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LBS2ITS

Co-funded by the Erasmus+ Programme of the European Union

Curricula Enrichment delivered through the Application of Location-based Services to Intelligent Transport Systems

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Erasmus+ Programme

Capacity Building in Higher Education

Summaries of team meetings held during "Alternative PNT technologies" course

27. April – 1. May 2023.

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618657-EPP-1-2020-1-AT-EPPKA2-CBHE-JP

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Document Overview

An “Alternative PNT technologies” TTT course was held in Belihuloya, Sri Lanka at the SUSL University from April 27th to May 1st 2023 (5 days). During this event, the project consortium held multiple meetings. Primarily, we have started working on the curricula course modules development as part of WP 5.2. “Workshop on core curricula course modules development”. Secondly, we had a pre-PMB meeting where we discussed some project management items and a few coming WPs.

This document details all the meetings and indicates what should be further done.

List of Abbreviations and Acronyms

Abbreviation/Acronym	Meaning
AB	Advisory Board
CBHE	Capacity Building in Higher Education
EACEA	The Education, Audiovisual and Culture Executive Agency
EC	European Commission
EU	European Union
ITS	Intelligent Transportation Systems
LBS	Location Based Services
LPT	Local Project Team
GA	Grant Agreement
PBL	Problem Based Learning
PC	Partner country
PNT	Position, Navigation and Timing
QA	Quality Assurance
QC	Quality Control
SC	Steering Committee
TTT	Train the Teachers
WP	Work Package

About LBS2ITS

Project Title	Curricula Enrichment delivered through the Application of Location-based Services to Intelligent Transport Systems
Source of funding	EU EACEA ERASMUS+ KA2 ACTION (Capacity Building in Higher Education)
Coordinating Institution	Technische Universitaet Wien (TU Wien)
Project Coordinator	Jelena Gabela Majic
Project Number	618657-EPP-1-2020-1-AT-EPPKA2-CBHE-JP
Website	lbs2its.net
Project total budget	965,465.00 EUR

The project '**Curricula Enrichment delivered through the Application of Location-based Services to Intelligent Transport Systems**' – LBS2ITS aims to improve the teaching capacity of Sri Lankan Universities through developing of new curricula course modules in the field of LBS.

Workshop on core curricula course modules development

The 3-day workshop will be held in mid-October 2023 in Athens, Greece. Official preparations started in February 2023.

Monthly team meeting – March 2023

We previously already discussed course curricula development in a monthly team meeting. The task was to try to prepare a list of courses/modules to be developed/modernised.

Notes from the monthly team meeting held on 28/03/23:

- SUSL: will introduce a couple of new modules and modernise existing BA and MA modules
- USJ: will introduce 1 new module (BA) and modernise 3 modules (BA). There is a will to modernise/develop more modules. The modules so far are in the area of Advanced Surveying, Survey inputs, and Transport elements.
- KDU: will introduce new modules (e.g., "Emerging IT" (MA)) and modernise existing modules (e.g., GIS; Emerging ICT – LBS and ITS topics)
- UoM: prepared a table

Module name	New module	Modernised module	Level
Urban Informatics (2 ECTS) / Environmental Informatics (2 ECTS)	✓		MSc
Spatial Data Collection (2 ECTS)	✓		MSc
Spatial Data Analytics and Visualization (2 ECTS)	✓		MSc
Urban Analytics and Simulation Lab (7 ECTS)	✓		MSc
Urban Informatics (1 ECTS)		✓	BSc
Spatial Data Analytics and Visualization (2 ECTS)		✓	BSc
Transit City Planning and Design Studio (7 ECTS)		✓	BSc
ITS applications & user information systems (5 ECTS)	✓		MSc
Crowdsource data for transportation (5 ECTS)	✓		MSc
Analysis and Design of Transportation Systems: LBS (5ECTS)		✓	BSc
Smart Transportation (5 ECTS)		✓	BSc

