D2.7: Annual case development report (year 3)

WP2 – Action research facilitation

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1 Introduction

In this document, we report on the activities and outcomes in the 12 Nextfood cases. The cases have reported these outcomes using a revised template, that was developed to further streamline case development reporting (see Appendix 4.1). The template covers both the descriptive elements of each case, and the reporting of the case development process and case research. The filled templates, i.e. the individual case development reports from the cases, form the basis of this document.

The third year of the Nextfood project started, like previous years, after the deliverables had been submitted at the end of June 2020. Unfortunately, the Ethiopia case has been put on hold in view of the situation in northern Ethiopia. The Chile case was started in the third year of the Nextfood project.

In this third year, further case development was facilitated through workshops for all cases and peer-learning groups for the cases. Additionally, the WP2 leaders set up an individual meeting with each case in October 2020. The workshops covered challenges that several cases were facing, and guidance from the WP2 leaders on how to overcome those challenges. Through these workshops, the work across the cases became more streamlined.

The four peer learning groups focused on the following topics, as selected by the cases themselves: Analysing competence development, qualitative data analysis, reflection, and the multi-actor approach. This last peer learning group gradually started focusing more on the topic of online action-oriented learning, due to the significance of that topic under the given Covid-19 pandemic. Several facilitators and researchers in the cases gave very positive feedback on their participation in the peer learning groups. They mentioned that they learned a lot from participating, specifically on issues that they had been struggling with for a while already.

This document will start by presenting the amended template structure, before providing summaries from each of the case development reports. All the individual case development reports will follow thereafter.

2 Case development during the third year

2.1 This year's report structure

Prior to finalizing D2.6 the WP2-team developed a template for the Nextfood cases to follow in their case development reporting. In the work with D2.7 we realized that there was a need to change the report structure to streamline the cases' reporting, and to improve the cross-case analysis for D3.5 Report on educational strategy (year 3). The amended template was designed to address the research questions more directly and to avoid thematic overlaps. Moreover, the re-formatting aimed at providing a clearer distinction between actions taken to develop the case, and the action-research activities to answer the main research questions. In the reformatted template there are detailed and clearly defined sections and sub-sections to make writing the report easier. In the new template, the cases still fill in the same "ID-card" as in previous years. Further, the chapters include an "Extended summary of development of the case since the previous reporting", "Data on the development of the case since the last reporting", and finally "Concluding remarks on the case development since the previous reporting". In the "Data on the development of the case…"-chapter, the structure follows that of the research questions, in addition to the cases reporting on the essential shifts. See Appendix 4.1 for the full template.

Table 1: Overview of WP2 research questions

Student learning RQs:	
I	How do students experience such a learning process? With respect to,
	a) learning goals
	b) view on competences needed for sustainable development
	c) recognition of own competences and competence development
	d) transformation
II	To what extent do educational activities enhance the students' competences in observation, reflection, visioning, participation (engagement) and dialogue?
III	To what extent do educational activities enhance the students' abilities to deal with "the challenge of the whole"?
IV	How do the different categories of learning activities impact on enhancement of the core competences?
Case development process RQs:	
V	What are the supporting and hindering forces for change towards the Nextfood approach in education?
VI	How can we build on the supporting forces and deal with the hindering forces (reformulated as challenges) for change?
VII	What does such a shift in education require from teachers, students and institutions?
VIII	What do the teachers perceive as the greatest challenge to achieving such a shift?

2.2 Summary of this year's case development reports

In this chapter we provide a summary of the content of the individual case development reports. The summary will present the findings case by case and give an overview of the development in each case during the last cycle.

2.2.1 ID cards

The Nextfood cases are geographically dispersed and diverse in terms of content, number of learners, size, and educational level. Some of the courses are short and run for just a week or two, while others span several months. Moreover, the Nextfood cases consist of a variety of learners, from forestry professionals (SKOGFORSK), to master students (CIHEAM; NMBU; UCH; USB; ISEKI), bachelor students (UoC), undergraduates (AFS; SEKEM), post-graduates (UoK), and high school students (UNIOR). In the last Nextfood year, two new master's programs in Agroecology have been created aimed at applying the Nextfood educational approach, one at the existing UNISG case, and one at University of Chile, who just became an official case in May 2021. All cases apply a multi-actor approach, involving several stakeholders in their educational activities, like foresters, farmers, or food system professionals, or by having a diverse group of learners.

2.2.2 Online action-oriented learning

The third Nextfood year has been impacted greatly by the Covid-19 pandemic, and adjustments to restrictions have had a strong influence on the educational activities in most cases. All cases except ISEKI (which was already online) have to some degree had to move their courses online. This has created challenges, but also opportunities – e.g. connecting learners across geographical locations. However, the severity of the pandemic and governmental restrictions has differed between countries, again affecting to what degree the cases have had to adjust. Some cases have been able to run a type of hybrid course, only partly online, while others have had to move all their activity on-screen. Naturally, the quality of the activity is then also affected by the digital literacy of both students and teachers, network connectivity, technical skills, and access to digital tools. Interacting with learners, motivating, and keeping them engaged online is challenging. While the USB case had issues with students "hiding" and being passive in the online classroom, the Skogforsk case experienced that learners simply didn't attend the online meetings, which resulted in them ending their activities mid-cycle. Nevertheless, the cases have proven to be very adaptable and report that if anything, they have learned a lot the past year. Some have even developed innovative solutions to this new online/hybrid format. For example, UoK and AFS/IHU have incorporated the use of photo novellas to avoid joint fields visits, while CIHEAM has created an e-learning platform for live lectures and meetings. Many have used 'break-out rooms' to create collaborative spaces for learners. ISEKI, the only full-time online case from the beginning of the project, is perhaps the only case whose educational activities were not drastically affected by the Covid-19 restrictions. Notwithstanding, the learners did in most cases warm up to the online classroom after some time.

Case 1: Norwegian University of Life Sciences (NMBU)

The NMBU case revolves around a full semester course which is the main course in the Master of Science in Agroecology. In the past cycle the students reported on transformative learning

and experiences. The competences of visionary thinking, participation, and dialogue were the ones most improved according to the students' self-assessment of competences. Visionary thinking, along with participation, was the second most developed competence through the course according to the self-assessment. Participation in casework gave the students valuable opportunities for putting knowledge into practice, becoming aware of presumptions, and identifying gaps in their knowledge. Dialogue is the competence which shows the largest increase in the self-assessment. It came across as useful for understanding the complex, "soft" properties of the farming and food systems.

The findings indicate that reflection is the competence that links all the other competences together. It came across as a tool to gain a holistic understanding of experiences and complex situations, hence enabling systems thinking. Through reflection students understood better how they learn and perceive things. As such, reflection resembles a key to becoming agroecologists and life-long learners.

The Covid-19 pandemic posed challenges of moving between different learning arenas. The course was organized as a hybrid of online and physical meetings, with some students attending virtually from their home country. Adjusting to the online learning arena brought challenges for the facilitation of learning in the past cycle. Teachers spent extra time on individual follow-up and lost the opportunity to interact spontaneously with the online students. Some students felt that the facilitators were not present enough in the online sessions, but the fulltime online students had a different experience. A takeaway from the online learning arena is the flexibility it provides, which is an opportunity to make us of in the future. A challenge for the teachers to address is how to facilitate action learning in a way that accommodates for a diversity of students and their needs.

