PR6 Validation of the proposed content, teaching tools and methods

LATEST
Local-focused AgTech Education for Successful Ag Transitions

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Appendix 1: Participant Details at Harper Adams, 9-11 April 2024

Organisation	Name	Title	Workshop Days Attendance
UniLaSalle	Marco Medici	LATEST Project Lead (and Associate Prof)	All
	Kimberley Couchy	LATEST Project Coordinator	All
BOKU	Christina Paulus		All
	Martin Mayr	PhD Researcher	All
	Vladana Vidic		Online - Tuesday, Wednesday
Hohenheim	Christa Hoffman	Senior Researcher for UHO activities	All
	Christolph Stumpe	PhD Researcher	All
	Bastian Sturmer-Stephen	Chief Engineer	All
	Eva Gallmann	LATEST Principal Investigator	Online - Tuesday, Wednesday
UNIUD	Elisa Marraccini		All
	Paolo Ceccon		All
	Elena Maiulini		All
	Giannina Vizzotto		All
	Rachel Falchi		All
HAU	Paula Misiewicz	Senior Lecturer in Soil Engineering	All
	Mitch Crook	Taught Post-Graduate Lead	Tuesday, Wednesday

	Sam Wane	Senior Lecturer in Robotics	Tuesday, Wednesday, Thursday
	Nick Covarr	Senior Lecturer, Forestry	Wednesday only
	Sarah Halligan	Senior Lecturer, Veterinary	Tuesday only
	Jenny Powell	Senior Lecturer, Veterinary	Tuesday only
	Sven Peets	Senior Lecturer in Applied Mechatronics	Thursday only

Appendix 2: Participant Details at UNIUD, 24-26 July 2024

Organisation	Name	Title	Workshop Days Attendance
UniLaSalle	Marco Medici	LATEST Project Lead (and Associate Prof)	All
	Kimberley Bourke Couchy	LATEST Project Coordinator	All
BOKU	Christina Paulus		All
	Vladana Vidic		All
Hohenheim	Christa Hoffman	Senior Researcher for UHO activities	All
	Bastian Sturmer-Stephen	Chief Engineer	All
UNIUD	Elisa Marraccini	Associate Professor, Agronomy	All
	Paolo Ceccon	Full Professor, Agronomy	All
	Giannina Vizzotto	Associate Professor; Pomology	All
	Rachel Falchi	Associate Professor, Pomology	All
	Guido Fellet	Associate Professor, Agronomy	All
	Giorgio Alberti	Full Professor, Silviculture Deputy Rector for International Relationships	24, 26/7
	Maurizia Sigura	Associate Professor, Geoscience	All
	Agostino Dovier	Full Professor, Informatics Deputy Rector for Education	24/7
	Raffaella Bombi	Full Professor Deputy Rector for Innovative Teaching	24/7
	Marco Bardelli	Collaboration, Education Science	24-25/7
	Elena Maiulini	Collaborator, Sociology	All
	Tommaso Minerva (UNIMORE)	Full Professor Digital Education Hub Project Leader	24/7 (online)
HAU	Paula Misiewicz	Senior Lecturer in Soil Engineering	All
	Laura Vickers	Taught Post-Graduate Lead	All
	Sam Wane	Senior Lecturer in Robotics	All

Appendix 3: Evaluation of Training at Harper Adams, 9-11 April 2024

Q1:

Response #	**Please could you let us know why you decided to come on the Training Course**
1	To share an experience on training with the LATEST partners. To get informed on training practices in other universities
2	Proposal of a colleague
3	Because it's interesting to learn something about teaching
4	To improve my communication skills in teaching
5	Because I'm working on LATEST project and I'm also interested in new training methods as active learning
6	Latest project team member
7	I'm interested in improving my skills in teaching and I recognized the importance of adapting to the changing landscape of education

Q2:

Response #	**ACTIVE LEARNING DAY (Tuesday 9th April): What did you find useful about the day?**
1	I was quite aware about active learning. I found very useful sharing different practices of active learning, i.e. the different practicals
2	Methods, engagement, speakers (Jane, Samuel, Amanda)
3	I learned new techniques and was able to try them out myself. There was theoretical information and practical ideas to better integrate students
4	Topic presentation, presenter ability
5	The framework and the practical examples
6	Different didactical methodologies/technics of teaching
7	I found the outdoor showcase particularly useful and being able to put myself in the shoes of a student

Q3:

Response #	**DIGITAL SKILLS DAY (Wednesday 10th April): What did you find useful about the day?**
1	The update on the different existing tools
2	I found the use of the video editing program particularly interesting and well explained
3	All practical examples
4	The information about new AI software
5	Different AI tools
6	Learning new AI tools

Q4:

Response #	**APPLIED TEACHING & LEARNING in AG-TECH (Thursday 11th April): What did you find useful about the day?**
1	All the activities scheduled
2	Practical experience, nice speakers (Sam, Sven)
3	I have gained new ideas for my lectures. Especially the CAN bus session and I found it interesting to understand how the agricultural engineering program came about
4	Playing with technology

5	Details on how the curriculum is implemented, the use of videos made by the drone
6	Computing/ robotic session

Q5:

Response #	**DIGITAL SKILLS DAY (Wednesday 10th April): What did you find useful about the day?**
1	The update on the different existing tools
2	I found the use of the video editing program particularly interesting and well explained
3	All practical examples
4	The information about new AI software
5	Different AI tools
6	Learning new AI tools

Q6:

Response #	**ACTIVE LEARNING DAY (Tuesday 9th April): Have you any thoughts on how the day's training could have been improved?**
1	Nothing to change
2	Presentation of ____ [Name withheld] was too long and not really interesting
3	I did not understand the long trip he had in the fields…
4	No, the day was perfectly organized

Q7:

Response #	**DIGITAL SKILLS DAY (Wednesday 10th April): Have you any thoughts on how the day's training could have been improved?**
1	It was quite difficult for me to understand the last lecture on video, probably because I was tired and I had some trouble with the computer
2	It would have been nice if there had been more time for some elements
3	Guiding participants in creating a digital content with AI
4	The training on videomaking software was too complex and the time was short
5	The video cutting simulation was to quick for beginners not knowing the program
6	In general more change between sitting and walking and talking activities

Q8:

Response #	**APPLIED TEACHING & LEARNING in AG-TECH (Thursday 11th April): Have you any thoughts on how the day's training could have been improved?**
1	Nothing to change
2	Presentation of [name withheld] was too long and not really interesting
3	I did not understand the long trip he had in the fields
4	No, the day was perfectly organized

Q9:

Response #	**Any other comments related to the Training Course?**
1	I wish to thank all the staff of Harper Adams for their involvement in this Training Course
2	Everything was very well prepared and the lecturers were exemplary
3	I wish to thank all the staff of Harper Adams for their involvement in this Training Course

Appendix 3: Evaluation of Training at UNIUD, 24-26 July 2024

Q1:

Response #	Please could you let us know why you decided to come on the Training Course
1	I was interested into the subject
2	I wanted to be active in learning the innovative smart technologies
3	I'm interested in innovative teaching
4	I am a teacher at the university and always interested in new and innovative teaching methods
5	Because I am interested in the Uni and the ideas of teaching
6	Innovative teaching methods interest me
7	To deepen methodological approaches in teaching
8	One of the project partners

Q2:

Response #	How would you rate the three-day training course? (1 = very poor, 2 = poor, 3 = ok, 4 = very good, 5 = excellent)
1	4
2	4
3	4
4	3
5	4
6	5
7	3
8	3

Q3:

Response #	INNOVATIVE LEARNING DAY (Wednsday 24 July). Overall, how would you rate the day's training? (1 = very poor, 2 = poor, 3 = ok, 4 = very good, 5 = excellent)
1	3
2	4
3	3
4	3
5	3
6	4
7	3
8	4

Q4:

Response #	CASE STUDIES I DAY (Thursday 25 July). Overall, how would you rate the day's training? (1 = very poor, 2 = poor, 3 = ok, 4 = very good, 5 = excellent)
1	4
2	5
3	3
4	4
5	5
6	5
7	4

8	5

Q5:

Response #	CASE STUDIES II DAY (Friday 26 July). Overall, how would you rate the day's training? (1 = very poor, 2 = poor, 3 = ok, 4 = very good, 5 = excellent)
1	5
2	4
3	5
4	3
5	4
6	5
7	3
8	4

Q6:

Response #	INNOVATIVE LEARNING DAY (Wednsday 24 July): What did you find useful about the day?
1	I did learn about the student centred approach in Udine
2	manly our discussions about the different lecture evaluation in our countries
3	I Like the idea of the digital education hub
4	The teaching lab wit video
5	I enjoyed and found interesting the session run by Zanon& co

Q7:

Response #	CASE STUDIES I DAY (Thursday 25 July): What did you find useful about the day?
1	Field applications
2	I could really use the new technology and remember the knowledge
3	field demonstrations (drone and robotic)
4	The crop Spectral part and the Experimental station
5	How students are involved in learning process
6	experimental approach, data collection and analysis
7	These were very interesting but unclear how they related to teaching and learning. More on the research side. Framework for learning was a bit less interesting and seemed basic to me.

Q8:

Response #	CASE STUDIES II DAY (Friday 26 July): What did you find useful about the day?
1	The presentation of the Sensor lecuture
2	The learning by doing process
3	Very interesting - both session. The AI session more on research than learning I felt

Q9:

Response #	INNOVATIVE LEARNING DAY (Wednsday 24 July): Have you any thoughts on how the day's training could have been improved?
1	More active hands-on learning

2	I missed interactive activities. Not just discussion topics, but also playing games, working in small groups etc. Most of the units based on speeches and not interactive activities.
3	Should be more interactive
4	proposing topics more related to pedagogy and searching interactions among participants
5	Overall, schedule the whole training into a number of themes - education, research, other?

