

WP2-a **Evaluation criteria**

- Evaluation criteria and concept
- Evaluation Process



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The creation of these resources has been (partially) funded by the ERASMUS+ grant program of the European Union under grant no. 2022-1-DE01-KA220-HED-000086134. Neither the European Commission nor the project's national funding agency DAAD are responsible for the content or liable for any losses or damage resulting of the use of these resources.

DIGITAL DECATHLON



WP 2 | Quality of the learning path

Politechnika
Warszawska



DIGITAL DECATHLON



UNIVERSITÀ
DEGLI STUDI
FIRENZE

DIDA
DIPARTIMENTO
DI ARCHITETTURA



building
environmental
exPerience

WORK PACKAGES

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WP 5	PUBLIC RELATION	Politechnika Warszawska

WP 2 - QUALITY OF LEARNING PATH

ACTIVITIES and RESULTS

	ACTIVITIES	EXPECTED RESULTS
1	IDENTIFICATION OF COMMON EVALUATION CRITERIA AND INDICATORS	State of the art - Criteria and indicators of the competition as quality Learning path
2	EVALUATION OF THE COMPETITION AS LEARNING PATH (INTERNAL)	Internal assessment (e.g. questionnaire) by participants (trainers and students) on their learning experience in the project, for optimization (the evaluation is repeated in the second competition phase)
3	EVALUATION OF THE COMPETITION AS LEARNING PATH (EXTERNAL)	External assessment of the competition as learning experience, by external experts (the evaluation is repeated in the second competition phase)
4	JURY	Selection of the best works on the basis of the common criteria. The jury is made up of two people from each partner organisation. The selection work of the jury is repeated in the second competition work.
5	UNDERSTANDING THE LESSONS	Guidelines for the implementation of the Decathlon as an innovative learning path.

WP 2 - QUALITY OF LEARNING PATH

OVERALL OBJECTIVE

Ensure the quality of the proposed innovative learning path

SPECIFIC OBJECTIVE:

Assessment of the Digital Decathlon as a learning path...

methodologies
contents
formats

“Whether the knowledge reaches the students and whether the methods are the right ones are crucial questions within the project that need to be examined”

for OPTIMIZATION!

(continuous DD adaptation, and replicability)

WP 2 - QUALITY OF LEARNING PATH

SPECIFIC OBJECTIVE:

Evaluation of the **Digital Decathlon** as a **Quality Learning Path**, beyond learning

= **continuous OPTIMIZATION** (adaptation, and replicability)

DEFINITION OF EVALUATION CRITERIA:

1. **LEARNING QUALITY**
2. LEARNING ENVIRONMENT (platform)
3. COLLABORATION AND SUPPORT
4. EXPERIENCE (competition process, gamification)
5. VALUE FOR THE FUTURE

implementable!

WP 2 - QUALITY OF THE LEARNING PATH

How to ASSESS the DD as QUALITY LEARNING PATH?

Proposal = adoption of an **OUTCOMES-BASED LEARNING PATH**

to evaluate:

- the contents of the 10 disciplines
- the BIM progresses

Outcomes influence the competition, in terms of:

- **Challenges**
- **Requirements**
- **Assessment criteria**

but, how to define learning outcomes?

WP 2 - QUALITY OF THE LEARNING PATH

1. LEARNING QUALITY

Adoption of **EU LEARNING OUTCOMES** as fundamental **EVALUATION CRITERIA**
focusing on what learners are expected to know, understand and are able to do

defined in terms of

- **KNOWLEDGE:** **theoretical** and/or factual
- **SKILLS:** **cognitive** - involving the use of logical, intuitive and creative thinking; and **practical** - involving manual dexterity and the use of methods, materials, tools and instruments
- **COMPETENCIES:** ability to apply knowledge and skills **autonomously and with responsibility**

The European Qualifications Framework

"catalysts for changes in education systems"

Common reference framework based on learning outcomes (8 levels), covering all types and levels of learning, and translation device between the different National Qualifications Frameworks (NQFs) of participating countries

WP 2 - QUALITY OF THE LEARNING PATH

WHY LEARNING OUTCOMES?