Peer interaction appeared to be important for individual growth and learning, enabling new thinking and reflections. The "collective autonomy" of the student groups seemed to enable cohesion building, peer-to-peer learning, and competence development in for example facilitation and dialogue. Students appreciated the opportunity for autonomous learning. It appeared to be a challenge for some students to become sure of how much theory they needed to investigate, and how to balance this with practicing skills and competences.

A successful transition to the Nextfood approach requires good time management and commitment by the teachers. Students should trust the approach and take charge of their own learning process. There is a need for improved communication between and amongst teachers and students. Institutions should provide for online learning of high quality when necessary and should in general make room for more interaction with students and reflection activities amongst teachers.

"The students described in their reflection documents how reflecting helped them identify room for further exploration – in learning, in competence development, and in the casework and group work. Reflection also helped the students identify and link their background and previous knowledge to the course activity and enabled them to engage in their own learning process"

NMBU, Case development report 2021

"While a few students emphasized the need to develop the competence of dialogue further to become even better autonomous learners, others link that improvement to the development of the competence of reflection, or rather the habit of reflecting frequently or continuously. Many students also linked autonomous learning to finding relevant literature and conducting literature studies on their own. This is a bit surprising given that literature search and study is only one (or two) aspect(s) of autonomous learning"

NMBU, Case development report 2021

"In the casework, the students were trained in approaching the complexity of food systems, while also being confronted with their own presuppositions. The core competences helped them make use of this and led to increased awareness. Using theory and systems thinking approaches in real life fostered transformation in how it enabled the students to organize and make sense of their experiences. Reflection in particular seemed to be intrinsically linked to transformative learning"

NMBU, Case development report 2021

"The casework was important for the students to cultivate the core competences as a part of a systemic inquiry, and this was essential to understand the importance of systems thinking"

NMBU, Case development report 2021

"In terms of implementing the action learning approach, one recurring requirement from teachers seemed to be commitment to the approach and more focus on the teachers themselves "practicing what they preach", so to speak. This seemed to be a challenge for the teaching team, due to time limitations and competing tasks. However, they all seemed to agree that it would be useful for them to "do some of the same exercises as the students do""

NMBU, Case development report 2021

Case 2: University of Oradea (UNIOR)

The UNIOR course on food innovation involves students from both university and high school. This has been a challenge in the case, especially in terms of organizing the course schedule, field visits (i.e. parents' approval), and difference in understanding and knowledge between the students. However, the high school students involved in the course often go on to continue their university education in the Nextfood case UNIOR program, which is considered a positive outcome.

From the last cycle, the UNIOR case reported that their students significantly improved their competences in reflection and dialogue. Teachers spoke of how they spent a lot of time and energy on explaining and instructing the students in these competences, e.g. on how to discern between dialogue, debate, and discussion, or how to write reflection diaries and learner documents. Even though teachers found this to be time consuming and challenging, they saw an improvement in their students and found that the students' familiarity with the concepts throughout the course also alleviated the need for follow-up. The students also reported an increased level of competence in dialogue and reflection in their self-assessments. In terms of observation and participation, these were also competences that were improved. However,

observation arguably was a competence which the students considered themselves to be quite proficient in from before. Participation was trained through group work and co-learning, while the class were given exercises in observation during field visits. Participation increased due to the level of motivation in the students, but also from the teachers' facilitation of student engagement as well as stimulating active participation. Visioning as a competence was considered by the teachers to be quite arbitrary initially. Their attitudes towards visioning as time-consuming and childish is hypothesized as being a product of communist culture, as creativity and imagination were not valued as academic abilities at the time. The teachers did not introduce more visioning exercises due to their own view on the competence as unnecessary. The students, however, contradicted the teachers' viewpoint, and they requested more attention for visioning as a competence. The students valued visionary thinking as an important competence to train, and particularly relevant to their field of food innovation. The teachers reflected on how their attitude towards visioning was contradicted, and how their own views changed.

In terms of facilitation and autonomy, the UNIOR case has worked on providing the students with a strategy for seeking information, to change their perspective from regarding the teacher as a resource person to relying on their own agency when acquiring information. The teachers designed this strategy with several steps for the students to take prior to contacting the teacher for help. The teachers and stakeholders also had to make a transition to become facilitators rather than lecturers, and this was an ability that had to be trained significantly in the course. Institutionally, and individually, moving away from rigid curricula and traditional educational structures has been a challenge, and the teaching team had to work on changing their mindsets. However, the process of finding new interesting topics and stimulating teaching aids seemed to inspire both teachers and students.

The UNIOR course also experienced challenges related to the Covid-19 pandemic and national and local restrictions. They too, had to conduct many of their educational activities online, and had to adjust their process. The students were less eager to participate online in the beginning but warmed up to the online format with time. However, they were still able to conduct some field visits and face-to-face meetings, though not with the whole student group. The pandemic, combined with problems related to aviary pest and swine flu, made it difficult to connect with stakeholders.

"I didn't quite agree with the other teachers when they decided to introduce a visioning exercise when the students had to imagine their perfect food product. I considered childish and time-consuming. At the end of the day, I proved that I was wrong because all the students enjoyed it" (TRD_T25_2019)

UNIOR, Case development report 2021

"After many years, today I stayed again at the desk in the classroom together with my new colleagues. I felt like a student again. It was a nice feeling to be part of a group of students. Some of them were very young of 18 years old but some others were of 20-22 years old. If I make a comparison, I can say that I am much older and there were moments when I felt like an intruder. The students were also not very enthusiastic about me considering me like a spy in their group. I think that after a while, they will accept me as their colleague and things will go better." (SRD_S27_2019)

UNIOR, Case development report 2021

"Today I was in the position of facilitating some activities within the group and I must admit it was very difficult for me to do it. Indeed, I know many things in my field of study, but being in the shoes of the facilitator was not easy. I realized that to be a good facilitator you need to have some skills such as: to be a good communicator, to be able to observe the members of the group and to intervene when it's the case, to guide and assist the group when they need it.» (LRD_S22_2019)

UNIOR, Case development report 2021

"The most inspiring experiences were those related to the hard work of identifying, adapting and creating new materials that we introduced during our course and the positive attitude of the students towards them."

UNIOR, Case development report 2021

"We have all learnt that the most diverse the teaching aids the most interested the students were in continuing their activity"

UNIOR, Case development report 2021

Case 4: ISEKI-Food Association

The third cycle of the ISEKI FoodFactory-4-Us competition involved more focus on peer-learning and interaction between students and among the different teams. This third cycle there were less examples from "the world out there", as the competition didn't collaborate with external experts. A take-away message for the coming cycle is to involve the students in looking for external stakeholders. Due to the lack of involvement of external stakeholders in the implementation of the competition, the core competences have been trained to a larger degree. The competition has moved away from typical webinar formats with linear learning towards "learning arenas that foster teamwork and interaction".

The ISEKI case does not collect student reflection documents, but the students are asked to reflect regularly, and a type of reflection document is collected in response to questions about the students' session in "soft skills". The students are also asked to complete the initial and final questions and self-assessments, which say something about their learning goals, competences, and competence development. From the students' responses they emphasize the importance of communication, teamwork, and other interpersonal skills. At the end of the course, the students express that they have trained skills in communication, teamwork, and problem-solving, as well as the five core competences. According to the students' self-assessments, the largest increase in competence proficiency was in dialogue. The teachers, on their part, reflected that they had improved their skills in facilitation and collaboration over the past cycle. According to their reflections, the facilitators have successfully moved towards more participatory and interactive facilitation. According to the teachers, peer-learning and teamwork has enabled the students to participate more actively. For the next cycle, the ISEKI team considers including student reflection documents in which students are asked to reflect on the whole competition process.