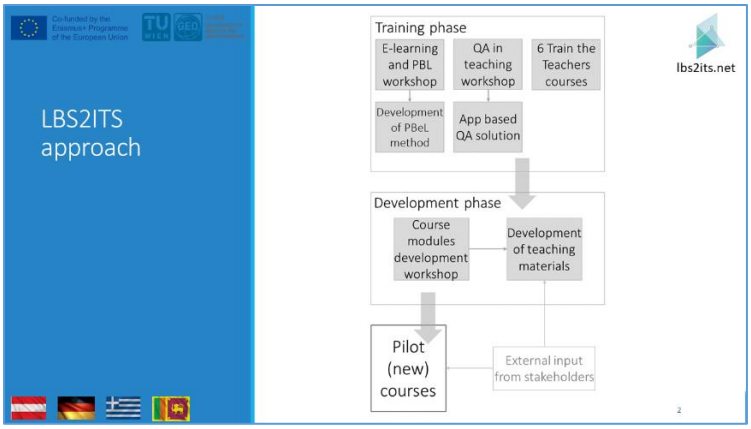
- Before we come to Sri Lanka in April, everyone will prepare a list like UoM did.
- A point was raised on the meaning of modernisation. Modernisation implies any changes made to improve the current module in the pedagogic method, delivery of materials to students, assessment methods and the content of the materials.
- We will prepare a template on how to develop curricula for the courses.

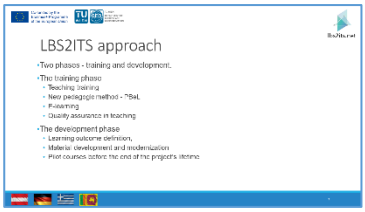
Curricula development meeting in Belihuloya – April 28th

This meeting was attended by all local project coordinators in person, except for the representative from TUD.

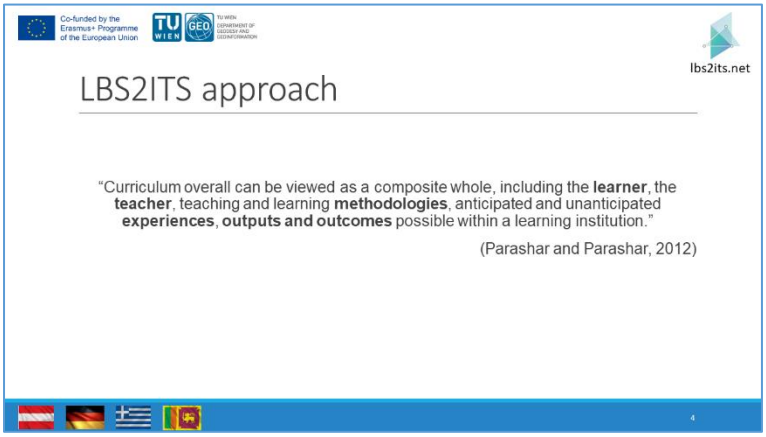
The project coordinator (Jelena Gabela Majic) prepared a presentation to start the discussion. Slides are attached here.

- Slides 2 and 3: 2 phases of the LBS2ITS project are shown in a flow-chart form. We are currently in the finishing stages of the training phase and the starting phase of the development phase.