FUNCTIONS (among others):

- transparency and communication (5 univ. X 4 NQF)
- design and review (reference point for planning processes)
- **quality assurance** (reference point!)

so, at first instance, they are useful to DEFINE:

- Teaching - training - curricula
- Learning assessment standards (contents, methods and criteria)
- Qualification standards (expected learning outcomes)

QUALITY OF THE LEARNING PATH =

ALIGNMENT between ASSESSMENT CRITERIA and LEARNING OUTCOMES

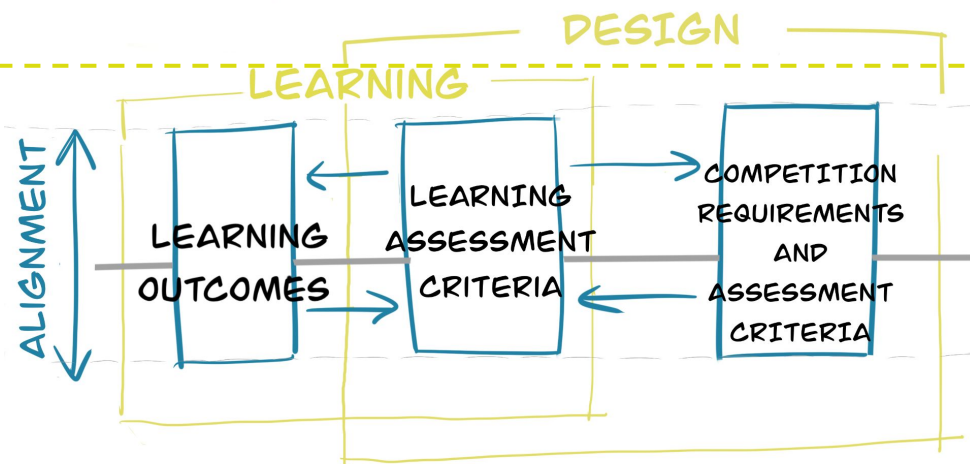
WP 2 - QUALITY OF THE LEARNING PATH

1. LEARNING QUALITY

For each one of the 10 DISCIPLINES, definition of:

- **LEARNING OBJECTIVES** (knowledge-skills-competencies)
what the learner will be able to?
- **TEACHING/LEARNING METHODS** (formats, hours, etc..)
how to teach/learn?
- **ASSESSMENT METHODS/CRITERIA** (satisfaction of objectives)
how to evaluate?

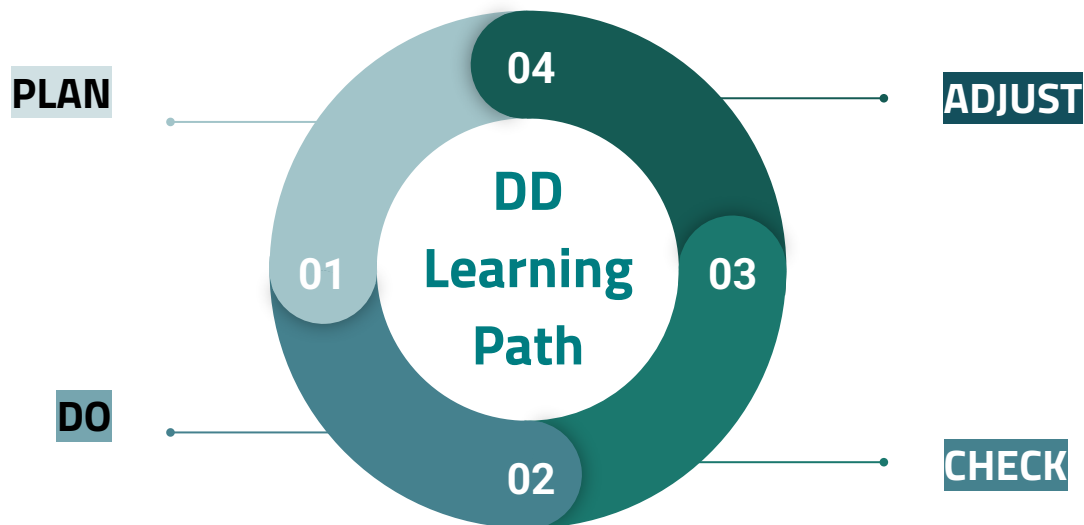
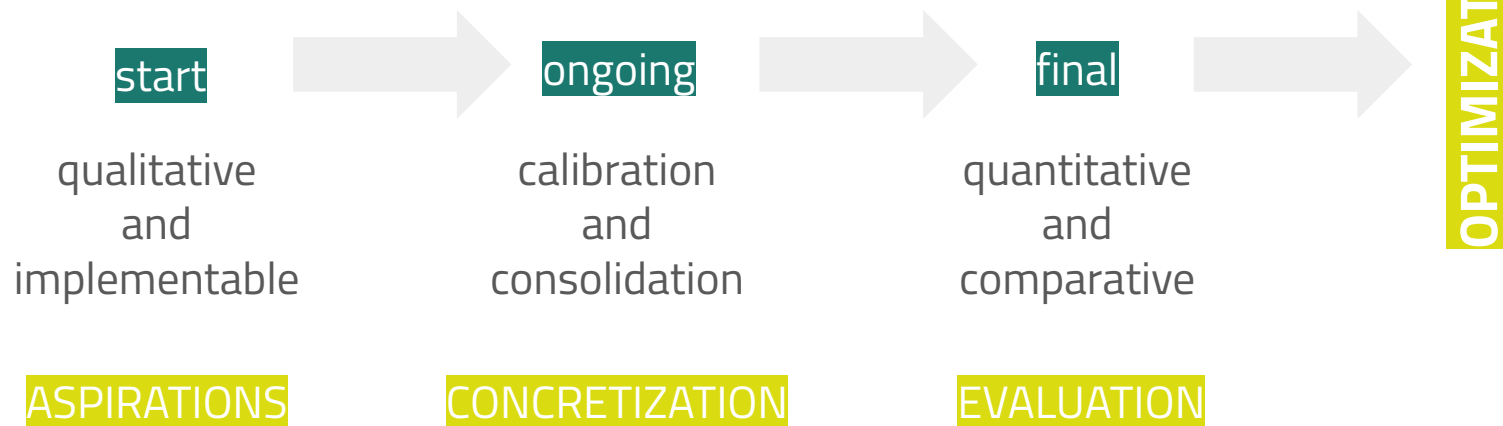
**"ALIGNMENT
AS CONDITION FOR IMPACT" [EU]**