When it comes to supporting and hindering forces, the ISEKI team states that the workload of the voluntary advisory board is the largest challenge/hindering force, while the students' willingness and open-mindedness towards actively participating in the process is a big supporting factor, paired with financial and educational support and the involvement of external stakeholders. As for requirements, the teachers need more training in being facilitators, while the institutions should increase their willingness to widen their context of thinking. The students need to understand that they are in charge of their own learning, which can be cultivated by involving them more in the process and giving them more responsibility.

"This shift towards practicing the core competences through interaction among teams is appreciated by most of the students. We can see in the data that students express the importance of skills related to communication and teamwork and that especially at the end students emphasise interpersonal skills before problem-solving skills."

ISEKI, Case development report 2021

"We have moved more and more to participatory sessions. We now have very few moments where students simply listen to us talk!" (Facilitator 13231332)

ISEKI, Case development report 2021

Case 5: American Farm School (AFS)/International Hellenic University (IHU)

The AFS/IHU Nextfood case is based around two courses, one in nutrition and nutritional value of food, and another one in farm animal reproduction. Both courses are based around the multi-actor, action-oriented Nextfood educational approach. Like for many cases this year, the AFS/IHU case experiences challenges with regards to the novel online learning arena, a part of adjusting to the Covid-19 restrictions. According to the AFS/IHU case development report, both students and facilitators viewed the online setting as "limiting in all respects". For the students, the lack of hands-on experience hindered their learning development, according to the AFS reporting. Online learning was an obstacle for exercising the competences in class, but certain adjustments were made. For example, the AFS/IHU case implemented virtual farm visits, and a photo novella project, to train the core competences. Despite the challenges of the digital platform, the past AFS/IHU cycle also proved that online action learning is possible, and that the classroom can "go anywhere". One result reported on from the AFS/IHU case, was that this year the facilitators showed more confidence and independence regarding action learning and they "reported high levels of satisfaction about attempting the Nextfood shifts". Moreover, this educational approach improves student-teacher relationships, which "allows for greater job satisfaction". In terms of peer-learning, it contributes to accessing "untapped" resources, and it provides an opportunity for critical and creative thinking. In addition, it is "time and resource efficient as a teaching methodology". The AFS/IHU team's plans for the coming cycle is to further build on the "action-learning culture" they have started, to expand the benefits to a larger population, and to improve attitudes towards action learning in students, facilitators and institutional actors. For the students, the objective is to become more proficient in the core competences.

"Other than this activity, the responses that we received from the students, contribute to our understanding that the most impactful activities for competence development are the group projects, the involvement of professional field actors in the modules and the training in research methods."

AFS, Case development report 2021

"Having said that, this cycle's activities, under the pandemic circumstances gave us no opportunity to observe students' ability to deal with this complexity and to become problem solvers within these systems in a practical and concrete manner. To a limited degree, students had the opportunity to discuss real life problems and difficulties with the professional actors and the facilitators. However, the circumstances did not allow for hands-on experience."

AFS, Case development report 2021

"It became evident that as a research team we need to promote better student group learning and to provide training in the development of online group dynamics by suggesting related methods, mechanisms and strategies for handling online group interactions such as online group leadership, conflict resolution and facilitation of online group decision-making procedures."

AFS, Case development report 2021

"In order to best serve the objectives of the NEXTFOOD PROJECT, the next activity cycle will need be more concentrated on studying the core competences in relation to real-life working conditions and the dynamics of multi-actor relationships."

AFS, Case development report 2021

Case 6: SKOGFORSK

The Skogforsk vocational course for forestry professionals is aimed at creating a higher understanding about logging techniques, strategies, and methods to enhance biodiversity in production forests. Participants in the course are forest management officers and logging machine operators, and the cycle is one year, consisting of four meetings.

This last cycle had to be ended early due to lack of motivation with the participants, and a declining number of learners. The Covid-19 situation moved meetings online which made it difficult to motivate the learners when they could not meet "in the field". The experience was that digital dialogue is difficult, and practical and technical issues with the digital format made for additional challenges. Before ending the cycle, certain adjustments were made, like creating a chat for communication in-between meetings and using photos to discuss phenomena and topics. After each meeting, the participants were also asked to fill out an evaluation form by marking words that could be used to describe the day. In addition, they also completed self-assessments of competences and the SKOGFORSK team collected reflections via phone calls, which were documented. However, the circumstances of the cycle made the data material slim, and any results from analysis quite insignificant.

The SKOGFORSK research team reports having learned a lot this past cycle. They are now planning the coming cycle and emphasize the need to have a plan B in place if the course were to be digital once more. They express a need to customize the Nextfood approach to their target group, i.e. busy working forestry professionals with various educational backgrounds, not full-time students. The forest professionals do not have time set aside for

completing tasks like written assignments, and thus it is important to make sure that the learners understand the benefits of participation and to explore ways to assure commitment. The course leaders should also facilitate in-between meetings, to keep motivation up.

"From the diagram we can draw the preliminary conclusion that the participants seem to be positive to the meeting days as a whole. Expressions /words like "I listened to others", "I learned something new", "others listened to me", "good climate" and "good discussions" are chosen by a majority of the respondents."

SKOGFORSK, Case development report 2021

"The learners in our case, i.e., the machine operators employed at a forest company are used to traditional learning situations, where they are the receivers of knowledge or instructions. Some of them are not very comfortable with or used to reflect and discuss, and there was an obvious need to build trust between those who had never met before, and this was not very easy when we did not actually meet. After two digital meetings, when we noticed that the machine operator's motivation quickly declined, we decided to end this cycle and the course leader made a last round of phone calls with the machine operators to sum up."

SKOGFORSK, Case development report 2021

"We believe that our group of learners would have been much more motivated if we could meet regularly and and to collaborate in our main classroom."

SKOGFORSK, Case development report 2021

Case 7: University of South Bohemia (USB)

The USB case also reported on having to adjust to Covid-19 restrictions. For example, they too had to move most of their education online and could not visit farms like planned. This led to a lack of interaction with farmers, who also struggled with the online format. Teachers experienced that it was harder to motivate students online than in real life, and the students were saddened that they could not go out "on the field" together. USB reports on the students losing concentration and motivation in the online environment, which also made it difficult to implement certain tools suggested in the Nextfood methodology that had been successful in previous cycles. Notwithstanding, students generally shared a positive experience of the course, and appreciated the practical approach and learning about real-life sustainability issues, according to the students' reflection documents. Two students, however, expressed that they preferred a more theoretical and linear approach. Others were impressed by the involvement of facilitators and external stakeholders. Apparently, there was visible progress in the "Nextfood" students' activity and ability to practice dialogue and do individual work, compared to other "non-Nextfood" students of more traditional courses. Nevertheless, the USB case did experience difficulties bringing students to a more active mode during this cycle compared to past ones. One of the most inspiring moments this year in the USB case, was the students' increased ability to present their own work, speak their own opinion, and work autonomously. Of the competences, the most significant improvement was seen in dialogue according to the students' self-assessments.