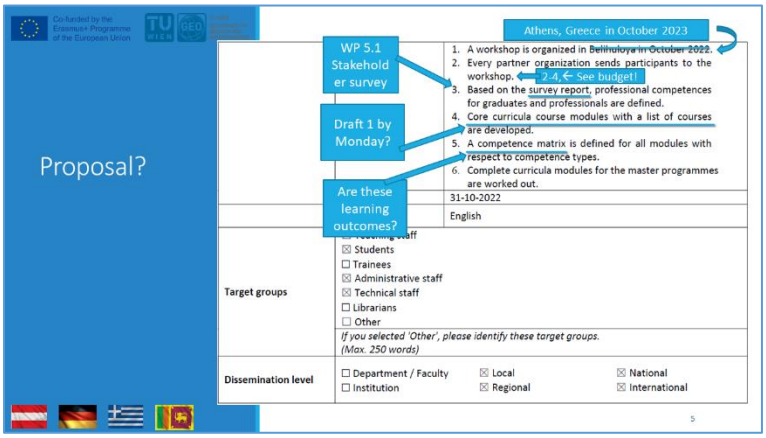




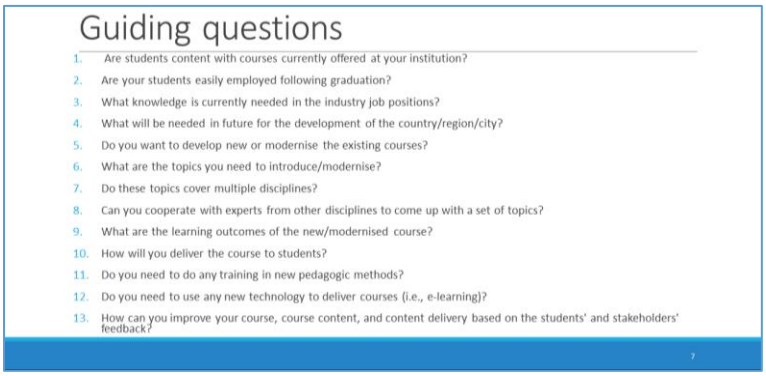
- Slide 4: We will approach the development phase holistically by looking at all aspects: learners, teachers, methods, outcomes, outputs, and experiences. That is why we are having all TTT courses, Problem-Based Learning and e-learning workshops, a Quality Assurance workshop, developing QA app-based solution, purchasing equipment etc.



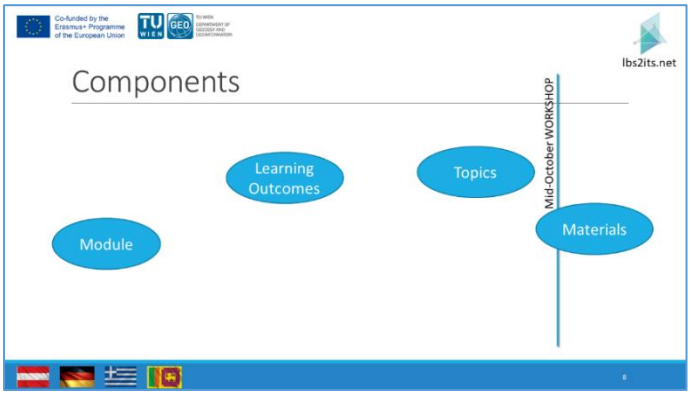
— Slide 5: What does the project proposal say? We need to have a look and consider how to best prepare for mid-October. We still need to do the survey of stakeholders!



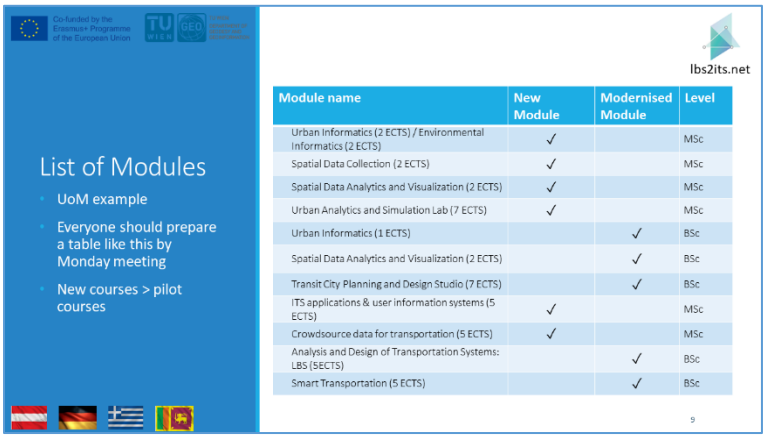
— Slide 7: Some guiding questions are proposed.