Q10:

Response #	CASE STUDIES I DAY (Thursday 25 July): Have you any thoughts on how the day's training could have been improved?
1	It was great the whole day
2	More interactive activities
3	see Nr 9 (mainly for the afternoon)
4	ITS fine, but the teacher of the framework should use active learning or teaching
5	field demonstrations were ok - perhaps a bit more of learning-by-doing?
6	As above

Q11:

Response #	CASE STUDIES II DAY (Thursday 26 July): Have you any thoughts on how the day's training could have been improved?
1	If we weren't tired we could create conceptual maps
2	More interactive activities
3	See Nr 9
4	The presentation of the ai was interesting, but the Relation to the topic of the Training was nor visible
5	a bit more interaction
6	As above

Q12:

Response #	Any other comments related to the Training Course?
1	More active instead of passively learning
2	Good training. Thank you!

Q13:

Response #	FUTURE TRAINING: Have you any thoughts on what additional training in teaching and learning would be most beneficial to you?
1	New skills
2	Integrating more case studies and practical examples
3	Case study approach

Q14:

Response #	The survey is anonymous but please provide you Job Title if you are happy that your responses may potentially be traceable to you.
1	Teacher
2	Senior Lecturer

Task 6.2 - Conceptualization of a hybrid learning program on agricultural transition (month 14-32)*

The LATEST Project will focus on the implementation of at least five cross-cutting activities on the topic of agrotechnology for a sustainable agricultural transition both at bachelor and master level, mainly as on-demand contents, to test the chosen e-learning platform and tools and to understand the response by the students. Each project partner will be in charge for the implementation of one of the activities identified in the Action plan for e-learning: each selected teacher will be coordinated by the eLM for the design and implementation of the online courses. The cross-cutting activities will be accessible to 50 users per institution for a period of one academic year (2023-2024). Finally, specific open online modules on research methods in the field of sustainability and agricultural transition swill be developed for PhD students.
** As task 6.2 has not been funded and it has been partially combined into task 6.3 below.*

Task 6.3 - Validation of best content and teaching methods (month 20-22)

As per PR1-5, the proposed course content, teaching tools and methods will be specified and implemented at the partner institutions as per Task 6.2. The main implementation programme will include a delivery of the proposed course content, teaching tools and methods to the relevant agricultural engineering and mechanisation courses both on the undergraduate and postgraduate levels over one academic year. This content and techniques will be also delivered to a range of relevant industry courses all linked with agricultural technologies. Further the suitability and quality of these methods will be validated using a consistent range of approaches at each partner institution. The effect of incorporating the novel content and teaching techniques will then be evaluated based on the student experience, knowledge gained, and feedback obtained on all undergraduate, postgraduate and industry courses. The feedback will be captured via an online survey conducted shortly after each training package is delivered. The results will be analysed as population and any specific comments will be considered. Additionally, an educational developer will be responsible for checking the teaching and learning quality (QAA) and the eLearning specialist will assess the teaching materials on the accessibility criteria. Further reflections and improvements will lead to completion of a report on the best practice and the new curriculum development.

Presented here, in the report are:

5) Summary of validation of best content and teaching methods
6) Survey template (Appendices)
7) Partner institution surveys (Appendices)

Summary of validation of best content and teaching methods

Task 6.3 (with elements of task 6.2) was successfully implemented, as outlined in the original proposal. In 2023-2024 academic year (and 2022-2023 for HAU and UNIUD), each partner institution nominated one university module related to agricultural technologies and during the module delivery special attention was given to innovative teaching and learning methods / eLearning as learned and broaden as part of LATEST project, especially during the training conducted as part of task 6.1. Following the delivery of the selected modules, HAU partner proposed a method to validate the quality of the modules (content and teaching methods) using a survey template for module leaders to provide details on the selected modules as shown in **Appendix A**.

The survey included the following:

- Module information
- Tutor and student reflection on the module
- Educational developer and e-learning specialist module review and feedback

The survey was slightly delayed, however, it took place in September / October 2024.

The following modules were chosen and used in this task:

3) Harper Adams University (UK): Sustainable Farming Systems ***(Appendix B)***
4) UNIUD (Italy): Fruit crops ***(Appendix C)***
5) BOKU (Austria): Advanced Technology in Smart Crop Farming ***(Appendix D)***
6) UOH (Germany): Precision Farming ***(Appendix E)***
7) ULS (France): Management of agricultural equipment ***(Appendix F)***

As shown by each partner institution (appendixes) and summarised in Table 1, overall, the use of novel teaching and learning method implemented by the partner institutions was well received by most students with 127 students being involved across 2 academic years (overall experience varied between institutions from 4.73 to 3.4). The recommendations given by Educational Developer and e-learning expert at three partner institutions (with BOKU and UOH not having a suitable expert) were mixed. Overall, many positive points were highlighted with further specific improvements recommended. These will be considered by the module leaders for further improvements in the next academic year.

Table 1 - Summary of the validation of best content and teaching methods

Partner institution	Module name	ECTS credit	Delivery time	Number of students	Overall experience (out of 5)	Expert recommendations
HAU	Sustainable Farming Systems	7.5	2023/24 2022/23	28	4.73	Improved accessibility needed. Greater use of varied teaching methods.
UNIUD	Fruit crops	6	2023/24 2022/24	43	3.88	Focusing on the usability of new teaching techniques by the students and improving their attitude to be involved in.
BOKU	Advanced Technology in Smart Crop Farming	7	2023/24	7	3.4	Not available.
UOH	Precision Farming	6	2023/25	29	4.5	Not available.
ULS	Management of agricultural equipment	4	2023/26	20	4.2	Maintain the quality, keeping up with pedagogical support and using the previous content as resources for the next students.