When it comes to the teachers, they still need to develop their communication skills and practice more of the methods, like rich picturing. Some teachers struggle to change their

attitude towards the innovative action-learning approach. These still see practice as something gained through employment, not education, and value grades over quality, according to the USB case report. Moreover, teachers experience difficulties with transitioning from lecturer to facilitator, and to see students as something other than subordinates. Also, farmers have a certain prejudice towards collaborating with universities, and they generally see no need to cooperate with students. All in all, there are still some challenges to overcome with openness to the Nextfood approach, at the USB case.

"Students changed their approach during the course, most of them became more active and they started to use critical thinking, they started to ask, bring our opinion and to use arguments".

USB, Case development report 2021

Case 8: University of Gastronomic Sciences (UNISG)

The UNISG case this year report on their one-week course as a part of their master's in Gastronomy, and their newly initiated master's program in Agroecology. In the one-week course the UNISG team report challenges with online learning, like the other cases before them. A big obstacle was not being able to physically visit farms, and this is something that hindered competence development as it is harder to practice the competences online. This year, they arranged for a "web-case" rather than an on-farm case. Notwithstanding, the main results were quite similar to previous cycles, according to the UNISG case. The students improved their core competence proficiency, and there was a visible "transition", or change, between the students' initial and final questions. However, the students still experienced challenges in writing their reflection documents, and the core competences were not often referenced in these. UNISG report that visionary thinking was a competence which the students improved while preparing their stakeholder documents and when creating rich pictures. Participation was a competence also cultivated by this type of collaborative work, however, it was also limited by the online format. On the other hand, the digital arena "nudged" the students to engage in dialogue when communicating with each other, and despite its challenges virtual communication did enable connectivity across geographical locations.

In addition to the 1-week course, the UNISG team also started a master's program in Agroecology and Food Sovereignty. Here the students were prompted to reflect when preparing a reflection journal, and to practice visionary thinking by completing numerous assignments on looking into the future. Also, here participation was limited by the online format, however, it was improved by group discussions and presentations. These activities also cultivated the dialogue competence.

The online platform required teachers to be flexible and both students and teachers to be competent in using digital tools. Generally, a shift to the action learning approach requires students to be patient and to have a high level of engagement. A challenge for the UNISG master's program is its novelty. It is lacking enough team members, and there are also certain institutional challenges. Moreover, Covid-19 restrictions created uncertainties. There are some collaboration challenges with external stakeholders and organizing "community matching" for experiential learning cases.

"Observation competence has the lowest growth (1,08). This could be explained by online didactic activities provided to the students. Thus, web-case (instead of experiential part of action learning) allowed to the students to observe each farm online. For some of them it was an interesting experience, while other students (without agricultural background) had difficulties to receive a comprehensive understanding of a farm without their physical presence there. This could be interpreted as one of limitations of online action learning.

As for Observation, there were two lessons that I internalized when creating the Rich Picture. Overall, the whole process of creating a Rich Picture taught me to be a better observer. (Student quote)""

UNISG, Case development report 2021

"Stakeholder document enhanced the students' capacities to work in the groups, to interpret the stakeholders' activity in a clear way and to connect a personal background with received information concerning stakeholders.

I appreciated being able to complete this document as a group. We were able to work off each other's strengths and learn from each other. I certainly felt that I learned a lot from my peers. I enjoyed this assignment much more because of this. My groupmates and I all come from different backgrounds in agriculture with different undergrad majors. We used this to our advantage where we could. (Student quote)""

UNISG, Case development report 2021

"Online education provided several benefits such as connection between professors and the students based in different countries, and recorded classes that could be used by students several times or according to their time zone. However, the action learning approach that attracted the students suffered from lack of hands-on activities limited due to red zone and lock down period."

UNISG, Case development report 2021 (Master program)

Case 9: University of Calcutta (UoC)

The University of Calcutta 3 months course in Agroecology aims to carry out "Pedagogical action research on knowledge transmission through Observation – Reflection – Conceptualization – Active participation learning cycle". The course, which last cycle was online, involved attaching students to a farm for them to observe, analyze, and develop a vision in collaboration with the farmer. In the previous cycle the UoC team reported that the students, according to their reflection documents, during the course enhanced their competence mastery in all the core competences, and that their "attitude towards the experiential, phenomenon-based approach" underwent a "transformation from frustration to appreciation." However, the UoC case also experienced challenges adjusting to Covid-19 restrictions, and especially conducting field work was difficult this last cycle, according to their case development report. Moving many of the educational activities online created new issues with technical skills and digital literacy, as well as network connectivity and keeping students present and motivated. Not to say the online learning environment didn't also have its advantages in how it could include people across different geographical locations, but this also created additional challenges when these students chose farm cases in their vicinity. Due to travel restrictions UoC could not connect students to farms of their choosing, and this made it impossible to collect farmers' reflection, for example. There is also a big variation in farmers' openness to the approach.

The UoC case reported that the change in learning methods are not successful for all, and that the transition to such an action-oriented, participatory education is a major challenge for some, including teachers. One requirement for a successful change towards the Nextfood approach is to increase the teachers' overall understanding of the approach as well as developing a habit in both students, and teachers, to reflect regularly. Students need to switch to "self-learning mode", i.e., become more autonomous and expect less direct knowledge transfer.

In most cases, however, the shift worked well, and particularly for students who are practitioners. Moreover, the casework, which involves exercises in observation, reflection, visioning, and participation, improves students' competences in systems thinking overall, according to the UoC case development report. Dialogue is cultivated by the students communicating with the farmers, and their collaboration in groups and with stakeholders enables participation. A big challenge to overcome is related to changes in mindset amongst students and authorities, amongst others.

"Due to the global pandemic, the whole course took a setback. The course structure, curriculum, facilitation methodology had to be improvised to fit into the online system. The mobile network is often a challenge in India to conduct online classes for rural area's students, which does not allow fluidity in the classroom. A strict barrier between subject domains as agroecology is an interdisciplinary subject.Self-learning, group learning and peer learning is rarely practiced."

UoC, Case development report 2021

"Most of the students had different backgrounds and they are the product of conventional chalk and talk education system. So they had to take some time to adopt to these action learning methods. They were not used to observation-participation-reflection kind of education system. But as soon as they managed to familiarize with the new system, they were loving it. They really quite enjoyed the process as they could participate in everything with the facilitator."

UoC, Case development report 2021

Case 10: SEKEM

The SEKEM case is based on a practice-oriented course in biodynamics for undergraduate students in the Faculty of Agriculture. The on-site SEKEM farm serves as the basis for the students' casework during the course. SEKEM reports that teachers are enthusiastic towards the different teaching methods, despite being new to the Nextfood approach. The students are also somewhat overwhelmed by the novelty of the educational activities and struggled to understand for example the self-assessment of competences at the start of the course. As such, there is a need for an improved understanding of the Nextfood model amongst both teachers and students in the SEKEM case, and one of the requirements for the future is to decrease the "resistance to change". The teachers also struggle to understand and improve the students' different skills and learning abilities. It is a challenge to motivate and encourage the students continuously and to establish active communication between students and teachers.

Like for many other cases this cycle, Covid-19 impacted the course activities. In the SEKEM case this resulted in them not being able to conduct physical reflection sessions with their students, and the restrictions also affected the data collection and analysis process. The basis for this year's reporting from the SEKEM case is the outcome from the students' two weeks training in reflection, initial and final questions, and self-assessments. According to the findings the students improved their competence in observation, and these were cultivated by having regular "group presentations from the observations". Also, participation improved throughout the course as the students became more engaged and less afraid to take part in group activities. In the students' final reflection documents students didn't mention reflection as a competence which they had improved through the course, nor did they write about visionary thinking. The SEKEM case report that the students "don't have skills in visualization", thus a goal for the coming cycle is to focus more on training visionary thinking as a competence.

