Erasmus +: BLISS

Blended Learning Implementation for reSilient, acceSsible and efficient higher education

Project 2021-1-SE01-KA220-HED-000023166

Project Result 3 –Deliverable 3.1.1 Ranking of the educational Units

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Document heading

Project title:	**Blended Learning Implementation for reSilient, acceSsible and efficient higher education**
Project result:	**3**
Leading org.:	**KTH Royal Institute of Technology**
Output title:	**Developing of blended learning educational units**
Authors:	**KTH Royal Institute of technology with input from the entire consortium**

Project Result 3 summary:

Project Result implementation

- **Needs Analysis**: Throughout the course of Result 2, we identified various activities that could significantly benefit from either an entirely new or an updated blended learning approach. In alignment with the project scope and available resources, we selected and developed a subset of candidate activities into fully defined and stand-alone educational units. This initiative was supported by a specific Learning Teaching and Training (LTT) activity called C1, where KTH shared their extensive experience in applying blended learning methodologies as well as Constructive Alignment.
- **Target Groups**: The primary target group for this initiative comprised the specific teachers and prospective students of the selected educational units.
- **Element of Innovation**: The direct outcome of this activity is the creation of at least three new educational units. In reality, given the success of the C1 activity, all the partners have engaged in Ed. Units design. This led to a higher number of proposed units as detailed later on in the report. Furthermore, this initiative has contributed to enriching the methodological approaches to designing blended learning systems, accompanied by relevant case studies.
- **Expected Impact**: Consistent with existing literature, converting traditional activities to blended learning formats has enhanced the effectiveness of transmitting intended learning outcomes. It has also increased accessibility for students and improved the resilience of the overall educational program. A specific investigation into this impact was conducted in the subsequent steps of the BLISS plan (Result 4).
- **Transferability Potential**: The developed educational units were designed as stand-alone courses or components of larger courses. The related learning materials are now available to the entire consortium. Upon project completion, documentation related to these educational units has been made publicly accessible, serving as an inspiration to the broader Higher Education Institution (HEI) community. Additionally, a scientific paper detailing the methodological contributions of this activity has been shared with the academic community.

Division of work

Activity Leadership and Planning KTH led this activity and organized the related work as planned.

Task 3.1: Selection of Educational Units for Development Starting from the requirements highlighted in Result 2, the research team was set to identify the most promising candidates for further development based on:

- Expected improvement of the quality of the underlying learning experience using blended learning.
- Specific opportunities/potential for implementation across the consortium.
- Impact of the expected improvement on the sustainability dimension as defined in the SDG agenda from the UN.
- Scope and resources available in the project.

In reality, as a result of the success of the C1 LTT all the partners decided to engage in Ed.Unit design. In view of this, all the Ed. Units proposed and deemed suitable by the expert KTH team were selected for further processing. This led to a higher number of Ed. Units been developed compared to the planned 3.

Task 3.2: Development of the Focal Educational Unit After the LTT C1 conducted by KTH, the research team developed the focal educational unit following a pedagogical approach based on constructive theory. The intended learning outcomes were defined along with related teaching and learning activities and assessment tasks, focusing on the student-requested actions and the desired level of understanding of the related concepts.

Project Result 3 in the context of the Project

PR1

- Conducted a comprehensive analysis of the diverse responses to the Covid-19 pandemic across different Higher Education Institutions (HEIs) within the consortium.
- Compiled and benchmarked the reactive measures implemented by various institutions to tackle the pandemic's impact on education

PR2

- Analyzed existing literature and Covid-19 experiences to identify successful blended learning strategies.
- Developed a research diary to highlight trends and define requirements for improving curricula through blended learning.

PR3

- Selected and developed at least three educational units based on identified requirements for blended learning.
- Created detailed syllabi for the selected educational units, ensuring alignment with pedagogical approaches.

PR4

- Implemented the new educational units and assessed their effectiveness in improving learning outcomes.
- Evaluated and documented the organizational impact of blended learning courses on the education system.

PR5

- Facilitated the exchange and implementation of developed educational units across consortium partners.
- Conducted a cross-evaluation of the educational units to propose environment-specific modifications for better applicability.

Results of the activities

The Project Result 3 goal was to develop a series of Educational Units to introduce specific applications of the Blended Learning approaches in the current engineering education activities at involved HEI. The candidate topics from each involved institution were presented at the beginning of the LTT C1 on Blended Learning (BL) and Constructive Alignment (CA) held at KTH. As a result of the elaboration of these proposal within the context of CA, a set of specific Intended Learning Outcomes (ILOs) were formulated. The following Table 1 details all the proposals from the partners that have been evaluated by KTH around the proposed criteria and consequently selected for further processing.

