AgriNext

Curriculum for Module 1

Training of

Competences for Teachers in Multifunctional Agriculture

MODULE 1: Flexible Teacher

Duration: 8 hours up to 45 minutes (6 hours face to face training, 2 hours self-preparation)

OVERVIEW

Agriculture is undergoing a major transformation driven by innovation and digital technologies, such as the Internet of Things (IoT) and Artificial Intelligence (AI). These tools are reshaping how farmers manage crops, optimize resources, and respond to global challenges like climate change and food security. This module provides an in-depth look at how digital competencies, IoT, and AI can revolutionize the agricultural sector, positioning it for greater sustainability and productivity in order to explain the need for more flexibility in education systems and teaching process. By focusing on education and digital skills, the AgriNext project plays a critical role in preparing the next generation of agricultural professionals. This module will explore how IoT and AI can be incorporated into agricultural practices and how AgriNext fosters these advancements through research, education, and collaboration.

LEARNING OBJECTIVES

Knowledge

The learner will be able to:

List the basic concepts of technological advancements in agriculture, traditional agricultural practices, challenges and opportunities through integration of technologies, describe how modern technologies contribute to sustainable and competitive agriculture, distinguish the dynamic interplay between tradition and innovation in shaping agricultural practices, and specify the elements of a flexible school system and differentiate the role of teacher as flexible in different pedagogical and professional situations, activities and educational levels.

Skills

The learner will be able to:

Combine traditional methods with modern technology for optimal results, understand how to integrate traditional agricultural knowledge with modern technological advancements and adjust the learning process to the needs of the labour market and students.

Attitudes acquired

The learner will be able to:

Value the new development opportunities offered in sustainable agriculture, thanks to the implementation of smart technologies, IoT and traditional skills, and accept importance of flexibility in teaching and creating curriculum

Learning units

Unit 1: What is flexible teaching?

Unit 2: Digital competencies in agriculture: Skills for the future

Unit 3: Practical examples of IoT and AI in agriculture

Unit 1/Outcomes: What is flexible teaching?

KNOWLEDGE	SKILLS	ATTITUDES
Learner is able to: Specify the elements of a flexible school system and differentiate the role of teacher as flexible in different pedagogical and professional situations, activities and educational levels.	**Learner is able to:** Adjust learning process to the needs of the labour market and students	**Learner is able to:** Accept the importance of flexibility in teaching and creating curriculum.
Transversal skills: Flexible approach in social, technological and economical aspect of the changing world.		
Digital Skills: Recognize new digital tools useful in flexible teaching.		
Green Skills: To raise awareness of the importance of flexible teaching for the acquisition of green skills		

Implementation Plan of Pedagogical Activities:

Date:		Location:	Duration: 60 min	
Description of participants: teachers in VET (agriculture sector)				
Expected number of learners: 25				
No. of Activity	Timing	Training Methods / Activity	What I do	What they (participants) do
A 1.1	45 min	Presentation: What is flexible teaching?	Present	Listen
A 1.2	15 min	Watching video	Start debate	Watch, debate
Material (What I need to have prepared):				

Flipchart, markers, PowerPoint presentation, link: https://www.youtube.com/watch?v=nsnpEmr1q_k
References/Sources: 1. Deed, C.: Teacher adaptation to flexible learning environments, Learning Environments Research (2020) 23:153–165 2. A Complete Guide to Flexible Teaching; https://spark.school/a-complete-guide-to-flexible-teaching/ 3. Sattorovna, T.S.: Development of flexibility competence is the main form of professional development of a teacher of education, The American Journal of Social Science and Education Innovations, Vol. 05 ISS. 04 Pp: 34-37 4. Sitthiworachart, J. et al.: Technology-Supported Active Learning in a Flexible Teaching Space, Educational Sciences
Other notes: The duration of each activity can be adapted.

Unit 2/Outcomes: Digital Competencies in Agriculture – Skills for the Future

KNOWLEDGE	SKILLS	ATTITUDES
Learner is able to: List the basic concepts of technological advancements in agriculture, traditional agricultural practices, challenges and opportunities through integration of technologies.	**Learner is able to:** Understand how to integrate traditional agricultural knowledge with modern technological advancements	**Learner is able to:** Accept new technologies in agriculture.
Transversal skills: • Effective Communication: Explaining complex technological concepts clearly to diverse audiences. • Collaboration: Working with different stakeholders, including farmers, technologists, and policymakers.		
Digital Skills: • Technology Proficiency: Properly choose IoT devices, drones, and data analysis software in agriculture.		
Green Skills: • Sustainability practices: Understanding and applying sustainable farming practices. • Environmental impact: Assessing and mitigating the environmental impact of agricultural activities.		

Implementation Plan of Pedagogical Activities:

Date:	Location:	Duration: 110 min		
Description of participants: teachers in VET (agriculture sector)				
Expected number of learners: 25				
No. of Activity	**Timing**	**Training Methods / Activity**	**What I do**	**What they (participants) do**
A 2.1	90	Presentation: Digital competencies in agriculture	Present	
A 2.2	20	Watching video	Prepare and play video link	Watch video. Participate in the discussion about the video.