WP 2 - QUALITY OF THE LEARNING PATH

optimization approach:

at least 3
consultations



WP 2 - QUALITY OF THE LEARNING PATH

How to assess, manage and improve the quality of the learning path?

DIGITAL DECATHLON AS QUALITY PROCESS

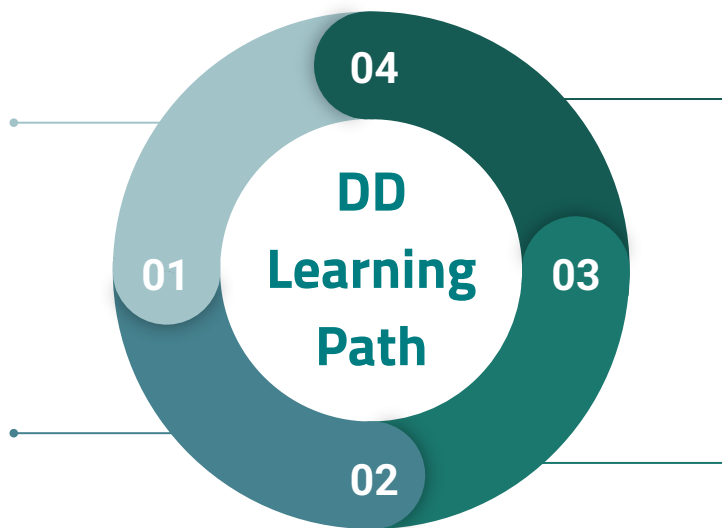
1st year = 1 competition

PLAN

DEFINITION OF COMPETITION CHALLENGES, SCOPES
AND OBJECTIVES, DESIGN CRITERIA,
DISCIPLINARY CONTENTS
STARTING FROM BIM GAME EXPERIENCE

DO

TEACHING, TRAINING AND DESIGN



ADJUST

UPDATE THE PROCESS TO INCLUDE
THE CHANGE = NEW BASELINE

CHECK

INTERNAL ASSESSMENT
EXTERNAL ASSESSMENT
FINAL ASSESSMENT (JURY)