"The students liked the idea of the Gothic teaching methods since the change of teaching method/place has let them experience other feelings and information compared to class-based education. Yet, the students were overwhelmed since a) the different nature of teaching since the method is not a direct information delivery b) the topic is not yet well organized, and the syllabus is not clear c) repetition of some topics since this training is repeated with first- and second-year students."

SEKEM, Case development report 2021

"The teachers from Switzerland and Egypt are still in understanding processing of NextFood model. Therefore, some of the tasks that required by NextFood research cannot fully implemented such as assessment of students on only five competencies. […] Due to Covid 19 measurements, we were not able to carry out some activities regarding data collection and consequently data analysis. In some of the activities, the students were not able to understand the tasks, and this due to the untraditional method used in the learning process and language barrier as English used in teaching and paperwork."

SEKEM, Case development report 2021

Case 11: CIHEAM

The CIHEAM case have in their case development report not been able to report on the most recent cycle, as it is still not completed. This affects the analysis and findings, and some of their reporting is based on coaches' observations, interaction with students, and oral reflections. Due to Covid-19 restrictions the course was moved mostly online, and the CIHEAM case reports that this has made it harder to develop the students' competences. More work was done individually, which resulted in less group cohesion and collaboration. Nonetheless, reflection as a competence has been improved in the students, according to the researchers. However, participation, dialogue, and visionary thinking have been challenging to cultivate. In an online format, action learning is challenging, and it requires additional efforts from all parties involved. Certain adjustments were made to make sure that the online learning arena also involved action-oriented and participatory activities, and the CIHEAM team tried to have the students find stakeholders in their own countries, but with varying degree of success. Despite best efforts, the learning outcomes are understood to be of much higher quality when the course activities are done in direct interaction with students, CIHEAM report. As such, online learning is a "logical contradiction" to action learning. As an adjustment to this new format CIHEAM created an e-learning platform for live lectures and meetings.

In the CIHEAM case the students conduct interviews with stakeholders in their home country and in Italy, they attend a series of topic-related seminars and lectures, they perform groupwork and presentations, engage in discussion with learning facilitators, and train the core competences through different exercises. They are also considering integrating individual essays as a part of the main learning path for the students. To foster peer-learning the CIHEAM case have invited previous students to share their experiences and reflect with the current class, and they report that there is a need to create more interaction between student groups. In terms of making the change towards the Nextfood approach, it requires flexibility, open-mindedness, courage, good-planning, and institutional support, the report states. Challenges of making such a transition includes how it's difficult to fully integrate action learning in a master's course due to the need for wide collaboration, and how it's hard to involve stakeholders, as this is dictated by good relationships and provision, rather than "real concern on activities and action learning results". Thus, human capital is the main supporting force, according to the CIHEAM case report. In terms of the core competences, visioning is the hardest one to convey, and an important question is how to improve the students' ability to practice visionary thinking.

"At the moment of the reporting, a full picture on the level achieved in this skill handling is not possible. The limited interactions with local actors have hampered the opportunity to grasp the concept of visioning in its full potential. A field visits organized in May to facilitate field experiences, will probably provide a good opportunity for reflecting on the visioning and where it can stand in their activities design."

CIHEAM, Case development report 2021

"Students have showed a good level of participation in activities and in the exchanges with coaches, sharing their doubts, achievements, and ideas, reflecting on their suggestions and integrating them in their work. They have also improved their participation in peer learning activities, discussing within the group how to design further steps in their assignments. They effectively interacted with key informants and actors from the territory, remotely, they showed interest in the role of each of the actors and tried to prepare questions that could clearly define roles, interests, conflicts, objectives, etc."

CIHEAM, Case development report 2021

Case 12: University of Kerala (UoK)

The University of Kerala 28-day "Cerificate Course on Agroecology" provide post-graduate students an opportunity to practice the Nextfood model through action learning and training in the core competences. The course activities include participating in field work activities, group work, online interactive sessions, and peer-learning sessions. The students at UoK are also introduced to exercises like transect walk and photo novella projects to cultivate the core competences. UoK write in their case development report that the students are initially skeptical of the novel educational approach, due to their familiarity with traditional ways of learning, but that they at the end of the course have an increased understanding of this new pedagogy. "Field work made indomitable impact in student learning", the UoK case development report states. In the last cycle the UoK case introduced some new teaching aids to their course, like the above-mentioned photo novella, but they also invited alumni to serve as mentors for the current student group. According to the students' responses, the learning process nurtured empathy towards stakeholders and peers, and increased acceptance of different attitudes and views. Students started to see learning as self-directed.

Based on the students' self-assessments of competences dialogue and visionary thinking were the competences most improved in the UoK case. Educational activities like photo novella and transect walk were exercises that improved observation, and through mind-mapping the students learned the difference between observation and reflection. Working in groups and communicating with stakeholders fostered dialogue, while participation was enabled by field visits. Class-sessions on reflection, dialogue and visionary thinking helped improve the students' ability to practice these competences. These sessions were easily transferred to the online classroom – i.e., using WhatsApp and other technology. UoK mention online learning and Covid-19 restrictions as a defining factor this cycle, and how it limited the scope and time available for action learning activities. However, it has also prompted an improved digital literacy and increased familiarity with online tools.

In general, the UoK case report addresses challenges and hindering forces related to the implementation of the Nextfood approach to be lack of focus in students when not in the classroom, cultural differences that prevent cordial relationships between students and teachers, and the time, effort and energy needed – from teachers in particular – to introduce new learning arenas and methods. Thus, the change requires certain changes in attitude amongst students, teachers, and farmers, as well as the teachers respecting the active role provided to the students. Institutions have to exit their comfort zone, while students need to take responsibility of their own learning process in order to be capable of dealing with real-life issues.

"Students started to be aware of sustainability issues in the surroundings and tried to find feasible solutions by adopting system thinking and agroecological position, especially after participation at fields. Students opined that many of the competences they learned are tools for life-long learning and the course made attitudinal changes in them to appreciate diversity and peer learning."

UoK, Case development report 2021

"Farmers acted as facilitators in the course and to them, it was a whole new experience. They haven't been in a university for all these years and participating in activities instilled sense of responsibility in them and their social status improved. They guided students at the field and these interactions helped students to learn farming techniques, issues faced by farms and economic, social, and cultural aspects of sustainability issues. Most of the farms are small holder farms and farming activities are a part of daily life in which all members in the family participates. So that, it was tedious for the farmers to find time to interact with students and arrange facilities for participatory action. However, they seemed satisfied with the new role entrusted to them and understood about learning and research happening at university and how they can contribute towards it. Also, the client document prepared by students was helpful for farmers for documentation and for further expansion of farming activities."

UoK, Case development report 2021

"To students, the new educational strategy is not just a process of creating knowledge, instead is a mediative process of reconstructing one's knowledge and attitude accumulated over these years of conventional education by applying action learning tools."

UoK, Case development report 2021

"Here, students understand the course as an interdisciplinary initiative from academia to create common platforms where different stakeholders including government officials, farmers and researchers can engage in dialogue and contribute to reach mutually beneficial, innovative and sustainable solutions."