Table 1. Summary of the proposed educational unit Intended Learning Outcomes (ILOs)

KTH	**Scientific Debate**: Gather information and elaborate a strategy to qualify and defend an opinion on a controversial topic, and analyse and summarize the consequent debate
UNIMA	**Six Sigma:** **ILO1:** Remember and understand the theoretical and background knowledge of Six-sigma process improvement methodologies. **ILO2**: Apply the Six-Sigma process improvement methodologies to an engineering case study. **ILO3**: Present the findings which will be discussed in class **Artificial Neural Network (ANN):** **ILO1:** Explain the basic structure and functions of Artificial Neural Networks. **ILO2**: Apply an Artificial Neural Network to solve a classification problem. **ILO3**: Compare the application of Artificial Neural Networks to the K-Nearest Neighbors Algorithm for a classification problem
POLITO	**Production System:** **ILO1:** Outline and express with mathematical models the technological properties of the materials used for production. **ILO2**: Evaluate and assess a given manufacturing process, analyzing the technical and economic performances and taking into account quality, safety and sustainability issues. **ILO3**: Choose, integrate and deploy the manufacturing steps as a coordinated system oriented to the making of an industrial product (process plan)
UNILJ	**PID Control:** **ILO1:** Program a discrete version of the PID control algorithm on an Arduino microcontroller and analyze the stability of the close loop system. **Mechatronic actuators:** **ILO1:** Compare pneumatic, hydraulic and electric actuator and select an appropriate one for a specific application with regard to cost, environmental conditions, operating conditions.
UNIRI	**Statistical Testing:** **ILO1:** Select and apply appropriate statistical tests on data obtained from a HCI experiment, and derive the conclusions according to their outcomes. **Multithreading in the Operating System:** **ILO1:** Explain multithreading in the Operating System.
UNIBG	**Business Process Modelling and Simulation:** **ILO1:** Describe business processes in the operations management domain and illustrate them using BPMN2.0 . **ILO2**: Produce discrete event simulation models of business processes in the operations management domain with AnyLogic, and analyze and compare their performance

Deatailed Proposals from the partners

This section introduces the Candidate Educational Units that each partner proposed at the beginning of the LTT C1 and that were, eventually, used as basis for the development in PR3.

The educational units formulated for the BLISS project are grounded in two fundamental pedagogical constructs: (1) Bloom's Taxonomy of Learning and its six levels, and (2) the Blended Learning strategies as utilized in the BLISS project. This comprehensive approach ensures a robust and versatile educational experience for students, combining theoretical understanding with practical application through innovative teaching methods.

Bloom's Taxonomy of Learning

Bloom's Taxonomy, developed by Benjamin Bloom in 1956, is a hierarchical model used to classify educational learning objectives into levels of complexity and specificity. The taxonomy is divided into six levels, each representing a different stage of cognitive skills, from basic recall to higher-order thinking. These levels are:

1. **Remembering**: The ability to recall or recognize specific information or facts. Key verbs include list, define, describe, and identify.
2. **Understanding**: The ability to comprehend and interpret information. Key verbs include explain, summarize, paraphrase, and classify.
3. **Applying**: The ability to use information in new and concrete situations. Key verbs include use, execute, implement, and demonstrate.
4. **Analyzing**: The ability to break down information into its components and understand its structure. Key verbs include analyze, compare, contrast, and categorize.
5. **Evaluating**: The ability to make judgments based on criteria and standards. Key verbs include evaluate, critique, justify, and support.
6. **Creating**: The ability to put elements together to form a coherent or functional whole. Key verbs include design, construct, develop, and formulate.

This taxonomy helps educators design curriculum and assessments that move students progressively through the cognitive stages, promoting deeper understanding and mastery of the subject matter.

Blended Learning Strategies

Blended Learning is an educational approach that combines traditional face-to-face instruction with digital and online resources. The BLISS project employs several Blended Learning strategies to enhance the learning experience:

1. **Face-to-Face Driver**: In this model, the teacher leads the instruction and incorporates digital tools to supplement learning. This strategy allows for direct interaction while leveraging technology to enrich the educational process.
2. **Rotation**: Students alternate between independent online study and face-to-face classroom time according to a set schedule. This model encourages self-paced learning and provides opportunities for in-person support and collaboration.