— Slide 8: There are 4 components to the curricula development. Firstly, we define the modules we need to develop or modernise. Then we need to define the learning outcomes for those modules. We need to define all the topics that these courses will cover. Lastly, we need to develop the materials for the courses based on the defined outcomes and the topics. We want to be at the point of material development by the time we have a workshop in Athens.



— Slide 9: By the next meeting we should have the first draft for everyone.



List of Modules

- UoM example
- Everyone should prepare a table like this by Monday meeting
- New courses > pilot courses

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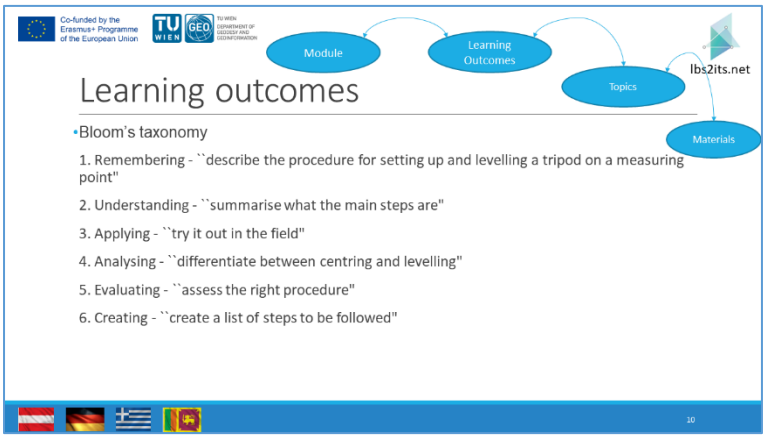
Module name	New Module	Modernised Module	Level
Urban Informatics (2 ECTS) / Environmental Informatics (2 ECTS)	✓		MSc
Spatial Data Collection (2 ECTS)	✓		MSc
Spatial Data Analytics and Visualization (2 ECTS)	✓		MSc
Urban Analytics and Simulation Lab (7 ECTS)	✓		MSc
Urban Informatics (1 ECTS)		✓	BSc
Spatial Data Analytics and Visualization (2 ECTS)		✓	BSc
Transit City Planning and Design Studio (7 ECTS)		✓	BSc
ITS applications & user information systems (5 ECTS)	✓		MSc
Crowdsource data for transportation (5 ECTS)	✓		MSc
Analysis and Design of Transportation Systems: LBS (5ECTS)		✓	BSc
Smart Transportation (5 ECTS)		✓	BSc

9

— Slide 10: Learning outcomes should be guided by Bloom's taxonomy. Refer back to what we did at the PBL workshop in September 2021. An example is given here.



Module → Learning Outcomes → Topics → Materials

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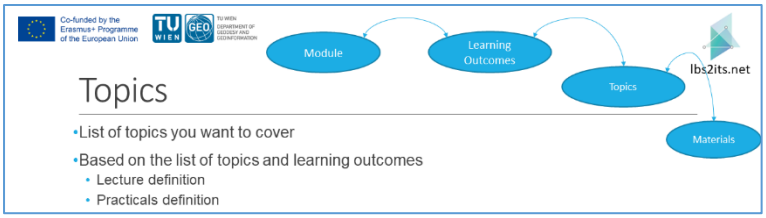
Learning outcomes

- Bloom's taxonomy

1. Remembering - ``describe the procedure for setting up and levelling a tripod on a measuring point"
2. Understanding - ``summarise what the main steps are"
3. Applying - ``try it out in the field"
4. Analysing - ``differentiate between centring and levelling"
5. Evaluating - ``assess the right procedure"
6. Creating - ``create a list of steps to be followed"

10

— Slide 11: Topics can be found in the proposal. These topics or "subject areas" are defined in the project proposal in WP 5.4 "Development of new teaching materials for 20 subject areas".