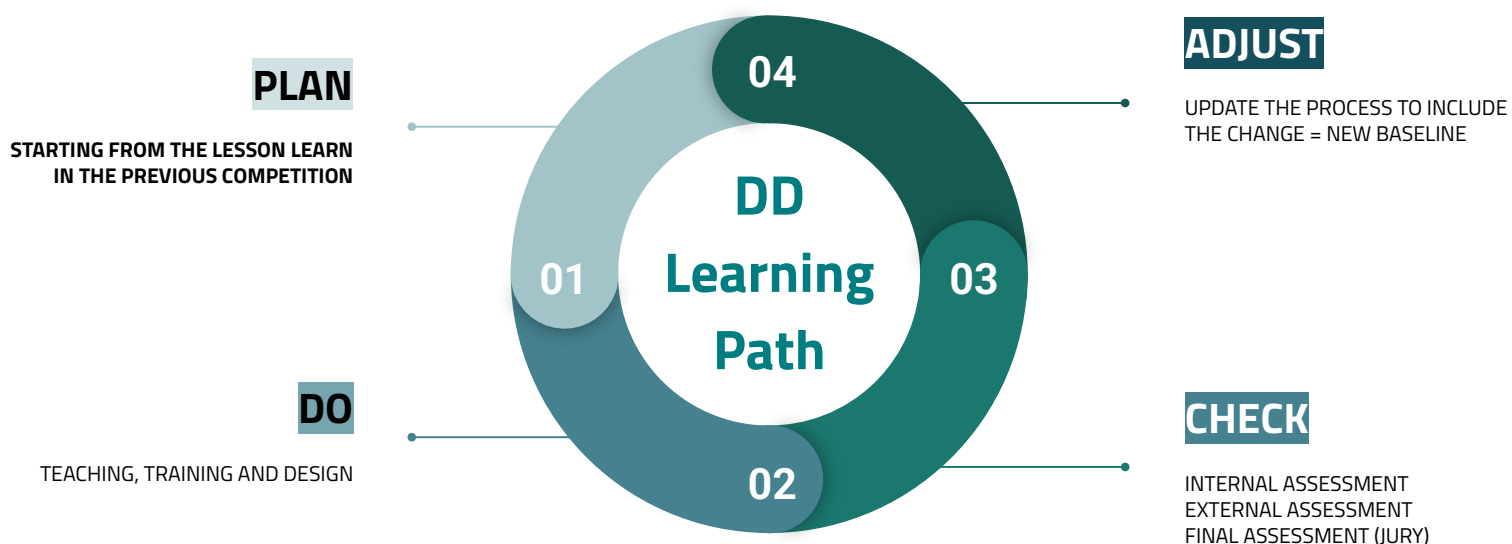
WP 2 - QUALITY OF THE LEARNING PATH

How to assess, manage and improve the quality of the learning path?

PDSA - quality improvement scientific method of change (Deming Cycle)

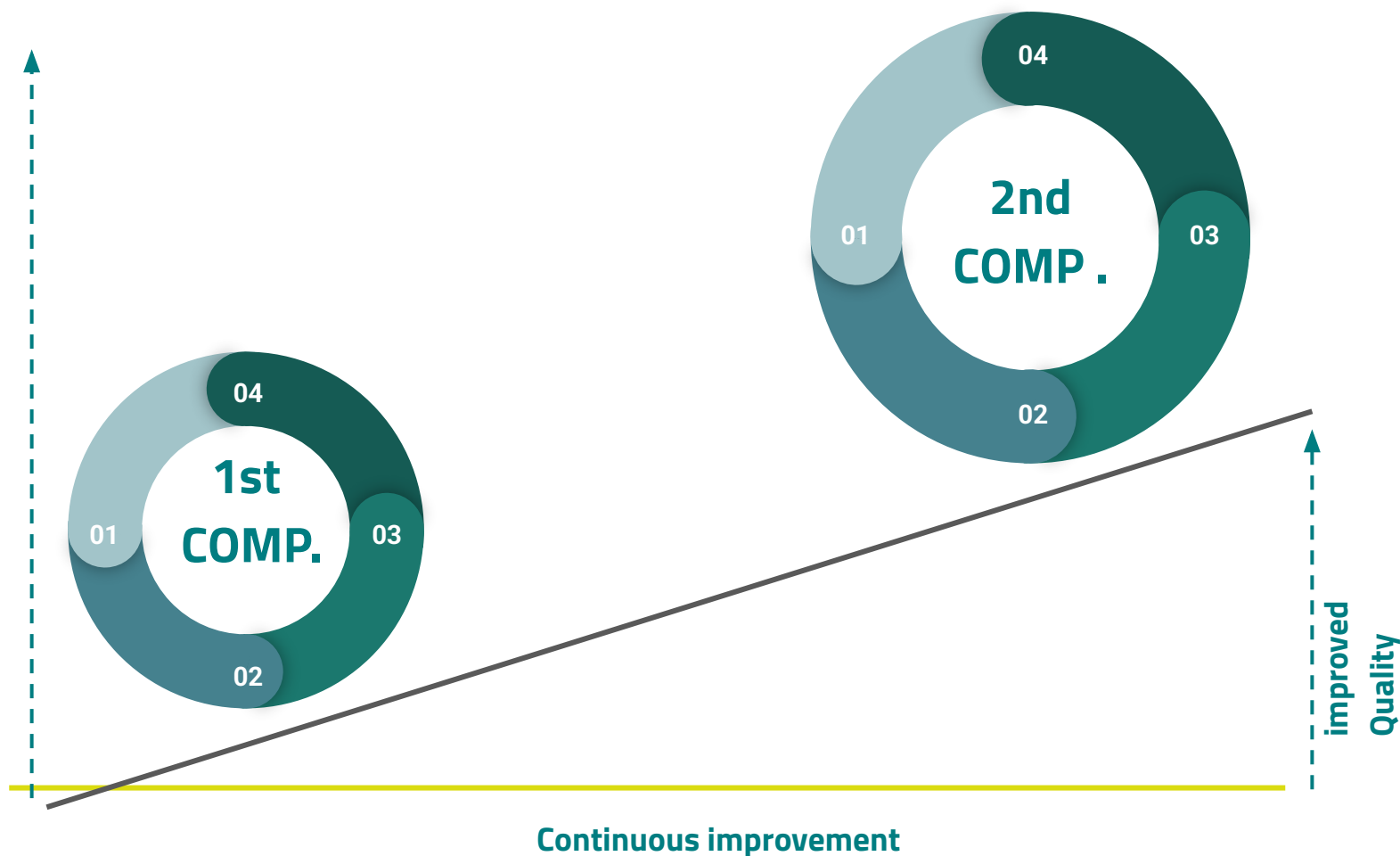
= method to achieve continuous improvement, consistent results and resource maximization in processes