UoK, Case development report 2021

Case 13: University of Chile (UCH)

The University of Chile case was just approved as a Nextfood case in May 2021; hence they don't have any educational activity to report on. However, they are in their planning phase of a M.Sc. in Agroecology, due to start up in March of 2022, which aims to incorporate the Nextfood educational approach. In their report they write about their plans for a pilot course to this master's. The pilot will take place in August of 2022 and will take the form of an interdisciplinary, participatory course aimed at connecting students with social organizations through work in real-life situations (cases). As such, their pilot course will serve as their first cycle of planning, implementation, and reflection. Already the UCH Nextfood team have had sessions with the teachers who will be involved in the course, and they have sent in formal applications. In these processes they have already reflected on what is needed, and what might be the hindering and supporting forces for implementing their program. Some of the hindering forces include challenges related to Covid-19, constructing a master's program from scratch with all that it entails, and coordinating and organizing interdisciplinary collaboration between teachers. As for supportive forces, the institution is open and supportive, the teachers have visionary ideas and are motivated, organizations and scientific societies welcome such a program, and students have voiced interest in applying. The creation and implementation of the program requires openness towards this novel educational approach from both students and teachers, as well as flexibility and adaptability. The teachers will have to be willing to spend time and energy, and thus need to be motivated to apply new methods. The institutions need to provide resources for off-campus activities, amongst other things.

"UCH is developing a MSc-program in Agroecology and will, with the support of the project, incorporate elements of the NF approach into the course structure. The program seeks to contribute a new vision to agriculture and agroecosystem research in Chile."

UCH, Case development report 2021

"The Msc in Agroecology aims to form professionals characterized by their ability to develop reflective and analytical thinking that allows them to approach their professional or research work based on the concepts and principles of agroecology, integrating interdisciplinary biophysical, ecological, socioeconomic components and food. […] The interdisciplinary vision is the hallmark of this master's degree and what will distinguish it to our graduates in the professional and research context."

UCH, Case development report 2021

3 Case development reports

3.1 Norwegian University of Life Sciences (NMBU)

3.1.1 ID card

Course title: PAE302, *Agroecology: Action learning in Farming and Food Systems*

Level: M.Sc.

Language: English

Institution: Norwegian University of Life Sciences, NMBU

Course leader: Dr. Geir Lieblein. The core teacher team consisted of Dr. Lieblein, Dr. Tor Arvid Breland, Dr. Anna Marie Nicolaysen, Dr. Charles Francis, with contributions from Dr. Suzanne Morse, Vebjørn Egner Stafseng and Petra Blackwell-Stone.

Timeline of the activities covered in this report

The course was held from September 21, 2020, to January 29, 2021, with a break from December 18 to January 4 (course duration was 17 weeks full time).

Learner categories and number per category (demographics)

Main learners: Students

Demographics:

Female: 13

Male: 5

Age group:

20-24: 9

25-30: 9

Background:

Social Sciences: 1

Natural Sciences: 2

Agronomy/Agricultural background: 7

Economy: 2

Other: 3

Other learners: Farmers

Female: 8

Male: 12

3.1.2 Extended summary of development of the case since the previous reporting

3.1.2.1 *Actions taken since the previous report*

3.1.2.1.1 Planning

The course leader started the planning process in March 2020, followed by further elaboration in collaboration with the two other senior members of the core teaching team during April – June. At an early stage it was decided to delay the start day of the course, in the hope that Covid-related problems would be less prominent. On August 6th, August 20th and September 9th further concrete planning was done by more or less the whole teacher team. The overall topic of discussion during these meetings was how to adapt to the Covid situation, that also included discussions about how to include students that could not travel to Norway in the course activities. These planning activities were supplemented by informal conversations and reflections among the members of the teacher team. The main outcomes in terms of changes from the 2019 course had to do with the timing of course start-up, the use of a fully online sub-course, inclusion of hybrid teaching, and changes in the main casework of the course. In addition, an expanded version of student-driven open-space sessions (as compared to the previous year) was included.

3.1.2.1.2 Implementation

The course was implemented within the same overall format as in 2019, with the following main, Covid-induced, changes:

- Start of the course was postponed from August 10th to September 21st
- The course started with a four and a half weeks fully online course. During this period, we had in addition weekly sessions in the classroom where the on-campus students participated in person, and the team of students that were residing in North and South America (the “A-team”) participated live through Zoom. These sessions therefore had to take place in the late afternoons, to accommodate for the time-difference. The online students were additionally served by two agroecology professors that were based in the USA.
- After this initial four and a half weeks online period, the course was conducted in a hybrid manner, with classroom activities for the on-campus students. These classroom activities were filmed and made available to the online students. These students continued to be served by the two agroecology professors in the USA throughout the course.
- The main real-life casework in the course was reduced from two separate cases (one farm- and one food system case) to one broader case that would include one farm and its related food system. With one broader case the students could focus on the farm in its food system, a similar situation to what they had been introduced to in the web-case used in the initial online course.
- Weekly reflection sessions and several student-led literature seminars were conducted live in Zoom in the afternoon to allow for synchronised participation by all students.
- An emphasis on student-led open-space sessions during the last weeks of the course. The students were encouraged to invite relevant speakers for online workshops with a topic of their preference and host these sessions. During the last four weeks of the course five open-spaces sessions took place, two whole day-, two half day- (one in the classroom), and one two-hours session. This was an opportunity to interact with speakers within a field of their interest, and their fellow students, as the Covid situation

had limited the students' opportunities to interact with others on and off campus during this schoolyear.

- Student-led literature seminars: The past few years, the course literature seminars have been organized in the classroom. In 2020, the main responsibility was given to the student groups (including all the students in live sessions) and executed in a hybrid fashion. This exercise allowed the students to work on their facilitation skills in an online setting, as the responsibility of organizing the Zoom meeting also was given to them.

3.1.2.1.3 Reflection

During the course activities the teachers hosted weekly reflection meetings, or "debriefs", which were also supplemented by ad hoc reflective conversations between teachers, and individual teacher reflections. The outcomes of these reflections were not collected as data for the Nextfood project. However, two reflection sessions were held in March 2021 (16th and 18th), with the teachers, the Nextfood research team, and hosted by an external facilitator familiar with the NMBU Agroecology program, the Nextfood action-learning approach, and the course activities. The two reflection sessions were recorded, and the researchers took notes underway. These notes/minutes formed the bases for further analysis of the case development process – as referred to later in this report.

In the reflection sessions several subjects were discussed, and the main outcomes were related to better time management, to conduct more frequent and structured reflections within the teaching team, to communicate more and better (internally and with students), and to increase and improve student feedback. Moreover, practicalities related to the course casework was discussed, and for the next cycle adding an additional farm visit and dividing farm and food case work is considered, as these changes might improve the students' familiarity and understanding of the complexity in farming and food systems.

3.1.2.2 *Research results since the previous reporting*

3.1.2.2.1 Students', teachers' and other stakeholders' experiences and learning

Based on the data collected from the last cycle of case development, the students appeared to have a common goal of facilitating change towards more sustainable farming and food systems. Collaboration and communication skills, working across disciplines and backgrounds, and interaction with farmers and other stakeholders seemed to be important to them. The students appeared to improve skills in communication and facilitation during the course. They saw systems thinking methodology as enabling them to make sense of the complexity and their own roles in farming and food systems. Further, the students appreciated the course's emphasis on autonomous learning, and linked this to becoming life-long learners. The results show no big changes in the students' view on competences needed for sustainable development through the course, but the Nextfood core competences of participation, observation and visionary thinking were considered more important at the end.