Module → Learning Outcomes → Topics → Materials

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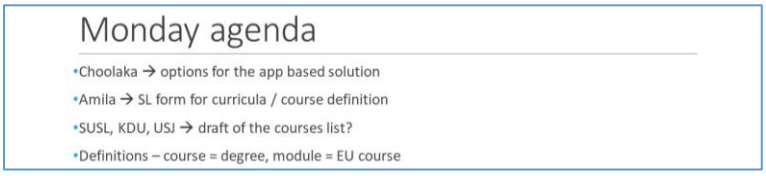
Topics

- List of topics you want to cover
- Based on the list of topics and learning outcomes
  - Lecture definition
  - Practicals definition

— Slide 12: Agenda we all agreed on based on the meeting



Monday agenda

- Choolaka → options for the app based solution
- Amila → SL form for curricula / course definition
- SUSL, KDU, USJ → draft of the courses list?
- Definitions – course = degree, module = EU course

Curricula development meeting in Belihuloya – May 1st

During this meeting everyone presented the modules they plan to introduce (at first glance) at their respective institutions. We agreed on the template that should be used to propose new or modernise existing modules at their respective institutions. Definitions of courses, modules, topics, and credit points were discussed. We also discussed and agreed on the timeline of how we want to approach curricula development. This particularly in view of getting the approvals for new modules.

Attendees:

Jelena Gabela Majic	TUW	Amila Buddhika Jayasinghe	UoM
Guenther Retscher	TUW	Perera Loshaka	UoM
Max Brandstaetter	TUW	Choolaka Hewawasam	USJ
Vassilis Gikas	NTUA	Pradeep Kalansooriya	KDU
Nishamani Ranasinghe	SUSL	Homindra Divithure	SUSL
Costas Raptakis	NTUA	Jenan Rajavarathan	SUSL
Vangelis Zacharis	NTUA		

First draft of new modules

— KDU:

- Degree programmes – BSc in Information Technology; BSc in Information Systems
- Proposing new MSc programme in CS → KDU is developing it at the moment
- Topics: LBS2ITS, ITS

Course name	New course	Modernised course	Level
Intelligent Systems for CS		✓	BSc
Intelligent Systems for IT	✓		BSc
LBS2ITS for Information Technology and Information Systems	✓		BSc
Emerging trends in ICT for Computer Science, Software Engineering, Computer Engineering		✓	BSc
GIS for IT, IS		✓	BSc
Intelligent Systems	✓		MSc

— USJ:

2 new modules
- Advanced Surveying and Geomatics – BSc of Eng. Technology (spec. area geotechnology)
- Environmental Informatics (selective module) – BSc of Eng. Technology (spec. area environm. techn.)

Modernisation
- Precision agriculture – BSc of Biosystems technology (agriculture engineering technology)
- Survey and landscaping technology - BSc of Biosystems technology (agriculture engineering technology)
- Environmental impact assessment - BSc of Eng. Technology (spec. area environm. techn.)
- Environmental data analysis - BSc of Eng. Technology (spec. area environm. techn.)

— SUSL:

Module name	New course	Modernised course	Level
Surveying Studio	✓		MSc
GNSS for surveyors		✓	MSc
Fundamentals in satellite positioning and navigation		✓	BSc
Advanced concept of GNSS		✓	BSc
Applications of GNSS		✓	BSc

— UoM: As previously shown.

— The partners will work on these lists further.