Material (What I need to have prepared):

Flipchart, markers, PowerPoint presentation, link: https://www.youtube.com/watch?v=D2BeFobOY58

References/Sources:

1. Friha, O. et al.: Internet of Things for the Future of Smart Agriculture: A Comprehensive Survey of Emerging Technologies. Journal of Automatica Sinica, 8(4); 718 – 752. Available on:https://www.ieee-jas.net/en/article/doi/10.1109/JAS.2021.1003925?form=MG0AV3
2. Hamadani, H. et al.: Traditional Farming Practices and Its Consequences. Microbiota and Biofertilizers, Vol 2, 119-128. Available at: https://link.springer.com/chapter/10.1007/978-3-030-61010-4_6?form=MG0AV3
3. IoT in Agriculture: Benefits and Project Examples (stormotion.io). Available on: https://stormotion.io/blog/agriculture-iot/?form=MG0AV3
4. IoT in agriculture: For real-time farm monitoring (cropin.com). Available on: https://www.cropin.com/iot-in-agriculture?form=MG0AV3
5. Kamilaris, A., Kartakoullis, A., & Prenafeta-Boldú, F. X. (2017). *A review on the practice of big data analysis in agriculture*. Computers and Electronics in Agriculture, 143, 23-37.
6. Li, L., Zhang, Q., & Wang, J. (2019). *Precision agriculture and high-performance computing to support big data-based agroecological decision-making: A review*. Computers and Electronics in Agriculture, 162, 193-206.
7. The Future of Farming/How AI is Changing Agriculture as we know it. Available on: https://www.youtube.com/watch?v=D2BeFobOY58
8. *The State of Food and Agriculture 2018: Migration, Agriculture, and Rural Development*. Food and Agriculture Organization of the United Nations. FAO, 2018.
9. Three Applications of AI in Agriculture. Available on https://www.youtube.com/watch?v=nsnpEmr1q_k
10. Traditional Agriculture: Benefits, Challenges, and Sustainable Practices (foreverfarms.org). Available at: https://foreverfarms.org/traditional-agriculture/?form=MG0AV3
11. Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M.-J. (2017). *Big data in smart farming - A review*. Agricultural Systems, 153, 69-80.

Other notes: The duration of each activity can be adapted

Unit 3/Outcomes: Practical Examples of IoT and AI in Agriculture

KNOWLEDGE	SKILLS	ATTITUDES
Learner is able to: Describe how modern technologies contribute to sustainable and competitive agriculture, distinguish the dynamic interplay between tradition and innovation in shaping agricultural practices	**Learner is able to:** Combine traditional methods with modern technology for optimal result	**Learner is able to:** Value the new development opportunities offered in sustainable agriculture, thanks to the implementation of smart technologies, IoT and traditional skills
Transversal skills: • **Analytical Thinking**: Evaluating data from IoT and AI devices and traditional methods to make informed decisions. • **Creativity**: Developing innovative solutions to integrate traditional and modern agricultural practice.		
Digital Skills: • **Information Literacy**: Interpreting and applying data to improve agricultural practices. • **Initiative with technology**: Proactively seeking out new technologies and methods to improve agricultural efficiency.		
Green Skills: • **Adaptability:** Adjusting to new technologies and methods while respecting traditional practices.		

Implementation Plan of Pedagogical Activities:

Date:	Location:	Duration: 100 min		
Description of participants: teachers in VET (agriculture sector)				
Expected number of learners: 25				
No. of Activity	**Timing**	**Training Methods / Activity**	**What I do**	**What they (participants) do**
A 3.1	20 min	Presentation of practical example of IoT and AI in agriculture	Present	

A 3.2	40 min	Creative Use of Digital Technologies in MA	Give instruction	1. Form small groups of four. 2. Choose one area of agriculture. 3. Open Miro. 4. Come up with different ways to use digital technologies in area you have chosen. 5. Present your results to the whole group.
A 3.3	40 min	Development of Digital Support in MA	Give instruction	1. Form small groups of four. 2. Look for the facts about fava beans farming. 3. Open Miro. 4. Brainstorm and develop a concept for digital tool technology that can support farmers in cultivating fava beans more efficiently or productively. Use the digital tools and innovations discussed in the presentation to guide your ideas. Key considerations: Who will use this tool? What specific farming challenges does the tool address? What digital technologies will the tool leverage? How will this tool improve the productivity or efficiency of fava bean farming? 5. Present your results to the whole group.

Material (What I need to have prepared):

PowerPoint presentation, Miro

References/Sources:

https://www.youtube.com/watch?v=5YEnhgTYLPM,https://www.youtube.com/watch?v=nsnpEmr1q_k, https://miro.com/

Other note:

The duration of each activity can be adapted