2st year = 2 competition



WP 2 - QUALITY OF THE LEARNING PATH

How to assess, manage and improve the quality of the learning path?



WP 2 - QUALITY OF THE LEARNING PATH

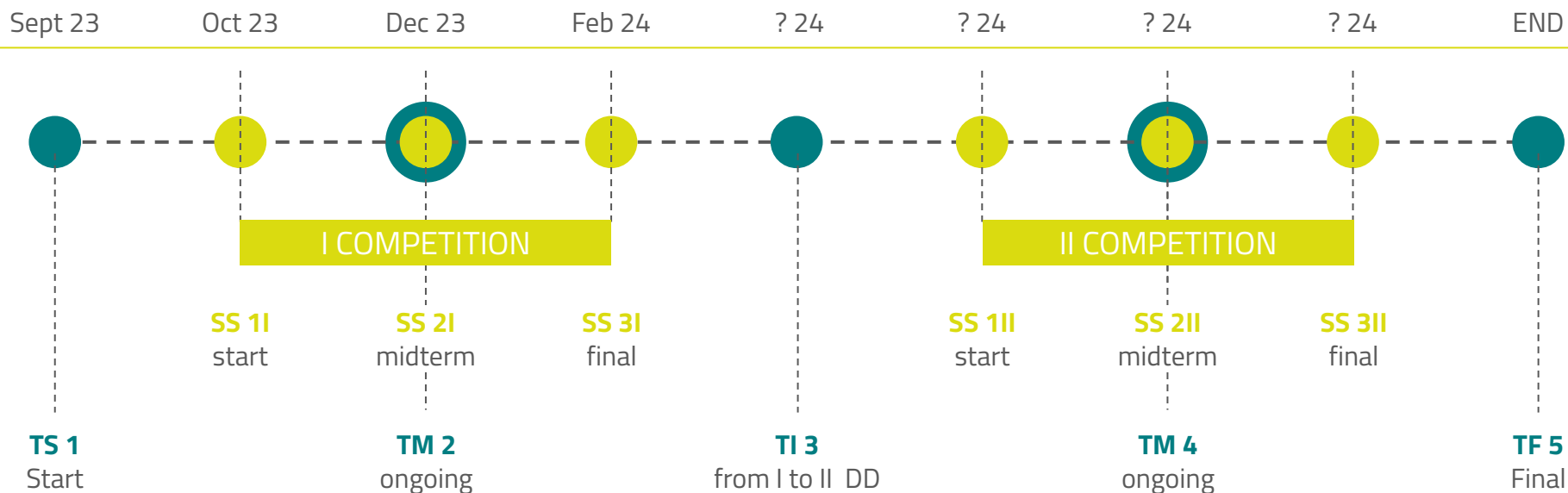
- 1- Plan: define the learning path (materials, methods, tools) according to learning outcomes
- 2- Do: training and design
- 3- Check: evaluate learning outcomes (internal and external evaluation)
- 4- Adjust: adapt the expected learning outcomes for the next competition

WP 2 - QUALITY OF THE LEARNING PATH

EVALUATION STRUCTURE AND SCHEDULING:

