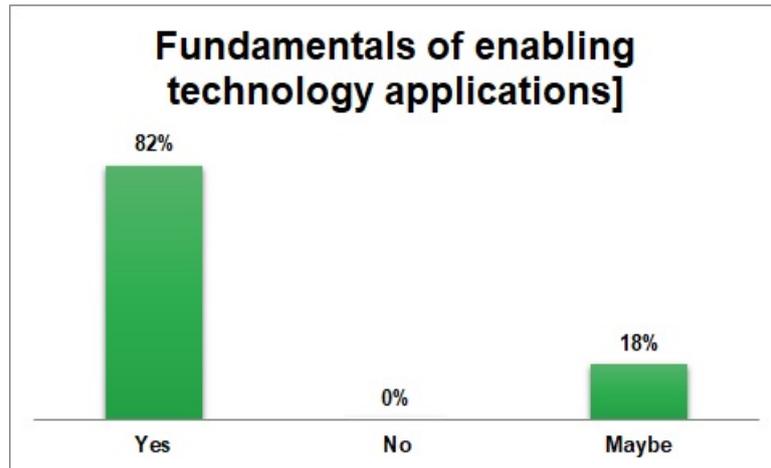
Figure 59. The preference of the participants for the topic "Fundamentals of enabling technology applications" to be included at a water management sector Master Degree.
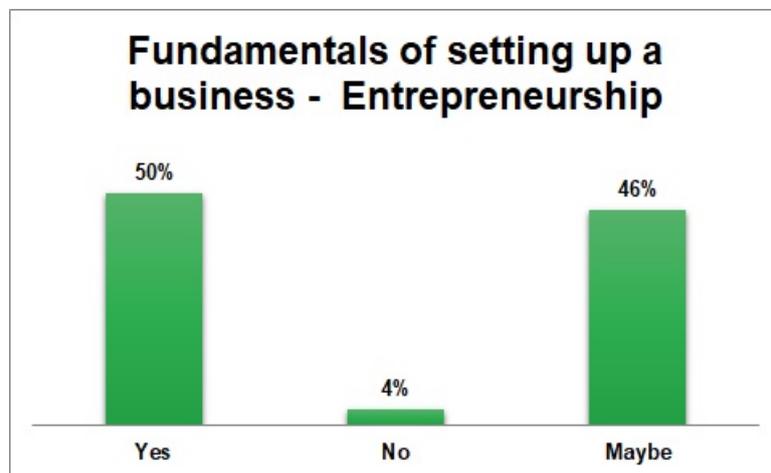
Figure 60. The preference of the participants for the topic "Fundamentals of wetting up a business-Entrepreneurship" to be included at a water management sector Master Degree.
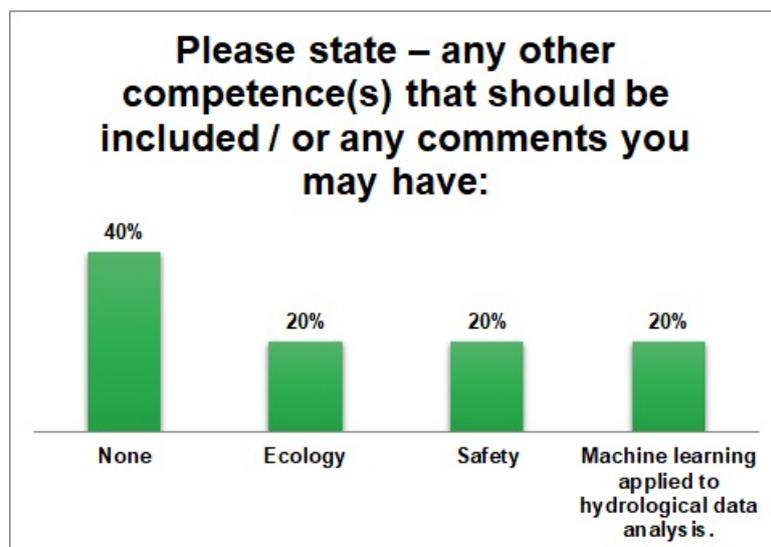