The students reported on transformative learning and experiences. It seemed that the vulnerability experienced by the students when involved in action learning held potential for transformative change, at least when accompanied by a safe learning community and cultivation of the core competences. The students were challenged and confronted with their

own presuppositions, and the core competences enabled them to deal with this constructively. Reflection and interaction with peers seemed to be intrinsically linked to transformative learning.

The competences of dialogue, participation, and visioning were the ones most improved according to the students' self-assessment of competences. The core competences were recognized by the students as helping to deal with challenges and as something to build upon in a life-long learning journey. Facilitation was regarded as a core competence for future work life.

The course activities involving observation practices and tools were acknowledged and appreciated by most students. Observation, along with reflection and dialogue, were by several regarded as essential in dealing with "the challenge of the whole". Students found it interesting to have learnt to distinguish observation from reflection. There seemed to be different views and uses of observation in relation to participation in the casework.

The findings indicate that reflection was the competence that linked all the other competences together. It was also the competence which the students felt the most proficient in. It appeared to enable students to become more present, aware and curious, while also confronting their assumptions and thinking patterns. Reflection came across as a tool to gain a holistic understanding of experiences and complex situations, hence enabling systems thinking. Through the reflection document and reflecting on reflection itself, students understood better how they learn and perceive things. Moreover, it seemed to be a valuable tool for the students to better understand group dynamics and in general enhance their competences. As such, reflection resembles a key to becoming agroecologists and life-long learners.

The concept of visionary thinking came across as something new, provoking both enthusiasm and reluctance in the students. However, most students showed excitement about learning how to develop a vision and facilitating visioning sessions with farmers. Visionary thinking, along with participation, is the second most developed competence through the course according to the self-assessment. Still, several students express a feeling of not having had enough time to practice and develop the competence. This may also explain why some students at the end of the course were not yet entirely convinced about the potential of visionary thinking as a tool.

Participation in casework appeared to give the students valuable opportunities for putting knowledge into practice, becoming aware of presumptions, and identifying gaps in their knowledge. Dealing with complex situations and systems in the casework, the students developed the core competences and skills in action learning and systems thinking. The groupwork with peers also gave opportunity to develop the competence of participation. Further, through participation in the casework students felt like active participants in the agroecosystem. However, some students expressed a need for more training and preparation before the casework, and more time for participation in the actual cases. There was some ambiguity about the students' role as both participants and facilitators in the cases, and some students expressed a worry that they might influence the farmers too much. Some students

understood the participation in casework as a learning opportunity, while others had higher expectations of making a real change. However, in general the opportunities to practice participation appeared to be highly appreciated amongst the students.

Dialogue is the competence which showed the largest increase in the self-assessment. A take-away for students seemed to be that dialogue requires intention, acknowledgement of assumption, awareness, and active listening. Dialogue came across as useful for understanding the complex, "soft" properties of the farming and food systems. The educational activities of the course and the other competences gave multiple opportunities for the students to enhance their competence of dialogue.

The systems thinking methodology came across as useful for making sense of complexity in farming and food systems. Through the application of systems thinking, the students seemed to gain a better understanding of their role as agents of change. Moreover, through practicing the other competences in the casework, the students enhanced their ability to think systemically and increased their understanding of the need for such a holistic perspective. The education thus seemed to enable the students to increase their competence of dealing with "the challenge of the whole".

3.1.2.2.2 Outcome of the case development process, including effects of making the essential shifts

The course in the Norwegian Nextfood case centres around real-life casework that provides the basis for the students' learning activities, and as such incorporates a diversity of learning arenas. For the past cycle, the Covid-19 pandemic affected the course and posed challenges in moving between different learning arenas. The course was organized as a hybrid of online and physical meetings, with some students attending virtually from their home country. The on-campus students were able to conduct real-life casework on farms in the university area, while the online students did casework with local farmers in their home countries. The past cycle of the case development process brought both challenges and valuable experiences with action-oriented learning in online and hybrid learning arenas.

The course's emphasis on co- and peer learning seemed to be appreciated by the students. Peer interaction appeared to be important for individual growth and learning, enabling new thinking and reflections. However, both teachers and some students pointed to a need for individual support of the students, aiming for a balance between individual development and peer learning.

Throughout the course, in addition to some fundamental readings and literature seminars, the students are encouraged to seek out literature and knowledge by their own preferences and needs. The students seemingly appreciated this as an opportunity. It appeared, nevertheless, to be a challenge for some students to become sure of how much theory they needed to investigate, and how to balance this with practicing skills and competences.

The students are encouraged to use a diversity of teaching aids and sources, trusting their own ability to select the appropriate ones. In the past cycle, they generally seemed to

understand that the holes in the course material helped to identify gaps and room for further exploration. Unlearning the reliance of a textbook as the “course encyclopaedia” came across as essential for making the shift from textbook to a diversity of teaching aids.

The students are assessed on their participation in the learning community, casework group reports, individual reflection documents where they evaluate their learning process, and an oral exam. It appeared as if this qualitative assessment methodology was appreciated by the students.

Adjusting to the online learning arena brought challenges for the facilitation of learning in the past cycle. Teachers voiced how they spent extra time on individual follow-up and lost the opportunity to interact spontaneously with the online students. Some students felt that the facilitators were not present enough in the online sessions, but the fulltime online students seemed to have a different and more cohesive experience. Teachers in the online class spent more time on individual follow-up, while campus teachers felt a need for more interaction with the students. Some students expressed a need for more guidance, follow-up, and feedback, while others appreciated the trust and responsibility given to them as autonomous learners. Thus, a challenge for the teachers to address is how to facilitate action learning in a way that accommodates for a diversity of students and their needs.

3.1.2.2.3 Supporting and hindering forces for implementing the Nextfood model

The students appeared to have positive experiences of the introductory online farm casework, and moreover appreciated the shift to a diversity of learning arenas. They seemed to embrace participation in real-life cases, reflection sessions, and student-led open space, among other course activities. The “collective autonomy” of the student groups seemed to enable cohesion building, peer-to-peer learning, and competence development in for example facilitation and dialogue. A takeaway from the online learning arena is the flexibility it provides, which is an opportunity to consider building on in the future.

In the past cycle a challenge was to adjust the course and adapt to an online learning mode. Students expressed disappointment with the online format, and frustration about studying and reading about action learning without being able to put it into practice. As such, the pandemic was a major hindering force for a shift to a diversity of learning arenas. Adapting to the online format seemed to require more resources on part of the teachers and could also require more institutional support to provide for students’ casework in a diversity of locations and contexts.

The results of the report point to some requirements for teachers, students, and institutions for a successful transition to the Nextfood approach. On part of the teachers, it requires good time management and structure of tasks. The teachers should commit to the approach and practice the competences themselves. Teachers should also be aware of their limitations and open to critique, i. e. be willing to put themselves in a vulnerable position. Moreover, the transition requires that teachers can navigate in a diverse group of students with different attitudes towards, and motivations for, the educational approach. It seems to be a need for more dialogue with the students, individual follow-up, and continuous feedback.