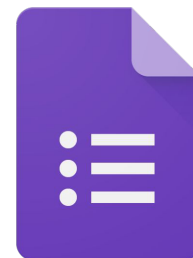
continuous assessment through qualitative/quantitative surveys **targeting:**

- **trainers** (all partners)
- **students** (x2 competitions)



WP 2 - QUALITY OF THE LEARNING PATH

TRAINERS SURVEY



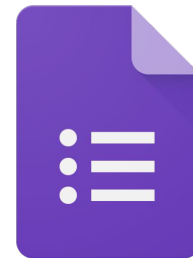
Google Forms

- **LEARNING QUALITY**
- **DIGITAL ENVIRONMENT**
- **COLLABORATION AND SUPPORT**
- **QUALITY EXPERIENCE**
- **VALUE FOR THE FUTURE**

WP 2 - QUALITY OF THE LEARNING PATH

TRAINER SURVEY 1. August 2023

Other evaluation criteria



- **Beyond learning quality**, which are the most important quality goals of the D10? Provide an order...

- DIGITAL ENVIRONMENT
- COLLABORATION AND SUPPORT
- QUALITY EXPERIENCE
- ADDED VALUE FOR THE FUTURE

Google Forms

WP 2 - QUALITY OF THE LEARNING PATH

Criteria of Evaluation



LEARNING
QUALITY

Quality of the DD as a learning path, considering the 10 DD disciplines and assessed in relation to the specific knowledge to acquire, the skills to improve and the competencies to develop. Topics include:

- Perspective of personal skills after Digital Decathlon;
- Competencies/preferences according to the 10 disciplines;
- Interest in the 10 disciplines.



DIGITAL
ENVIRONMENT

Several suggestions have been provided by students to improve the DD digital environment. This criteria would like to evaluate:

- Digital environment in own University;
- Infrastructure supporting the DD;
- Previous experiences;
- Their perspective on advantages and disadvantages of digital learning environment.

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Criteria of Evaluation



The heart of the Digital Decathlon is BIM methodology. An important focus to improve knowledge and a specific training. This topic include:

- Opinion on BIM;
- Knowledge on BIM;
- Previous BIM training;
- Use of BIM in Digital Decathlon.



This criteria is focus on the design competition launched in the context of the DD. To improve the learning path for the students this topic include:

- Previous experiences in Design Competition;
- What they like and dislike;
- Advantages and disadvantages for their learning path to be involved in experiences like DD;

WP 2 - QUALITY OF THE LEARNING PATH

Criteria of Evaluation



Collaboration among students in design teams and support refers to the interaction with trainers. To make the difference about collaboration is important evaluate:

- Previous experiences in interdisciplinary and/or international teams;
- Expectations;
- Collaboration in own team during Digital Decathlon;



Digital Decathlon could contribute to academic path and students' future for professional life. This criteria evaluates how much this opportunity is intended from students.



DD: EVALUATION PROCESS

(I competition: 10.10.2023 – 15.02.2024)

WP 2_ Quality of the Learning Path

UFI



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PARTICIPATING UNIVERSITIES

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POLITECHNIKA WARSZAWSKA	PWA
UNIVERSITÀ DEGLI STUDI DI FIRENZE	UFI

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INTRODUCTION

The overarching scope of the Digital Decathlon (DD) is to address the EU priority of **digital transition** in the under-digitised AEC sector (Architecture, Engineering and Construction), by proposing an innovative experience of “**learning by designing**” to European university students (four countries) in architecture, civil engineering, building services and related disciplines.

The DD is a unique occasion to experience a **full-digital, collaborative and interdisciplinary design processes**, essential to address the complexity of contemporary challenges, by exploiting the potentiality of **BIM (Building Information Modelling)**, recognised enabling technology in the digital transition of the building sector, which can also support the parallel ecological transition.

The DD provides students with **innovative and motivating teaching concepts and learning contents**, covering the basic knowledge about BIM and 10 related disciplines encompassing the building interrelated aspects.. The didactic goal is addressed in an attractive way through the provision of a **virtual platform**, encouraging and stimulating students to learn and develop basic digital skills in a competitive but playful environment; the theoretical knowledge in fact is interactively and iteratively applied on a real case study for the development of an innovative and sustainable project, provided in the format of a design competition.

Combining theoretical knowledge, the training on digital tools and the interdisciplinary teamwork for the competition, the DD allows students to develop **knowledge, digital and soft skills and**

professional competences to operate effectively in the digital world of tomorrow.

