INNOMATH: Innovative enriching education processes for Mathematically Gifted Students in Europe

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Implementation period: September 2019 – August 2021

Training program for teachers or others interested in the identification/ support/ enriching with practical skills of mathematically gifted students in the context of the INNOMATH project

Template (*for the Methodology and Structure of a Learning Plan for Presenting a Module for the INNOMATH course programme, module of 3 hours duration*).

Module Number and Area/ Topic: Module 9
Cloud Computing and Cloud Education Leadership

Introduction and Broad Description of the Context and Goal of the area/ topic addressed:
In the context of promoting skills and competencies for learning facilitators, supporting mathematically gifted students, it is essential that they should be able to:

- Work in a contemporary environment that is shaped by the developments of the 4th Industrial Revolution,
- Work in an environment that promotes the achievement of the goals of mathematics
- Connect the work of the students to the real world and particularly the Industry
- Provide to the students the means for developing competencies for creativity and innovation but also for the development of positive attitudes towards mathematics.

As a result of this a facilitator should be competent in some of the tools of the new era. Such a tool is Cloud Computing and Cloud Education Leadership.

An approach for achieving this goal is to provide the means to the trainees for taking the advantages that are the outcomes of the L-Cloud project. In this module we are aiming at introducing and presenting to them the main components of this project.

Learning Outcomes: With the completion of this module the trainees will be able to
1. Identify the need to endeavor in areas that will provide the background for an educational leader with skills and competencies relating to the technologies that are setting up the framework of working in education 4.0
2. Refer to what about is the project L-Cloud and the concepts involved in it.
3. Consider the concept of education in the context of L-Cloud
4. Specify the goals and objectives of L-Cloud
5. Refer and know of a framework of competencies in the Educational Environment of Cloud Computing.
6. Know the content of the training course for adaptive educational leaders and
7. Refer to the process of Certification of the adaptive educational leaders in the context of L-Cloud
8. Assess the extent of usefulness of the various competencies that an educational leader should develop in the context of

Content and Resources (providing information on the various constituents/ dimensions of the topic under consideration):
The project L-Cloud: https://www.l-cloud.eu/en_US/

Methodology and approaches for the module training presentation: Collaborative learning: brainstorming, debates, co-design and planning
Constructionism: inquiry based and project-based learning
Developing case studies and worksheets, answering questionnaires and quizes
Investigating-researching using the web
Maieutic: Socratic method of questioning

Instruments/ Tools/ Supporting Material/ Resources to be used:
(list of file, web links, videos, PPT…. use file names etc)
The L-Cloud platform: https://www.l-cloud.eu/en_US/
The School on the Cloud Platform:
https://www.schoolonthecloud.net/#:~:text=By%20encouraging%20collaboration%20and%20knowledge,countries%2C%20distributed%20widely%20across%20Europe

Pedagogical/Learning Sequencing and Activities Plan: ………………..
Introductory activities (creation of interest, reference to real value issues, relation to background experiences etc)

Activity 1: Introduction and reflection on how the developments in the 4th Industrial Revolution lead to the need of promoting in the educational forum the ideas of Cloud Computing and Cloud Education Leadership	
Development	Refer to education in connection with the idustrial revolutions Write some answers on the following Questions

	What are some aspects that characterize the 21st century in the context of the economy, the social conditions, the realms of meaning, the educational forum and so on?
	To what extent do these aspects influence the work of a learning facilitator?
	What is the conclusion from these observations for a learning facilitator?
	Does the term adaptable educational leader make sense to you?
	Reflection and discussion on these answers
	Refer to the relation of education with the developmnts in the digital era and in particular to Cloud Computing
Materials	ppt
Resources	
Estimated Time	30 min
Environment/Room Setting	In the case of a class: Circular arrangement in order to facilitate discussion In the case of online presentation: Provisions for chatting
Trainees' role	Discussion and reflection

Development activities

Activity 2: Description of the L-Cloud project and the basic concepts involved in it	
Development	Presentation and explanation of the various concepts involved in L-Cloud
Materials	ppt, laptops
Resources	The L-Cloud webpage: https://www.l-cloud.eu/en_US/ The School on the Cloud webpage: https://www.schoolonthecloud.net/
Estimated Time	30 min
Environment/Room Setting	In the case of a class: Circular arrangement in order to facilitate discussion In the case of online presentation: Provisions for chatting
Trainees' role	Discussion and reflection

Activity 3: Presentation of the framework of competencies expected from an educational Leader in the context of a cloud education environment

Development	Reflection on the needs for a framework of competencies for an educational leader in the cloud educational environment Presentation and reflection on this framework
Materials	ppt, laptops, internet
Resources	The outcomes of the L-Cloud project
Estimated Time	30 min
Environment/Room Setting	In the case of a class: Circular arrangement in order to facilitate discussion In the case of online presentation: Provisions for chatting
Trainees' role	Discussion and reflection

Activity 4: Description of the course and the certification process leading to a certified cloud education leader	
Development	Presentation and explanation of the course and the certification process of L-Cloud
Materials	ppt, laptops, internet
Resources	The outcomes of the L-Cloud project
Estimated Time	30 min
Environment/Room Setting	In the case of a class: Circular arrangement in order to facilitate discussion In the case of online presentation: Provisions for chatting
Trainees' role	Discussion and reflection