— Agreed timeline → Draft for all modules – End of June 2023

— New modules finalised form – End of July 2023? → Submission for approval

Template for module definition

— We all need to agree on a template on how to present the new and existing modules

— In Sri Lanka, they already have a standardised template to do this

— We suggest, for the sake of clarity and sustainability, to use the same template

— Information for the pedagogic method will be added at the bottom in the remarks

— The template is shown below:

Module Code	CE3162	**Module Title**	Fundamentals of Transportation Engineering			
Credits	2.0	**Hours/Week**	**Lectures**	1.5	**Pre-requisites**	None
GPA/NGPA	GPA		**Lab/Assignments**	3/2		
Module Type:	Core Module/Compulsory ☑		Elective ☐		Optional ☐	

Learning Outcomes (LOs)
After completing this module, students should be able to:

LO-1: *express* basic traffic flow theory to *describe* traffic flow conditions and *recognize* the appropriateness of traffic management measures that are in use,

LO-2: *identify* basic elements in highway planning, *describe* transport planning process, *identify* its importance and *calculate* traffic demand based on given information,

LO-3: *discuss* the importance of transportation systems management for various modes of transport, and

LO-4: *discuss* the importance of safety, socio-economic, environmental considerations and sustainable developments in transportation systems.

Module Outline	**LOs Covered**
Introduction [1.5 h] *Fundamentals of transport systems, impacts, desired features, role of transport professionals*	LO-3

Transport Function and Transportation System Management [3 h] *Need for transport, accessibility and mobility, different transport modes and transportation systems management*	LO-2, LO-3
Traffic Flow theory [1.5 h] *Speed, flow & density measurements, data handling, analysis and interpretation*	LO-1
Fundamentals of Transport Planning [6 h] *Planning processes, trip generation & attraction, trip distribution, model split, trip assignment*	LO-2
Transport Safety [3 h] *Concept of safety and risk, safety management, driver behaviour and human factors, human error, overview of road safety in Sri Lanka, risk mitigation*	LO-3, LO-4
Sustainable development and environmental considerations [3 h] *Sustainable development of transport infrastructures, transport related activities that affect the environment, identification of possible impacts and countermeasures*	LO-3, LO-4
Transport Infrastructure [3 h] *Process of development, basic elements of highway planning, airport and rail transport infrastructure, new transport infrastructure developments*	LO-2
Practical Work	
1. Debates on transport related topics	LO-1, LO-2, LO-3
Assignments	
1. Assignment on traffic data analysis	LO-1
2. Assignment transport projects in SL	LO-2, LO-3, LO-4
3. Assignment on Transport Infrastructures/safety	LO-4
4. Assignment on Transport Systems/Planning	LO-3

	Category	Type	Assessed LOs	Weightage (%)
Assessments	CA	Report on Assignment 1 [6%]	LO-1	40%
		Presentation on Assignment 2 [6%]	LO-2, LO-3, LO-4	
		Report on Assignment 4 [6%]	LO-3	
		Report on Assignment 4 [6%]	LO-3	
		Debates [10%]	LO-2, LO-3, LO-4	
		Quiz [6%]	LO-1, LO-2, LO-3	
	WE	End Semester Examination	All	60%

Recommended Textbooks	1. Kadiyali, R. L. (2007). Traffic Engineering and Transport Planning (7th ed.). Delhi: Khanna Publishers.
Names of Lecturers	Dr. H. L. K. Perera, Dr. H. R. Pasindu, Dr. G. L. D. I. De Silva

Mapping of Module Learning Outcomes (MLO) to the Programme Outcomes (PO)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
LO-1	M	L	M									
LO-2		M			L	L	M					
LO-3						M	M	L	H	H		M
LO-4						M	H	L	L	M		
Module	**L**	**M**	**L**		**L**	**M**	**M**	**L**	**M**	**H**		**L**

Scale: H – High M– Medium L– Low

Remarks:

What point system equivalent to ECTS is Sri Lanka using?

- A member of the consortium raised a question of the ECTS point.
- It was clarified that LBS2ITS does not need to do anything here because Sri Lanka already has a country wide framework that all partner universities already use in their courses
- Excerpt from the mid-term report: "Sri Lanka does not follow ECTS standard but they have a 'Credit and Qualifications framework of the degree programmes in universities' from the Ministry of Higher Education where they recommend that 1 credit in engineering should be defined by 50 hours of study. Comparatively, 1 ECTS in Austria equals 25 hours of study."