1. QUALITY OF THE LEARNING PATH

The overall objective of Work Package 2 (led by UFI) is to **ensure the quality of the innovative learning path proposed by DD project.**

Specific objective is to **assess methodologies, contents and formats implemented** in order to understand if they addressed the initial expectations of the project partners, such as for continuous adaptation/optimization within the project (foreseeing two cycles) and for future replication.

The central questions addressed by WP is if the knowledge provided by the DD reaches the students, if the methods are the right ones, and which kind of skills and competences are developed by students attending the competition.

DD proposes a digital learning path based on the exploitation of BIM technology in architecture/engineering and building service education (interrelated domains), mainly dedicated to bachelor students.

The main scope of adopting a digital platform to share didactic contents and organise the competition is to let students experiment both a **digital education environment** and online **collaboration ways of working**, fundamental in the connected work system of tomorrow.

Two main strategies characterise the methodological and design approach of the DD project: gamification and competition.

The objective of **gamification** is to make everyday training situations, which have nothing to do with games, more interesting for students by enriching game design elements such as a narrative, avatars, levels, points or badges; this approach has already been experimented by the previous project BIM GAME (led by DD's leader Jade University in 2020).

Working on a **design competition** for training represents a diffused approach for exercising in the disciplines of design (such as the ones involved in the DD), since competitions contains in clear form objectives, needs, a location, a building or an area to intervene on, the typologies and number of documents to present but above all the criteria of evaluation, according to the various levels of framing and detail.

For these features, existing competitions have been largely adopted in education contexts as real case studies to experiment with innovative design processes for didactic purposes. Moreover, to address sustainability challenges, contemporary competitions even more require interdisciplinary teams of professionals; the team work in the European context of the DD offers students a possibility to experiment with international and integrated design processes, supported by the adoption of digital and BIM technologies.

The main skeleton of the DD's evaluation process (expectations, criteria, scheduling) has been jointly developed by project partners during the kick-off project meeting in Oldenburg (DE, 14-17/02/2023), where common expectations, criteria and schedules have been discussed and aligned.

2. EXPECTATIONS

The main aims of evaluating the DD as a quality learning path are to monitor the collaboration between teachers and students and to measure the effectiveness of the project in relation to the original expectations.

Project partners believe that focusing on quality can stimulate the **visibility** of the project and improve its **attractivity**, since continuous assessments consent to adapt the project also for future replications, in terms of **internationalisation** and **augmented interdisciplinarity**.

The evaluation process is intended to encompass the whole project, foreseeing **three evaluation moments** for each one of the two competitions (beginning, mid-term, final).

This structure consent to define, and have control of, the quality in terms of **continuous improvement**, consistent results and resources maximisation, as a scientific method of change (e.g. Deming cycle).

The three-evaluations within a competition guarantee the possibility to continuously adapt the DD in order to solve the retrieved criticalities; the results of the first competitions are then useful to recalibrate and improve the second. Finally, the evaluations of the two competitions will consent to define a “lesson learned” document, intended as a guideline for the further implementation of the DD.

3. REFERENCES

The evaluation process is developed referring to shared concepts, approaches and objectives characterising the DD as an innovative learning path, translated into common criteria.

For a reliable implementation of the project, the DD's evaluation process considers the **European Qualification Framework**, a common reference framework based on learning outcomes covering all types and levels of learning, also used as a translation device between different countries.

As in the EQF, the DD's evaluation criteria refers to learning outcomes, intended as a statement of what the learner is expected to be able to do on successful completion of learning, in terms of **knowledge** (theoretical and/or factual), **skills** (cognitive - involving the use of logical, intuitive and creative thinking; and practical - involving manual dexterity and the use of methods, materials, tools and instruments) and **competencies** (ability of the learner to apply knowledge and skills autonomously and with responsibility).

The DD's innovative learning path is dedicated to students of the 6th level (bachelor) and/or 7th level (master degree) of the EQF.

Level 6

Knowledge	Skills	Responsibility and autonomy
Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	Manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts; take responsibility for managing professional development of individuals and groups

Level 7

Knowledge	Skills	Responsibility and autonomy
<p>Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research</p> <p>Critical awareness of knowledge issues in a field and at the interface between different fields</p>	<p>Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields</p>	<p>Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches; take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams</p>

The adoption of and reference to the EQF is intended both to inform and align the learning outcomes foreseen by the DD, object of the quality evaluation, as well as to improve transparency, compatibility and portability of people’s qualifications.