3. **Flex**: Most of the curriculum is delivered through a digital platform, but teachers are available for face-to-face consultations. This model offers flexibility in learning while ensuring that students have access to necessary support.
4. **Labs**: The entire curriculum is delivered via a digital platform within a consistent physical location. Students also engage in physical classes, blending digital learning with traditional classroom experiences.
5. **Self-Blend**: Students enhance their physical learning with online coursework, choosing additional online resources and activities to complement their in-person education. This model promotes autonomy and personalized learning.
6. **Online Driver**: Students complete the entire course through an online platform, with potential teacher check-ins. The curriculum and instruction are entirely digital, and face-to-face meetings are scheduled as needed.

By integrating Bloom's Taxonomy with these Blended Learning strategies, the BLISS project aims to provide a comprehensive, adaptable, and effective educational framework. This approach not only fosters cognitive development at all levels but also accommodates diverse learning preferences and environments, ensuring that all students can achieve their full potential.

KTH –Sweden

Proposal Scientific Debate

Responsible: Eleonora Boffa

Course Name: Scientific methodology (Master's degree)

Problem: Students may have a narrow perspective of controversial topics, focusing on limited points and lacking ideas to anticipate counterarguments. This can lead to inadequate preparation for debates. To address this, incorporating a digital tool like ChatGPT is proposed to enhance students' understanding of debate dynamics, refine their arguments, and improve their learning outcomes related to the debate topics and formulation of arguments and counterarguments.

Modifications proposed:

- **Bloom level of understanding:** Analyse. Evaluate
    - No changes will be made to the Bloom levels of current educational units.
- **BL strategy – Face-to-Face Driver (F2F):**
    - The students will attend lectures onsite and prepare for the debate using a digital tool, i.e., ChatGPT.
    - ChatGPT will be used for finding arguments and counterarguments, providing immediate feedback on them.
- **Teaching Activity:**
    - F2F lectures will focus on the structure and techniques of debate.
    - Students will use ChatGPT to prepare for the debates by finding arguments and counterarguments. ChatGPT will provide immediate feedback on the quality and relevance of these arguments.
- **Assessment:**
    - Written Report: Students will retrieve and analyse relevant information for the debate, report the collected and analysed information, and explain their choice of arguments and counterarguments based on those proposed by ChatGPT.

Implementation:

- **Possibility for the unit to be actually implemented next year:** YES, Spring Semester 2024

UNIMA- Malta

Proposal 1 Six Sigma

Responsible: Joseph Zammit

Problem:

This ILO focuses on teaching Six Sigma process improvement methodologies in Quality & Reliability Engineering. Student feedback reveals that while the traditional teaching method imparts theoretical knowledge of Six Sigma tools, it lacks hands-on practical experience. Students express a keen interest in transitioning to a flipped classroom approach, allowing them to apply these tools to a case study under guidance. This enables students to gain a deeper understanding of the Six Sigma methodology and its practical application in solving engineering problems.

Modifications proposed:

- Bloom level of understanding – **Remember**, **Understand and Apply**

The theoretical and background knowledge of the topics will be delivered asynchronously online, requiring students to independently follow and comprehend the material prior to the physical lecture. In the lecture, students will be organized into teams to actively apply the acquired knowledge in tackling an engineering case study.

- BL strategy – **Self-Blended and Rotational**
    - Theoretical and background knowledge of Six-Sigma process improvement methodologies will be provided to students asynchronously online prior to the physical lecture.
    - During the asynchronous online lecture, students will have the chance to assess their comprehension of the learning material by responding to non-graded multiple-choice questions.
    - During the physical lecture, a brief presentation will be delivered to emphasize the key points of the topic and address any questions students may have regarding the learning material.
    - An engineering case study will be introduced, prompting students to form teams and apply Six Sigma process improvement methodologies to devise a strategy for addressing the identified problem.
    - Lastly, the students/groups will present their findings, which will be discussed in the class.

- Possibility for the unit to be actually implemented next year: **YES, FIRST SEMESTER (Oct-Jan) 2023/2024**

Proposal 2 Artificial Neural Network

Responsible: Joseph Zammit

Problem:

This ILO involves the teaching of Artificial Neural Networks within the context of Artificial Intelligence for Engineering. From feedback collected by students, they find it better to have a recording of the lecture which they can pause/play and access online in support of other material and study which is provided in this study unit. Artificial Neural Networks is a mathematically heavy explanation with complex derivations and explanations. Students have provided feedback that they find it easier to understand when they have the possibility to access this material at their own pace/time and they can be assessed on the application of what they have learnt.