What is a course and what is a module?

- When talking in the Sri Lankan context, module is a subject you will teach to students. In EU we would call it a course.
- In Sri Lanka, A course would be a degree program that consists of modules you need to pass in order to get a degree.

What are the topics?

- A question "What are these topics?" has been raised. The confusion originated frm thinking these are the lectures that need to be designed. The topics are suggested in the proposal as "20 subject areas".
- TOPICS = SUBJECT AREAS
- Teaching areas are defined by the content taught in the TTT courses
- From WP 5.4 "Development of new teaching materials for 20 subject areas"
    - To support education modernization, new teaching materials will be developed, with emphasis on new technologies. A preliminary list of materials is given below:
        - 1. Introduction to LBS;
        - 2. LBS theory;
        - 3. LBS applications;
        - 4. Localization techniques;
        - 5. Alternative PNT technologies;
        - 6. Smartphone positioning;
        - 7. Low-cost sensors for positioning, navigation and mapping;

- 8. Cartography and geovisualisation;
- 9. Web cartography;
- 10. Sensor fusion;
- 11. Estimation theory methodology;
- 12. Spatial analysis;
- 13. Smart city mobility;
- 14. Understanding travel behaviour;
- 15. Traffic engineering;
- 16. Traffic safety;
- 17. Traffic quality;
- 18. Mobility concepts;
- 19. Data and models in transportation; and
- 20. Interdisciplinary study project.

— New subject areas can be added based on the need as informed by the consortium or the stakeholders!

How do we tackle module accreditation?

— Accreditation is an important issue
— We must distinguish two actions: module modernization and module development
— Module modernization process is easier as the modules already exist and adapting pedagogic methods, materials, outcomes, assessment methods can be done on the internal basis
— New modules need to be proposed and approved by the university senate (?). This process can take multiple months. It is not necessary to have materials! Modules just need to be approved. For this, local coordinators will prepare the templates as shown in one of the previous sections.
— Consequently, we have decided that everyone will focus now on the novel modules so that the accreditation procedure can be started by July/August in order to start teaching some pilot courses at the beginning of the 2024.