Concerning skills, the Renewed Agenda for Higher Education” (EU, 2018), states that *“all students in advanced learning, irrespective of discipline, need to acquire advanced transversal skills and key competences that will allow them to thrive. High-level digital competences, numeracy, autonomy, critical thinking and a capacity for problem-solving are increasingly crucial attributes”*. Regarding competencies, the Digital Compass (EU, 2018) describes the digital ones as *“the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for*

participation in society. It is defined as a combination of knowledge, skills and attitudes”.

Since the DD’s learning path is based on the adoption of the BIM technology, the evaluation process assuring the quality of the learning path will also take into account as reference the UK BIM Framework Learning Outcomes. This framework identifies learning outcomes of introductory training in information management using building information modelling (BIM), and it is intended for training providers to support training course design, and by those seeking training to help them to understand the outcomes which will support the UK BIM Framework and the ISO 19650 series of standards.

4. EVALUATION CRITERIA

A first list of evaluation criteria refers to learning outcomes reachable with the DD; these criteria will be developed to define the evaluation process foreseen by the project.

Evaluation criteria are useful to determine the level of learning outcomes reached by students; at the same time they represent a valid reference to keep track of the DD’s implementation by project partners. Yet, evaluation not only refers to the learning quality but to the overall experience provided by the DD.

- **LEARNING QUALITY**

In the light of the educational purpose, the first criteria related to the **quality of learning is the most impactful**, and related to the ten disciplines of the DD.

following the **EU learning outcomes approach**, learning quality is assessed in relation to three main elements:

- Learning Objectives: *what the student will be able to do?*
- Learning Methods: *how to teach/learn?*
- Evaluation Criteria: *how to evaluate the achievement of the learning objectives?*

A draft structure of evaluation criteria is illustrated in the following table:

	LEARNING OUTCOMES	ASSESSMENT CRITERIA (low, medium, high)	INDICATORS	SELF-ASSESSMENTS (students)
KNOWLEDGE	The student has to acquire knowledge on the 10 DD disciplines	Levels of knowledge evaluated through tests, interviews and discussions	Number of attendance to online lessons, number of downloaded materials, test results, interaction and discussions, etc.	es. self-assessments questionnaire
SKILLS	The student will be able to applying the knowledge of the 10 disciplines in a design experience (hard/soft skills)	Levels of introduction/application of the 10 disciplines' knowledge in the competition	Quality of the project output and delivery items (design competition)	es. flipped classrooms for discussion about the delivery items
COMPETENCES	The students will be able to work in autonomy and responsibility valorising knowledge and skills acquired	Levels of capacity to work in autonomy, valorising its knowledge and skills in personal curriculum	Quality of the project output can be valorized in future project, quality of curriculum and portfolios	es. presentation and discussion of curriculum and portfolios

Beyond learning quality, other selected criteria are intended to understand the wider benefits of the DD, in particular:

- **DIGITAL ENVIRONMENT**

Refers to the evaluation of the digital infrastructure created to support the DD learning and collaboration objectives (Moodle and cloud)

- **BIM ADOPTION**

Refers to the adoption of BIM methodologies both as object of learning and for the development of the design proposal;

- **DESIGN COMPETITION**

Refers to the design competition launched in the context of the DD, and to approach according to the 10 discipline of the DD;

- **COLLABORATION AND SUPPORT**

Refers to the level of collaboration between students stimulated by the project, as well as to the collaboration between trainers in the implementation of the project; support refers to the interaction between students and trainers.

- **VALUE FOR THE FUTURE**

Refers to the contribution that the DD will bring in the academic path and professional life of the students as future professionals.

The objective of fixing criteria is not only to focus on the main relevant aspects of the Digital Decathlon experience, but also to maintain a common reference along the evaluation process, consenting to track the evolution of the quality aspects highlighted by the criteria.

5. EVALUATION TARGETS

The evaluation regards two different points of views, useful to be verified each others:

- **trainers** (evaluating the effectiveness of the learning path, according to the learning outcomes reached by students);
- **students** (how the students perceive the improvement of their knowledge, competences and skills, through a self-assessment).

Students and trainers are evaluation targets.

Moreover, the evaluation criteria will be adopted by **external auditors** called to assess the quality of the project's implementation.

6. EVALUATION STRUCTURE

In order to provide a quality and optimization approach, the evaluation has been distributed, both for students and trainers, in three main moments, before, during and after the two competitions.

- **BEFORE - Starting Survey**

Objective: understand aspirations (qualitative and open nature)

- **ONGOING - Middle term Survey**

Objective: calibration and consolidation (mixed and practical
- ex. valuation of the learning material)

- **AFTER THE COMPETITION - Final Survey**

Objective: understand the results (quantitative and
comparative)