Modifications proposed:

Bloom level of understanding – **Explain (before)**, **Compare (new) and Apply (new)**

The introduction of the “Apply” taxonomy includes exercise activities where students will learn how to implement Artificial Neural Network algorithms to solve a classification problem. This will be done by using an online platform and engaging with students both physically (one-on-one help, questions) and online (questionnaires).

BL strategy – **Rotational**

The theoretical concepts (structure and function) of Artificial Neural Networks is explained by using an online platform (online).

Students are asked to answer multiple choice questions to assess their understanding (not graded - online).

A real-life problem is presented, and explained step-by-step with a short presentation (in person).

A problem is divided into several steps where students are asked to implement a little piece of code with support (in person).

A new problem statement is given to students and they are asked to solve it on their own (online)

Possibility for the unit to be actually implemented next year: **YES, FIRST SEMESTER (Oct-Jan) 2023/2024**

POLITO – Italy

Proposal Production Systems

Responsible: Dario Antonelli

Problem: The current approach to teaching production systems lacks flexibility for students who prefer different learning environments and methods. While traditional F2F lectures are effective for some, others benefit more from online resources and self-assessment opportunities. To address this, a self-blend model is proposed, allowing students to choose between attending lectures in person or online and providing various self-assessment tools to enhance their learning experience.

Modifications proposed:

- **Bloom level of understanding: Remember to Analysethe related**
    - No changes will be made to the Bloom levels of current educational units.
- **BL strategy – Self-Blend Model:**
    - Students can decide whether to attend lectures online or in person.
    - F2F lectures and video-recorded lectures will be available for all educational units.
    - Self-test questions and self-assessment randomized exercises will be published on Moodle, allowing students to engage with the material at their own pace.
- **Teaching Activity:**
    - F2F lectures and video-recorded lectures will be provided for comprehensive coverage of all educational units.
    - Self-test questions and randomized self-assessment exercises will be available on Moodle for continuous learning and self-evaluation.
- **Assessment:**
    - **Online Driver Model:**
        - Students can access the assessment online, either from their homes or from the classroom.
        - Assessment activities include online exercises on process sizing and optimization, and multi-answer questions about process descriptions.
        - Assessments will be supported by a lockdown browser and proctoring to ensure academic integrity.
        - The application 'Exam' developed by POLITO will automatically rate the assessments.

Other Initiatives:

- Following the training on the Community of Inquiry in Stockholm, teaching activities will include a self-assessment questionnaire at the end of each educational unit.
- Additionally, a team-based activity will be developed during the related ILO to foster collaborative learning.

Implementation:

- **Possibility for the unit to be actually implemented next year:** YES, Spring Semester 2024

UNILJ – Slovenia

Proposal 1 PID Control

Responsible: Primoz Podrzaj

Problem: Students have problem to fully comprehend abstract concepts such as stability. The achievement of system stability is the primary goal of PID tuning. It is therefore of utmost importance to have a firm grip in the backgrounds of PID tuning and programming of the PID control algorithm itself.

Modifications proposed:

- **Bloom level of understanding –** stays the same: **Apply, Analyze**

  The idea is to use different principles of good learning, e.g. prompt feedback, active learning, etc. to actively engage students in said topic from the beginning.

- **BL strategy –** Self assessment questionnaires, Interactive courses

  - Students fulfill self-assessment questionnaires (online; 10 minutes with prompt feedback) at the end of the lecture
  - Students use ICCT to gain additional knowledge (interactive examples, self-assessment tasks)

- **Possibility for the unit to be actually implemented next year**: YES, SUMMER SEMESTER 2023/2024

Proposal 2 Mechatronic Actuators

Responsible: Primoz Podrzaj

Problem: Pneumatics, hydraulics and electrical engineering are topics typically taught within different lectures and by different lecturers. It is therefore often not so easy for students to use this knowledge in an intertwined manner within the same problem/task. Therefore it is important to use all three disciplines in the same project to fully grasp advantages and drawbacks of each of them.

Modifications proposed:

- **Bloom level of understanding –** stays the same: **Compare**, **Select**

  The idea is to use different principles of good learning, e.g. encouraging active learning, development of reciprocity and cooperation among students.