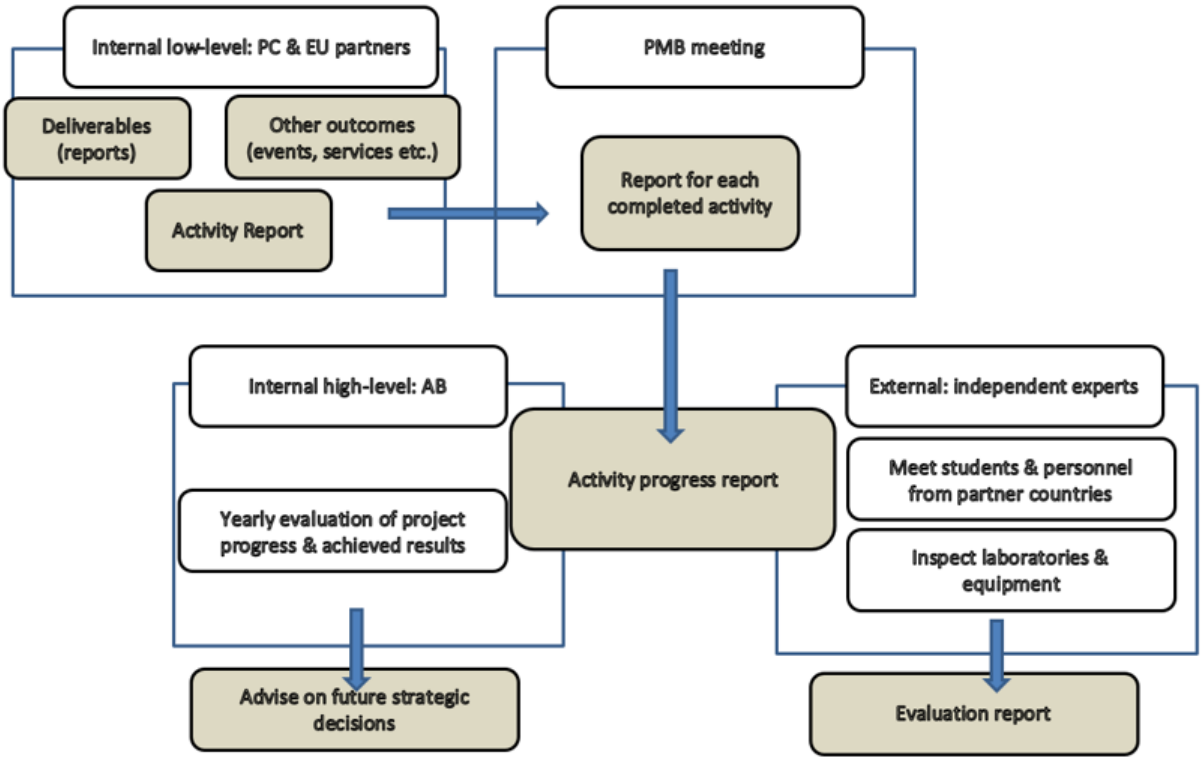
Future tasks

— Agreed timeline
  - Draft for all modules – End of June 2023
  - New modules finalised form – End of July 2023? → Submission for approval

- Jelena will check some information:
    - What is the final output?
    - Accreditation?
    - How many new and how many modernized courses?
    - How many do have to be pilot courses?
    - Have a look at other CBHE project that have finished and how many courses they introduced
- Loshaka will send out the word document for the template
- Choolaka will work on the app based solution for the Quality Assurance
    - It needs to be open-source
    - It should go to the administrator (when the survey is done)
    - There should be also option to do it during the semester and that should go to the teacher to be able to do real-time improvements of the module
    - Cognito forms

"Project Management Board (PMB) meeting" – April 30th

- Project members have acknowledged that PMB meeting have not happened as they were supposed to according to the project proposal
- QA plan was shown and the role of the PMB has been looked at with more care



- Given the upcoming need for the AB meeting → PMB needs to produce a report so that we can look at how our project is progressing with a critical eye.
- This was not a real PMB meeting as 2 important members were not attending:
  - The chair of PMB Prof Georg Gartner
  - TUD coordinator Prof Regine Gerike
  - All other members were there in person
- That is why this meeting is actually considered a pre-PMB meeting.
- The consortium was unsure how often we need to have a PMB meeting. Given the current transition from the Teacher Training phase into the Development phase, we all agreed that we should try to have meeting more often. It was proposed to have PMB meeting every 3 months.

The next one will be at the end of the June and the following meeting will be in person at the beginning of the September at the UoM when majority of us meet in person again.

- What will we do at these meetings?
    - Given the experience of writing the mid-term report we need to update and track project progress more often.
    - In meetings we will always have a look at the
        - Activity Monitoring Manual
        - Financial Statement
    - We always need to be on top of things that need to be done and write reports for everything we do!
- Current tasks to be done:
    - Advisory Board → Loshaka will ask UNIC to join
    - Advisory Board → Everyone will ask other companies so that we have representatives from different branches
    - WP 3.8. → Everyone was advised to find a female staff to come to EU partners for training. This is at the moment led by TUD so we can ensure everyone does it. The goal was to have it done from October but some members indicated it would work better for them after April/May. Female staff could face difficulty of coming here given the fact that they maybe have children to care for or some other personal circumstances that stop them from coming for 2 months. Given this, we would be ok if any female staff could come to visit us for more than 2-3 weeks.
    - Can we make cash payment to female staff when they come to our universities?
    - Can we make cash payments when all project members visit us at the European universities? It is becoming increasingly difficult for our project members to receive money from their institution and also to cover all costs incurred by this project given the high taxes.

Issue date: October 2021

Updated: January 2023

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