Appendix A
TEMPLATE: Task 6.3 Validation of best content and teaching methods

Partner task:
Each partner institution to nominate 1 university module related to agricultural technologies where innovative teaching and learning methods / eLearning have been used. Please complete Table 1 – 3 to provide information about the module. This task needs to be completed in 2 weeks please.

Table 1: Module information

Partner institution	
Module name	
Module level	
ECTS credit	
Reasons for module selection	

Table 2: Module details and reflections

Module description	
Details on innovative methods used	
Intended learning outcomes	
Learning and teaching strategy	
Virtual learning strategy	
Number of students responses	
Module rating (5 = Excellent, 4 = good, 3 = acceptable, 2 = below	

expectations, 1 = poor]	
Student written feedback	
Module Leader Reflections on the module	

Table 3: Educational Developer and e-learning expert appraisal

Educational Developer Assessment	
E-learning: Accessibility	
E-learning: Good Practice	
E-learning: Improvements	
E-learning: Recommendations	

Appendix B - HAU
TEMPLATE: Task 6.3 Validation of best content and teaching methods

Partner task:
Each partner institution to nominate 1 university module related to agricultural technologies where innovative teaching and learning methods / eLearning have been used. Please complete Table 1 – 3 to provide information about the module. This task needs to be completed in 2 weeks please.

Table 1: Module information

Partner institution	Harper Adams University
Module name	Sustainable Farming Systems (C7060)
Module level	MSc
ECTS credit	7.5
Reasons for module selection	This module has been chosen for PR6.2 as for the last two years it has been delivered using a range of novel ways of learning and teaching at HAU. The module introduces sustainable farming systems and concentrates on technology used in agriculture.

Table 2: Module details and reflections

Module description	Sustainable agricultural development requires the effective protection of the environment but recognises that economic growth must also be maintained. This module concentrates on scientific and technological approaches to problem-solving, for example in the improvement of environmental quality with time as measured by sustainability indicators, and allows you to show the core skills required for managing agricultural systems in a sustainable manner i.e. analysing options and making choices. Environmental quality may be measured by a reduction in pollution to an 'acceptable' level, maintenance of biodiversity, careful use of non-renewable resources (and replacement of them with renewable resources where appropriate) and the maintenance of the productive capacity of the soil. This module seeks to critically review current research and hence develop strategies that will allow agricultural sustainability to be met at global, national and local levels. It studies the role of integrated farming systems and organic farming as holistic approaches to producing safe, wholesome, affordable food in an environmentally sensitive manner whilst maintaining profitability.
Details on innovative methods used	1. Applied module including both theoretical and practical elements. 2. Module is taught by a range of lecturers based on their expertise (approx. 10).

	3. The module includes many applied sessions: class-room quizzes, discussions and groupwork; farm visits (to the Future Farm at HAU and local commercial farms). 4. The module is delivered to a small group of students allowing for a lot of interactions with the tutors and between students. 5. Advanced, well-structured and presented Virtual Learning Environment used for the module.
Intended learning outcomes	1) Evaluate the importance of the conservation of natural resources and the protection of biodiversity, and the legal and other frameworks governing their management; 2) Review the philosophies of sustainable farming systems, including organic systems and International Conservation Agriculture; 3) Evaluate organic farming and integrated farming systems and recognise the role of assurance schemes and national/international frameworks; 4) Select appropriate strategies for achieving sustainable targets and highlight the commercial possibilities and the uncertainties associated with such systems; 5) Evaluate integrated land use strategies for livestock and crop production systems that manage land in a sustainable manner, giving due consideration to environmental protection, wildlife habitats, conservation of natural resources and economic growth.
Learning and teaching strategy	This module is taught in 1 five-day block. The underlying principles of sustainable agricultural production are delivered through a series of keynote lectures and tutorials during the first week. These will be reinforced through a focus on practice and application throughout the teaching week. The use of the Harper Adams University farm, case studies and site visits based on commercial farms, where appropriate, will reinforce teaching and learning. Support for learning is offered via the Harper Adams University Virtual Learning Environment.
Virtual learning strategy	Learning materials are made available in advance of the module on the Harper Adams University Virtual Learning Environment, the Learning Hub. Material to support the classroom sessions and study visits are also be available during the block delivery.
Number of students responses	2023/24: 4 students (15 students on the module) 2022/23: 10 students (13 students on module)
Module rating (5 = Excellent, 4 = good, 3 = acceptable, 2 = below expectations, 1 = poor]	2023/24: 4.75 (Overall experience) 4.75 (Face to face activity) 4.25 (On-line delivery) 4.75 (Virtual Learning Environment) 4.75 (Clarity of Assessment Brief)