- BL strategy – **Group project**
  - Students work in groups with each one working on a specific project
  - Each group presents its results to all the others

- **Possibility for the unit to be actually implemented next year**: YES, SUMMER SEMESTER 2023/2024

UNIRI – Croatia

Proposal 1 Statistical Testing

Responsible: Sandi Ljubic

Problem: Students have difficulty with statistical analysis of data obtained from their own projects. Although they should have sufficient prior knowledge (based on mathematics) and appropriate concepts are taught in lectures, there are many errors in statistical analysis and there is a general problem of misunderstanding. Points are often lost in well-designed and executed projects simply because incorrect statistical tests are applied and/or incorrect procedures are followed in their application.

Modifications proposed:

- Bloom level of understanding – stays the same: <u>**REMEMBER**</u> [select], <u>**APPLY**</u> [apply, derive]

The idea is to reinforce the "Apply" part by introducing activities that actively engage students in said topic from the beginning. In doing so, we use the features of BL.

- BL strategy – <u>**FACE-TO-FACE DRIVER**</u> (the teacher drives the instruction and augments with digital tool)
    - students are given a small-scale case study: design of a hypothetical HCI experiment (description) and corresponding artificially generated (e.g. mock-up) data → context (data, description) is delivered via LMS
    - students are provided with online tutorials
    - students are provided with report template
    - students are provided with “rubrics” (a matrix combination of checklist and scoring guide)
    - students consider the given case at home, choose a strategy for statistical data analysis, apply appropriate statistical tests in a chosen software tool, draw conclusions and write a short report → reports are submitted via LMS
    - in class, each student/group presents the results of their case study
    - following the presentation, a joint discussion is encouraged
- Possibility for the unit to be actually implemented next year: **YES, FALL SEMESTER 2023/2024** [a small scale course; 10-15 students]

Comment:

Many course descriptions at UNIRI/RITEH should be adapted / revised in order to follow the constructive alignment.

ILo1, as described currently, is not formally embodied in the list of the learning outcomes. It describes part of the project activities within an empirical HCI research. The preparation, organization, and execution of the HCI experiment are actually covered under a single learning outcome: "be able to apply interface evaluation methods (with or without test users)". This is not a good solution because such an outcome actually implies a number of individual learning outcomes.

Proposal 2 Multithreading in Operative Systems

Responsible: Sandi Ljubic

Problem: In Operating Systems course, students typically learn about the theoretical concepts behind multithreading and its positive and negative effects on system performance. One of the potential issues that can arise when using multithreading is known as a race condition, which occurs when multiple threads access a shared resource simultaneously and the result depends on the timing of their execution. Although professors may provide examples of race conditions in lectures, students may benefit from practical examples they can run, modify, and analyze on their own. By gaining hands-on experience with race conditions, students can better understand how they occur and develop strategies to mitigate them in real-world scenarios.

Modifications proposed:

- Bloom level of understanding – **Remember (before)**, **Apply (new)**

The introduction of the "Apply" taxonomy includes interactive laboratory exercise activities where students will learn how to recognize race condition problem and solve it with the introduction of the mutex. This will be done by using an online platform and engaging with students both physically (one-on-one help, questions) and online (questionnaires).

- BL strategy – **FACE-TO-FACE driver**
  - The theoretical concept of multithreading is revised with a short presentation
  - Students are asked to answer multiple choice questions to assess their understanding (not graded)
  - A real-life problem (e.g. ATM withdrawal) is presented, implemented, and explained step-by-step by using an online platform (Google Colab)
  - The problem is divided into several steps where students are asked to implement a little piece of code with the help of the professor
  - A similar problem statement is given to students and they are asked to solve it on their own
- Possibility for the unit to be actually implemented next year: **NO, THE COURSE WAS HELD IN SUMMER SEMESTER 2022/2023 (change of teaching staff)**

Comment:

Many course descriptions at UNIRI/RITEH should be adapted / revised in order to follow the constructive alignment.

UNIBG- Italy

Proposal Business Process Modelling and Simulation

Responsible: Giuditta Pezzotta e Fabiana Pirola

Problem: In Operations Management students typically learn about the concepts of business process modeling and simulation with weak connection with real problems of manufacturing companies. By implementing the concepts explained during lectures in (simplified) real life problems, students will be able to better understand the concepts themselves and to learn how analyze and optimize processes in a real environment through the application of the methods and tools described during the course.