Figure 61. The results on any competence(s) or comments that the participants had based on the questioner.
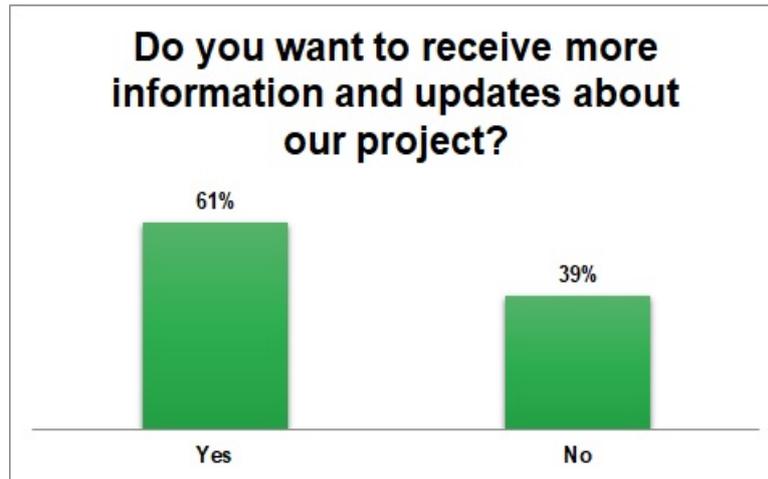
Figure 62. Results based whether the participants want to receive any more information or updates related to the project.

PARADOX certificate attestation with blockchain

Certified qualifications, whether they are university degrees, college diplomas or school graduation certificates, are crucial data to businesses around the world, allowing them to determine whether a job applicant is the right candidate for the position and is qualified to complete the work they will be required to do.

However, not all certifications are equal or even valid. There is a global problem around the proliferation of fake degrees and qualifications issued by unauthorised universities, and the current systems to combat this are both inefficient and incomplete.

Many businesses attempt to solve this problem by requiring attestation of a candidate's certification – they request a communication from the applicant's university or college which confirms they attended and graduated there as they claim. This is not an ideal solution, as it incurs additional costs and is impossible to provide in the case of the university records no longer existing.

Blockchain technology has revolutionized the way we validate certificates and credentials. Traditionally, certificate validation involved relying on centralized authorities to authenticate the information contained in a certificate. This process was slow, expensive, and prone to errors and fraud. However, with blockchain technology, certificate validation has become faster, cheaper, and more secure. By using a decentralized ledger to store certificate information, blockchain ensures that the information is tamper-proof and cannot be altered without the consensus of the network. This makes it an ideal solution for validating certificates and credentials, as it eliminates the need for intermediaries and creates a transparent and immutable record of all transactions. Overall, blockchain technology offers a reliable and efficient solution for validating training certificates, ensuring that individuals can prove their qualifications with ease and confidence.

To generate a blockchain certificate, you can follow these general steps:

1. Choose a blockchain platform: There are several blockchain platforms available, each with its own features and capabilities. Some popular platforms for certificate generation include Ethereum, Bitcoin, and Hyperledger Fabric.

2. Define the certificate content: Determine the information that you want to include in the certificate, such as the name of the recipient, the issuer, the date of issuance, and the certification type.

3. Create a smart contract: Smart contracts are self-executing programs that can run on a blockchain platform. You can create a smart contract that specifies the rules and requirements for issuing and verifying certificates.

4. Encode the certificate data: Once you have defined the certificate content and created the smart contract, you can encode the certificate data using a standard format such as JSON.

5. Deploy the smart contract: Deploy the smart contract on the blockchain platform of your choice.

6. Issue the certificate: Use the smart contract to issue the certificate to the recipient. The certificate will be stored on the blockchain platform and can be accessed and verified by anyone with access to the platform.

7. Verify the certificate: To verify the certificate, you can use the smart contract to check that the certificate data matches the data stored on the blockchain. This ensures that the certificate is genuine and has not been tampered with.

Overall, generating a blockchain certificate involves creating a smart contract that defines the rules for issuing and verifying

System Architecture Overview

The system briefly consists of four components in our implementation: verification application including federated identity, issuing application involving multi-signature and BTC-address-based revocation, Blockchain and local Database adopted by PROOF EASY system for PARADOX project certificate validation.
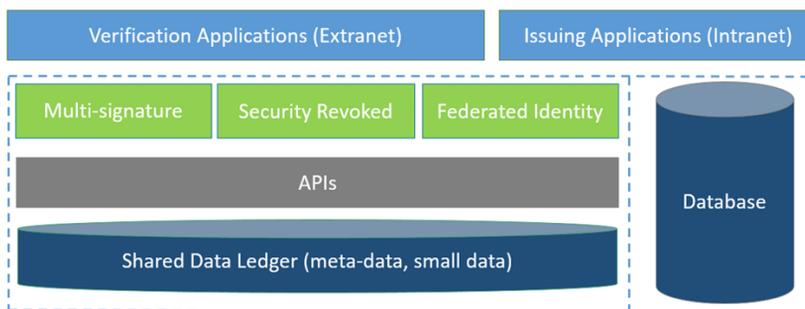

Fig1: System Architecture Context Diagram

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CERTIFICATE OF COMPLETION

This certificate is proudly presented to

....

Has successfully completed the training course offered by the framework of
the PARADOX Project (ref. Number 2020-1-UK01-KA203-078871)

Certified by:

Project Coordinator · Partners

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