	2022/23: 4.70 (Overall experience) 4.70 (Face to face activity) 3.25 (On-line delivery) 4.40(Virtual Learning Environment) 4.30 (Clarity of Assessment Brief)
Student written feedback	2023/24: • Probably the best assignment we've been given in my opinion, love the depth, breadth and individualism we've been allowed to express. • Teaching from all lecturers was excellent, though there were a couple of repeated sections we'd seen in other modules. [The Module Lead's] enthusiasm and passion for learning was evident in the organisation of the module, he gave us time with people from as many different backgrounds as possible and that was much appreciated! • Generally, very good. I really enjoyed having the varying experiences of lecturers regarding organic farming. • For someone who has completed the soil and water, nutrient cycling and waste management module + the fundamentals of agroecology module, there was quite a lot of overlap which is fine given not everyone had completed those modules. However, perhaps those you had could have been given a heads up and therefore been able to focus their time on other module work? Also regarding the Tuesday session with [Lecturer #2] and [Lecturer #3], they were great although, I wasn't sure why we weren't able to see any of the suckler grazing stock within differing grazing systems? There were 2 hours left at the end of the day to undergo a presentation on an extremely broad and vague topic of sustainability which seemed quite unnecessary given the discussions that were had whilst on the farm visit. Additionally, a trip to a traditional farming system might have been a welcome source of discussion too. Being able to test our knowledge against someone in the industry would, in my opinion, be worthwhile. • Thanks [Module Leader] - brilliant as ever! 2022/23: • This was a really interesting and thought provoking module, which brought together lots of themes about sustainability. The farm visit day was excellent and well planned. It was good to have a focus on some of the livestock systems, as the other modules I

	have done so far have leaned more towards crops. The virtual section by [Lecturer #3] was really interesting, but it would be really good if he could record his commentary on the Powerpoints. In preference, I would have loved to have had face to face lectures as his material raised lots of questions and could have been a great opportunity for discussion. The lecturers were all passionate about their subject areas and there were lots of good in-class discussions. Have come away thinking about the material and reflecting about it! • Great range of speakers/expertise. • Online section from [Lectuer #3] was weak and a bit frustrating and with no follow up discussion - would have been better on Friday afternoon and we could have completed in our own time over weekend etc. As it was it felt like every other section was quite rushed - we could have spent way more time on almost any other section and then we had this completely dead time on Thursday afternoon. Would have been nice if instead of just reading slides and clicking through to YouTube, we'd had some commentary around the slides most of the plants referred to were not familiar and some further discussion would've been helpful. • I would just like to thank all of the staff that taught on the module. It was great to have an overview of multiple production systems throughout the week. The farm visits provided an excellent opportunity to apply the taught content to a working environment which I thought worked really well. Finally, it was nice to have a summary session on Friday to discuss the week and how our perception of sustainability might have changed. Thank you! • It was a very insightful and interesting module. The delivery by a range of lecturers, who were experts in their field, meant we covered a wide range of topics in suitable detail. Thank you. • The module was a good overview to everything we have been focused on this year. The lessons focusing on livestock and the farm visit were particularly good as we haven't covered this much in other modules. As it was the last module in the course, and some of the lessons were refreshers, some more time designated to discussion would have been beneficial. It would have been a great opportunity to get a wide range of views on many different subjects in sustainability and farming. There was some discussion but I think there could have been more.

	• Fantastic module - lots of really varied and interesting content delivered by real experts in their field. Really grateful for all the planning that went into it. Great module to finish on. Thanks to [Module Leader] and all the other lecturers for a very enjoyable and thought provoking final module.
Module Leader Reflections on the module	This module has been designed, developed and delivered over more than a decade to encourage students to critically evaluate sustainability issues relating to a wide range of farming systems. By focussing on this, the learning environment encourages students to contextualise their learning to farming systems that they are familiar with or are interested in. This approach means that learning takes place not just between student and lecturer but also between student and student. Such an approach results in great interaction, and also helps to convey the diversity and complexity of sustainability issues. The staff who teach on this module not only bring their expertise to the module, but also their own perspectives relating to sustainability. This helps to expose students to a wide range of perspectives relating to sustainable farming. Both students and staff greatly enjoy this module and the challenges it presents.

Table 3: Educational Developer and e-learning expert appraisal

Educational Developer Assessment	Having reviewed the module for adherence to the QAA codes of the university, and can confirm that this module is fully compliant. Moderated assessment briefs, and marking, and with further scrutiny from an External Examiner. The module has good to excellent feedback scores – and can be viewed as an exemplar of good practice.
Accessibility	Having reviewed the module for adherence to the QAA codes of the university, and can confirm that this module is fully compliant: Moderated assessment briefs, and marking, and with further scrutiny from an External Examiner. The module has good to excellent feedback scores – and can be viewed as an exemplar of good practice.
Good Practice	The on-line content mostly conforms with accessibility best practice of the university.
Improvements	A wide range of different teaching material which will appeal to a diverse range of types of learner. In general, there are a lot of files in many sections with no descriptions, so just a long list of files to either download or view. Perhaps not all need descriptions, but you could add to some. Some of the content is listed with no description in the filenames either, so for example: “Lecture 1”.

	Hyperlinks should be displayed in a readable format, so rather than displaying the full link, text should be written to describe the content, the text should be selected and converted to a link.
Recommendations	Consider my points above for improved accessibility. Even greater use of varied teaching methods – for example quizzes.