Practicing Activities (hands-on activity)

Activity 5 : Reflection on ideas of L-Cloud that can provide resources for the facilitators of training mathematically gifted students and discussion on how L-Cloud could become a catalyst for the achievement of the goals of the INNOMATH project.	
Development	Presentation, Reflection and discussion on the usefulness of the ideas of L-Cloud for facilitators in the training of gifted children in the context of the INNOMATH project
Materials	ppt, laptops, internet
Resources	The outcomes of the L-Cloud project
Estimated Time	30 min
Environment/Room Setting	In the case of a class: Circular arrangement in order to facilitate discussion In the case of online presentation: Provisions for chatting
Trainees' role	Discussion and reflection

Evaluation of Learning Outcomes

Activity 6: Questionnaire on the extend of support and usefulness of the L-Cloud framework of competencies to the learning facilitators in the INNOMATH project	
Development	Presenting and requesting answers by the participants to a Questionnaire relating to the competencies of an educational leader and its usefulness in the context of the INNOMATH approach
Materials	Questionnaire in the APPENDIX
Resources	ppt, laptops, internet
Estimate Time	The outcomes of the L-Cloud project
Environment/Room Setting	30 min
Trainees' role	In the case of a class: Circular arrangement in order to facilitate discussion In the case of online presentation: Provisions for chatting
	Discussion and reflection

Reflection and Closure activity

APPENDIX

QUESTIONNAIRE

Assessing and commenting on the extent of usefulness of the ideas of L-Cloud in the INNOMATH context

Complete the following questionnaire by assessing the degree of contribution of each competency in the strengthening of a teacher's competencies, aiming to support mathematically gifted students. Mark with: 4 (Excellent), 3 (Good) 2(satisfactory), 1(little). Furthermore add your comments on the advantages, practicality and difficulties you would expect in applying these competencies in an INNOMATH class

AREAS	COMPETENCES	MARK 1,2,3,4	COMMENTS
1. Communication, Collaboration and Participation	1.1. Knowledge of the foundations of communication as applied to Cloud Education Environments **(CEE)**.		
	1.2. Ability for communication in CEE.		
	1.3. Ability to establish a shared vision on CEE in the educational organization.		
	1.4. Capacity to build and consolidate communities of interest related to CEE.		
	1.5. Negotiation skills (social and political interactions) with multiple educational stakeholders, actors and contexts, and decision making in cloud education.		
	1.6. Ability to manage personal emotions.		
	1.7. Disposition to team building and active participation in CEE.		
2. Innovation, Creativity and Creation	2.1. Knowledge of the foundations of creativity as applied to CEE		
	2.2. Ability to lead cloud education innovations in parallel to the pedagogical project and the infrastructure of the centre		
	2.3. Ability to creatively use CEE in different educational contexts.		
	2.4. Disposition to investigate about current research, innovations and best practices in the field of cloud education.		
	2.5. Disposition to express creative ideas, experiences and emotions about CEE.		

3. Professional Development	3.1. Understanding, construction and continuous reflexion on educational leaders' professional digital identity in CEE.		
	3.2. Ability to actively participate in educational research and practitioner networks in CEE.		
	3.3. Ability to critically assess your own practice as leaders and develop their understanding of effective and sustainable leadership.		
	3.4. Disposition to participate in cloud education Professional Development programmes (CPD).		
	3.5. Disposition to promote reflexive practice and professional development focused on engagement, responsibility, teaching, learning and leadership, and keeping abreast of change.		
4. Ethics and professional responsibility	4.1. Knowledge on the effective and ethical use of the different types of CEE (public, private and hybrid) and their services, tools and functionalities (SaaS, PaaS and IaaS).		
	4.2. Knowledge on legal issues related to safety, data protection, privacy and a responsible use of CEE.		
	4.3. Ability to solve complex problems in CEE.		
	4.4. Disposition to Identifying and removing barriers to create/maintain a cloud education infrastructure.		
	4.5. Disposition to motivating, encouraging, trusting and valuing colleagues to create and use cloud education in their contexts		
	4.6. Disposition to social and global awareness and responsibility in relation to CEE.		
	4.7. Disposition to promote and build an ethical digital identity in cloud education.		
5. Intercultural relationships and internalization	5.1. Knowledge on international and global aspects of CEE.		
	5.2. Ability to build and maintain intercultural relationships with partner, stakeholders and the educational community as a whole through CEE.		
	5.3. Disposition to promote international mobility, entrepreneurship, training and cooperation on cloud education.		

	5.4. Disposition to respect and become aware of the diversity of learners' cultures, and identify common values.		
	5.5. Commitment to foster inclusion, cross-cultural skills and equal opportunity in CEE.		
	6.1. Pedagogical content knowledge in relation to different subjects, contents and structure in CEE.		
	6.2. Knowledge on contextual, institutional, organizational aspects of educational policies		
	6.3. Knowledge on class management, assessment and feedback processes in CEE.		
6. Pedagogical and Organizational	6.4. Skills on using, developing, creating and managing CEE, including applications, devices, and networks		
	6.5. Skills on selecting, creating, organizing, sharing and publishing educational content according to different CEE.		
	6.6. Skills to identify students' learning needs, and learning progress in the cloud.		
	6.7. Disposition to accept responsibilities to planning and implementing CEE.		