Modifications proposed:

- Bloom level of understanding – **Understand and Apply** (more focus on apply than the current course)

The focus of physical lectures will be more on the apply level of understanding, while the understanding will be mainly done autonomously by students thanks to the online material provided

- BL strategy – Self blended

    - The students will have available short videos (pills) explaining the main concepts of modeling and simulation and the main elements of the BPMN and AnyLogic software.
    - An online forum for Q&A will be available on the LMS to encourage students' participation and exchange of doubts and suggestions.
    - Exercises will be presented and solved step by step with the support of teachers.
    - Additional, optional, exercises will be available on the LMS for students who want to practice more on the course topics.
    - A (simplified) real-life problem will be presented, and students will be asked to solve it by working in groups with the support of teachers helping to solve doubts and issues.
- Possibility for the unit to be actually implemented next year: YES, AUTUMN SEMESTER 2023/2024

Ranking and selection of the educational units

The following Table 2 represents the outcome of discussions held during the LTT C1 workshop. Each educational unit has been carefully selected for full development due to the high interest demonstrated by the consortium and the identified potential for cross-implementation across various institutions. This selection reflects a collaborative effort to enhance the quality of the underlying learning experiences, leveraging blended learning strategies and addressing sustainability goals as defined in the UN SDG agenda.

Table 2. Summary of the discussion and selection of relevant educational units

Educational Unit	Expected Improvement of Quality	Implementation Potential	Impact on Sustainability (SDGs)	Scope and Resources Available
KTH				
Scientific Debate	High - Enhances critical thinking and argumentation skills through digital tools	High - Easily implementable with existing digital platforms	Medium - Encourages informed discussions on sustainability-related topics	High - Requires standard debate tools and digital platforms (e.g., ChatGPT)
UNIMA				
Six Sigma	High - Combines theory and practical application of Six Sigma methodologies	High - Relevant across various engineering disciplines	High - Promotes efficient and sustainable engineering practices	High - Well-supported by digital and F2F resources
Artificial Neural Network (ANN)	High - Provides practical AI skills and comparative analysis for problem-solving	High - Broad application in computer science and engineering programs	High - AI solutions can significantly contribute to sustainable development goals	High - Supported by available digital platforms and resources
POLITO				
Production System	High - Integrates theoretical knowledge with practical system evaluation and optimization	High - Applicable in various industrial and manufacturing contexts	High - Focuses on sustainable manufacturing processes	High - Supported by digital tools and physical labs for hands-on learning
UNILJ				
PID Control	High - Practical programming skills on microcontrollers	Medium - Requires specific hardware (Arduino) but feasible	Medium - Promotes energy-efficient control systems	Medium - Limited by availability of microcontroller hardware
Mechatronic Actuators	High - Comprehensive comparison and selection of actuators for specific applications	High - Relevant for multiple engineering fields	High - Enables selection of sustainable actuator systems	High - Supported by digital resources and practical lab setups

UNIRI				
Statistical Testing	High - Critical for data analysis in HCI experiments	High - Broad applicability in various research and development fields	High - Supports evidence-based conclusions that can inform sustainable development	High - Requires standard statistical software and data from HCI experiments
Multithreading in the Operating System	Medium - Provides foundational understanding of multithreading concepts	Medium - Specific to computer science and IT programs	Medium - Indirect impact by improving efficiency of operating systems	High - Supported by existing computer science infrastructure
UNIBG				
Business Process Modelling and Simulation	High - Enhances understanding and simulation of business processes	High - Widely applicable in business and operations management fields	High - Optimization of business processes can lead to more sustainable operational practices	High - Well-supported by existing business process modeling tools and simulation software

Positioning of the Proposal according to the key dimension

This section Introduces a matrix view (Table 3) of the proposed educational units, structured around the two primary dimensions of our analysis: Bloom's Taxonomy levels and Blended Learning strategies. This matrix provides a clear and comprehensive overview, illustrating how each educational unit aligns with specific cognitive skills and teaching methodologies, ensuring a balanced and effective learning experience.

Table 3. Matrix view of the proposed educational unit: Bloom Taxonomy-BL strategy

	F2F Driver	**Flex**	**Self-Blend**	**Rotation**	**Labs**	**Online Driver**
Create						
Evaluate	KTH					
Analyse	KTH		UNILJ 1			POLITO
Apply	UNIRI 1 and UNIRI 2		UNIBG UNILJ 1 UNILJ 2	UNIMA 1 UNIMA 2		POLITO
Understand			UNIBG			POLITO
Remember						POLITO

Suggested Readings

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