Appendix C - UNIUD
TEMPLATE: Task 6.3 Validation of best content and teaching methods

Partner task:
Each partner institution to nominate 1 university module related to agricultural technologies where innovative teaching and learning methods / eLearning have been used. Please complete Table 1 – 3 to provide information about the module. This task needs to be completed in 2 weeks please.

Table 1: Module information

Partner institution	Udine University
Module name	Fruit crops
Module level	BSc
ECTS credit	6
Reasons for module selection	The module was chosen as fruit crops orchard management could efficiently be implemented with new technologies such as sensors and decision support systems.

Table 2: Module details and reflections

Module description	Tree architecture and life cycle. Apical dominance, growth habit. Training system and pruning. Fruit crops and environmental factors: soil and light regime. Orchard design and management. Planting density. Reproductive cycle: phase transition and flower development. Sterility. Mechanisms of fruit development, kinetics. Correlative inhibitions. Flower and fruitlet abscission, thinning methods (manual, chemical, mechanical). Fruit ripening and harvesting indexes. Training and pruning of main fruit crops.
Details on innovative methods used	Different active learning methods were adopted throughout the module, such as: cooperation learning, Jigsaw classroom technique, learning by doing (at the university experimental farm students, in small group, pruned different fruit species. Each group had a tree in charge).
Intended learning outcomes	Knowledge of the physiological mechanisms underpinning fruit trees development and their interaction with environmental factors. Capacity to recognize and address problems in the area of fruit tree crops management. Apply knowledge from theoretical lectures to case studies.
Learning and teaching strategy	Teaching activity during the module alternates conventional lecturing and student-centered experience. New teaching approaches were implemented in order to push students out of their comfort zones to increase the cognitive effort required and facilitate their deep learning.
Virtual learning strategy	Before the start of the lessons, for each module (and each year) a virtual class room was created on University of Udine Teams platform, where lecture notes were let available, as well as ppt presentations and asynchronous lectures. Moreover, the Teams chat represents an easy way to share messages and documents with the student.

Number of students responses	2023-2024: 16 students 2022-2023: 27 students
Module rating (Poor = 1, below expectation = 2, good = 3, Excellent = 4]	Even limited to a single year, the adoption of new teaching strategies improved scores from Student evaluation as compared to the previous year: 2023/24: 3.94 (Overall experience) 3.94 (Clarity) 3.81 (Practical activity) 2022/23: 3.81 (Overall experience) 3.81 (Clarity) 3.74 (Practical activity)
Student written feedback	None
Module Leader Reflections on the module	The main difficulty encountered was the attitude of the students to be engaged in active learning, and keeping them motivated. However, once students were involved the feedback is positive.

Table 3: Educational Developer and e-learning expert appraisal

Educational Developer Assessment	Udine University and the DI4A encourage the use of educational technologies, and the efficacy of online teaching methods is taken into consideration in student evaluation with a specific question. The module obtained an excellent score from the official student evaluation.
E-learning: Accessibility	University offers the Moodle platform for e-learning, but this was not adopted in the present module. During, and after, the Covid emergency the Teams platform has been very widely adopted for online educational activity as it is considered more user-friendly as compared to Moodle.
E-learning: Good Practice	University of Udine foster and support the use of new teaching methods to improve the academic success of the students.
E-learning: Improvements	Adoption of new methods as, for instance, mobile learning and gamification to improve the flexibility of the learning activity.
E-learning: Recommendations	Focusing on the usability of new teaching techniques by the students and improving their attitude to be involved in

Appendix D - BOKU
TEMPLATE: Task 6.3 Validation of best content and teaching methods

Partner task:
Each partner institution to nominate 1 university module related to agricultural technologies where innovative teaching and learning methods / eLearning have been used. Please complete Table 1 – 3 to provide information about the module. This task needs to be completed in 2 weeks please.

Table 1: Module information

Partner institution	BOKU University
Module name	Advanced Technology in Smart Crop Farming
Module level	EQF Level 7
ECTS credit	6 ECTS
Reasons for module selection	The module is designed as a Micro Credential with hybrid learning

Table 2: Module details and reflections

Module description	The course "Advanced technologies in smart crop farming" is a continuing education certificate program designed to provide multidisciplinary education in the utilization of advanced digital technology for monitoring and optimizing agricultural production processes. It covers key subject areas such as precision farming, GIS, remote sensing, and variable rate technology. The course aims to develop participants' knowledge, skills, and competencies in these areas through a combination of e-learning, face-to-face lessons, and hands-on exercises. Graduates will acquire specialized knowledge in control systems for automation in agriculture, data structures, and network systems, and will be able to apply GIS tools and remote sensing techniques for decision-making in agricultural production.
Details on innovative methods used	The certificate course "Advanced technologies in smart crop farming" employs a variety of teaching and working methods to ensure comprehensive learning outcomes. These methods include: 1. **E-learning**: This method allows students to access course materials and lectures online, providing flexibility in learning and the ability to revisit content as needed. 2. **Face-to-face lessons**: In-person classes facilitate direct interaction between instructors and students, enabling immediate feedback and clarification of concepts. 3. **Hands-on exercises**: Practical exercises are designed to give students real-world experience in applying the theoretical knowledge

	they have acquired. This approach helps in solidifying their understanding and skills in a practical context. The combination of these methods aims to help students acquire knowledge, skills, and competences at the EQF-level 7 within the course's key subject areas. This systematic approach aligns with the Bologna declaration, focusing on learners and learning processes.
Intended learning outcomes	Knowledge: • Acquire highly specialized knowledge of control systems for automation in agriculture. • Understand data structures and network systems. • Define the science of site-specific farming and its benefits. • Develop and apply proprietary technology in plant systems and automation and control. Skills: • Interpret, integrate, and transmit theoretical and methodological concepts required for the use of GIS and remote sensing techniques. • Discriminate and categorize geospatial data according to their nature, conversion procedures, and advanced processing techniques. • Integrate GIS tools and functions to store, manage, analyze, and process geospatial data to extract relevant information for decision-making. Competencies: • Generate, assess, evaluate, and manage data from crop production, soil, and water resources to improve agricultural production efficiency through efficient and economical use of resources. • Use scientific and technical information sources efficiently to develop research skills. • Handle complex contents and carry out specific applications of digitalization methodology in agricultural processes
Learning and teaching strategy	There are four blocks of online learning and two presence blocks. Between the sessions learners work on hands on projects and have access to support by experts.

Virtual learning strategy	The virtual learning strategy of the course includes a combination of e-learning, face-to-face lessons, and hands-on exercises supported by the BOKU E-Learning platform.
Number of students responses	5 of 7 participants
Module rating (5 = Excellent, 4 = good, 3 = acceptable, 2 = below expectations, 1 = poor]	5: 0 4: 2 3: 3 2: 0 1: 0
Student written feedback	Some content was not adequate
Module Leader Reflections on the module	Content was adapted according to learners feedback

Table 3: Educational Developer and e-learning expert appraisal

Educational Developer Assessment	No Educational Developer present at BOKU.
E-learning: Accessibility	The on-line content conforms with accessibility best practice of the university.
E-learning: Good Practice	Learners need close support for assignments, depending on their prior knowledge.
E-learning: Improvements	Feedback by learners helped refining the online course material.
E-learning: Recommendations	Online sessions need to happen in smaller blocks that can be accessible 24/7

Appendix E - UOH
TEMPLATE: Task 6.3 Validation of best content and teaching methods

Partner task:
Each partner institution to nominate 1 university module related to agricultural technologies where innovative teaching and learning methods / eLearning have been used. Please complete Table 1 – 3 to provide information about the module. This task needs to be completed in 2 weeks please.

Table 1: Module information

Partner institution	University of Hohenheim
Module name	Precision Farming
Module level	Msc
ECTS credit	6
Reasons for module selection	This module was chosen because it covers the topic in a very broad technical spectrum thanks to the different lecturers involved. For their part, the lecturers use very different methods to impart their knowledge

Table 2: Module details and reflections

Module description	Fundamental precision farming principles and description of spatial heterogeneity of soils and plants; data base structures, geographic information systems (GIS), global navigation satellite systems (GNSS) and variable rate technology (VRT) for the main operations in crop production, especially tillage, sowing, fertilisation and harvesting; decision support and economic evaluation
Details on innovative methods used	Lectures, demonstrations and practical exercises. Each student needs to contribute in a group of students to read, present and discuss a scientific paper as an exam prerequisite. The module is conducted in cooperation with teaching staff from other departments, international scientists and experts from different companies. Lecture handouts and other materials will be provided.
Intended learning outcomes	Students will be able to highlight fundamentals, including - background, potential and perspectives of Precision Farming - data base management and decision support systems (farm management information systems) - function and application of different technical solutions. Students can - apply and appraise precision farming technology and equipment - optimize plant production by understanding and applying sophisticated crop models and software. Critical and analytical thinking as well as language skills and communication and cooperation skills will be gained during presenting scientific paper related to Precision Farming in group work.

Learning and teaching strategy	- 1 Semester - 56 hours in presence (4 hours/ week, 13 weeks) - 124 hours self-study (Preparations for paper presentation)
Virtual learning strategy	- Due to university policy, virtual learning units must be reduced to a minimum (presence university) - The lecture materials are provided via a learning platform (ILIAS) as standard) - Most lecture units contain short virtual contributions, such as videos. Overall, the module offers many opportunities to work with and familiarise yourself with digital, specialist tools - 75% of the examination will be done by an ILIAS online test (25 % Paper Presenation)
Number of students responses	SS 2024: 18 evaluations (in total 29 students on the module resp. exam)
Module rating (5 = Excellent, 4 = good, 3 = acceptable, 2 = below expectations, 1 = poor]	SS 2024: 4.5 (overall assessment) 4.5 (preparation, structure, educational objectives and contents) 3.5 (work load and level of content) 4 (the combination of the online elements offered was a useful support for achieving the learning objectives)
Student written feedback	- Sometimes the presentation of the companies were at least partly very basic and have been common knowledge for all students in the module, so should not have been - No overlaps, but varying quality of lecture (example: positive: absolute and relative positioning/negative: remote sensing - Bachelor was completed at another university, but overall the overlaps where helpful (see AI for agriculture, 3 D – Modelling), these models fit the scheme of Precision Farming - There were some overlaps but they were absolute helpful. Here are shown the practical examples
Module Leader Reflections on the module	The combination of guest lectures from the agricultural engineering sector and practical exercises is very attractive. It is very instructive to reflect on the different perspectives and approaches of the companies in the subject area and also to discuss them from a scientific point of view. The illustrative practical units (geoinformation systems, automatic steering systems, farm management systems, yield map creation) are very useful for in-depth study and are a pleasure for both lecturers and students. The good interdisciplinary exchange between students from different subject areas (e.g. crop science, soil science, economics, agricultural engeneering) who choose the module is particularly positive. There were

	lively discussions in presence. The external guests also request appropriate feedback in terms of content and methodology. The module is deliberately international and in English. The students like to use it as an opportunity to expand their language skills in an otherwise German-language degree programme. Potential for improvement is seen in a better thematic sequence of the teaching content along the typical work processes on the farm. This was not always ideal, as the availability of external guests had to be taken into account. The topics of "Agricultural Robotics" and "Electrification" are interesting and could also be covered in the module in the future.

Table 3: Educational Developer and e-learning expert appraisal

Educational Developer Assessment	No Educational Developer present at UHO.
E-learning: Accessibility	
E-learning: Good Practice	
E-learning: Improvements	
E-learning: Recommendations	

Appendix F - ULS
TEMPLATE: Task 6.3 Validation of best content and teaching methods

Partner task:
Each partner institution to nominate 1 university module related to agricultural technologies where innovative teaching and learning methods / eLearning have been used. Please complete Table 1 – 3 to provide information about the module. This task needs to be completed in 2 weeks please.

Table 1: Module information

Partner institution	Institut Polytechnique UniLasSalle
Module name	Management of agricultural equipment
Module level	MSc
ECTS credit	4
Reasons for module selection	The module aims to provide a framework for farm management and economic evaluation of agricultural technologies.

Table 2: Module details and reflections

Module description	This module describes the factors affecting farm management such as farm structure, new technology, farm governance. It also offers an overview of management sciences and marketing elements, exploring the functions of management, the strategy, and the type of decisions that need to be taken. The module also addresses cost concepts like cash and noncash expenses, fixed/variable costs in the context of agricultural machinery management.

Details on innovative methods used	1. Applied module including both theoretical and practical elements.
	2. Module is participated by a range of external speakers (4-6) such as industrial managers and product responsible
	3. The module includes class-room quizzes, discussions and groupwork;
	4. The module is delivered to 4-5 groups of students with up to 5 members allowing for a lot of interactions with the tutors and between students.
	5. Grades are complemented by the use of a grade modifier that is result of an intra-group evaluation provided by students; each student evaluate their group colleagues by assigning up to n+1 points for two criteria (availability and efficacity), where n is the group size. The modifier (m) of the grade (g) is determined based on the following scale:
	n=4: g=(0,1) m=-1; g=(2) m=0; g=(3) m=+1; g=(4,5) m=+2;
	n=5: g=(0,1) m=-1; g=(2,3) m=0; g=(4) m=+1; g=(5,6) m=+2;

	6. Being informed about the present and the prospects of mechanization/digitalization in agriculture. 7. Understanding and integrating the challenges of agro-equipment manufactures. 8. Select appropriate marketing strategies for leveraging commercial possibilities and addressing uncertainties. 9. Reflective posture and capacity; considering the challenges and needs of society.
Learning and teaching strategy	This module is taught in a semester. The main elements related to firm strategy, cost assessment and marketing strategies are delivered through a series of keynote lectures during the first weeks. These will be reinforced through external speakers' presentations. The module is complemented by company site visits proposed in another module in the same period.
Virtual learning strategy	Learning materials are made available in a MS Teams folder accessible by students. Students themselves upload reports and presentations in the same folder.
Number of students responses	2023/24: 20 students (20 students on the module)
Module rating	4.2 (5 = Excellent, 4 = good, 3 = acceptable, 2 = below expectations, 1 = poor)
Student written feedback	"Not enough savings in my opinion, it would have been interesting to see the financing and return on investment aspect" "Very good. The professor is a great teacher and very interesting in his assessments and the way of doing them"
Module Leader Reflections on the module	What I did was reinterpret them from a mechanical engineering perspective to a value chain perspective, introducing elements of strategy analysis, commercial and marketing networks, both on the farmer side and on the agricultural machinery company side. We always endeavour to improve the module with feedback received by students and opportunities from the research side.

Table 3: Educational Developer and e-learning expert appraisal

Educational Developer Assessment	Pedagogical support team has contributed to this module from the beginning, with a special attention to objectives and rhythms from teachers and students' points of view. The module assessment has been thought to involve student.
E-learning: Accessibility	The whole module is accessible through a Teams Chanel, allowing students and pedagogical teams sharing contents, following tasks and keeping up with meetings and documents.

E-learning: Good Practice	The way teams app is used is totally coherent with the pedagogical approach, making students living this module in a professional way.
E-learning: Improvements	The module might benefit from moodle activities too.
E-learning: Recommendations	Maintain the quality, of course, keeping up with pedagogical support and using the previous content as resources for the next students.