Moving towards the Nextfood approach requires from students that they trust the approach, the process, the teachers, and themselves. Furthermore, that they take charge of their own learning, and are open to learn in new ways. There is a need for improved communication between and amongst teachers and students, including clarification of the course content and what is expected from the students. In this course cycle, the online learning environment has required flexibility and adaptability from both teachers and students, moreover acceptance of a less action-oriented experiential learning experience. Institutions should be built to provide for online learning of high quality when necessary. Institutions should make room for more interaction with students and reflection activities amongst teachers.

3.1.3 Data on the development of the case since the last reporting

3.1.3.1 *Students' responses, learning and competence development*

3.1.3.1.1 Methods of data collection and analysis

The 2020 PAE302 class were introduced to the Nextfood research project on the 21st of September. Eighteen students in total attended the course while fifteen consented for their course documents to be analysed as part of the project and consent forms were collected. The students were asked to fill out a self-assessment of competences and to answer four questions about their contributions to and expectations for the course at the beginning of the semester. The same exercises were also conducted at the end, where they again assessed their level of competence (five core competences) and answered five final questions about their experience in the learning community. Two weeks before the end of the course, the students were also asked to complete an individual reflection on learning goals. These reflections were prompted by three questions: "My main goal in this course is…"; "Which core competences and learning goals are my favourite, and why?"; and "What additional goals do I have for myself in this course?". The purpose of asking these initial and final questions is to gain an understanding of the students' comprehension, contribution, and motivations, while also enabling them to reflect on and engage in their own learning process.

BEGINNING OF THE COURSE		END OF COURSE
• What are the knowledge and skills we need to support sustainable development in agrifood and forestry systems?	REPEAT	• What are the knowledge and skills we need to support sustainable development in agrifood and forestry systems?
• What experiences and competences do I bring to the educational activity to make it a success?	PROGRESS?	• Which of the experiences and competences I brought to the educational activity contributed the most to the learning community?
• What are the questions I would like this educational activity to help me find an answer to?	PROGRESS?	• What questions did this educational activity help me find an answer to?
• What are the competences I´d like to train and improve significantly in this educational activity?	PROGRESS?	• Which competences did I train/improve significantly in this educational activity?
	ADDITION	• What are the questions I am now asking myself?

Figure 1 Initial and final questions for students

As a core activity in the course the students are asked to write an individual reflection document, where they reflect on all their experiences throughout the course. During the first

week of the course, the students were encouraged to keep a reflection diary/log and they also received input on how to write in their learning log. Templates and instructions for the data collected can be found in Appendix 4.2.

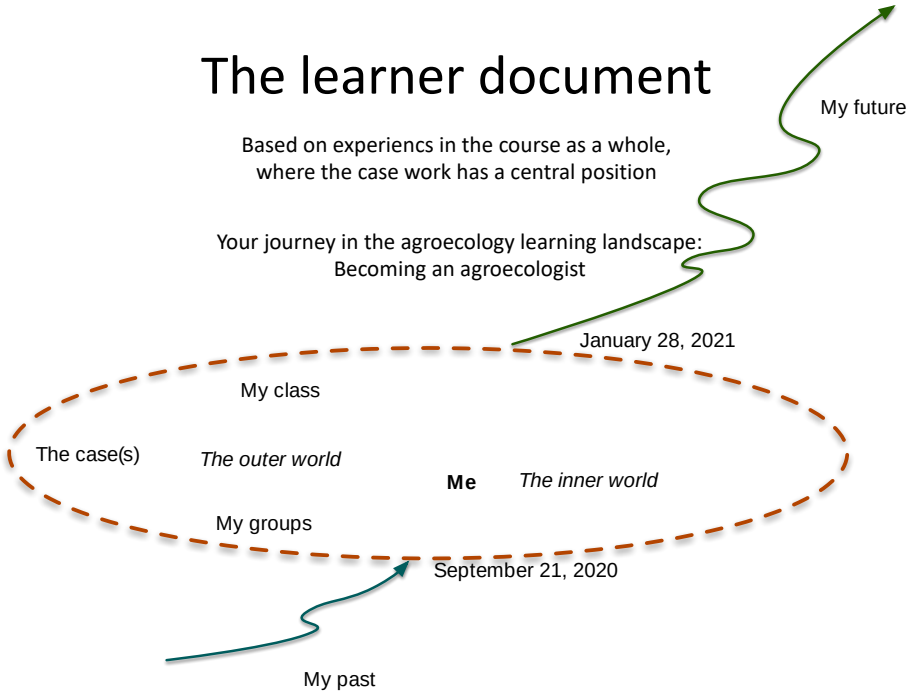

Figure 2 The learner document as a reflection on the students' journey through the agroecology learning landscape

Due to the Covid-19 restrictions, we were not able to conduct any individual interviews or focus group discussions with the students during this Nextfood cycle. Nor did we collect student course evaluations as data. This reduces the opportunities for triangulation and therefore the validity of the results. Nevertheless, the reflection documents from this last cycle were rich, which improves the quality of the data.

The collected data material was thoroughly anonymized using a physical identification key.

All the data, except the self-assessments of competences, were grouped per data source and then analysed qualitatively using the data analysis software NVIVO (QSR International 2020). The analysis followed the recent amendments to the Nextfood research protocol, found in Appendix 4.3. We used content analysis with an “abductive” approach (Graneheim, Lindgren et al. 2017) – combining deductive and inductive analysis – by coding according to the pre-defined coding tree, while at the same time allowing for new additional codes that might be relevant to the research questions to emerge from the data.

The data was analysed mostly by one researcher alone, and therefore an inter-coder reliability check was only conducted once. However, the researcher in charge of most of the coding, tried to keep rigorous track of the process and document interpretations and rationales. To ensure reliability of the results, the data was also analysed in several cycles, and the clustered

data further analysed by a second researcher as well. Nonetheless, the results are subject to the main researcher's interpretations, especially of the tacit/latent content.

The self-assessments of competences were analysed quantitively by running a paired, two-tailed t-test according to the amended research protocol instructions for numerical data.

Overview of Nextfood WP2 research questions

A. Students´ learning and competence development
    - How do students experience such a learning process with respect to,
        - learning goals?
        - view on competences needed for sustainable development?
        - recognition of own competences and competence development?
        - transformation?
    - To what extent do educational activities enhance the students' competences in observation, reflection, visioning, participation (engagement) and dialogue?
    - To what extent do educational activities enhance the students' abilities to deal with "the challenge of the whole"?
B. The development of the Nextfood approach in 12 cases
    - What are the supporting and hindering forces for change towards the Nextfood approach in education?
    - How can we build on the supporting and address the hindering forces (reformulated as challenges) for change?
    - What does such a shift require from teachers, students, and institutions?
    - What do the teachers perceive as the greatest challenge to achieve such a shift?

3.1.3.1.1.1 First week (day) & last week (day) of the course

3.1.3.1.1.1.1 Student's understanding, contributions, and expectations

The four initial questions and five final questions were collected in order to gain an understanding of the students' expectations, motivations and contributions to the course, but these data also say something about the students' learning and its outcomes when compared to each other. As such, the analysis of these questions was done to triangulate findings from the qualitative content analysis of the students' reflection documents. The questions were analysed together with the students' individual reflection on learning goals, as a final step in the analysis process. We used an "abductive" approach (Graneheim, Lindgren et al. 2017), combining the existing coding tree with new codes that were created underway. In addition to the already developed coding tree with the core competences, the questions and reflections on learning goals were first coded for 'Needed knowledge or skills', 'Learning goals' and 'Learning outcome'.

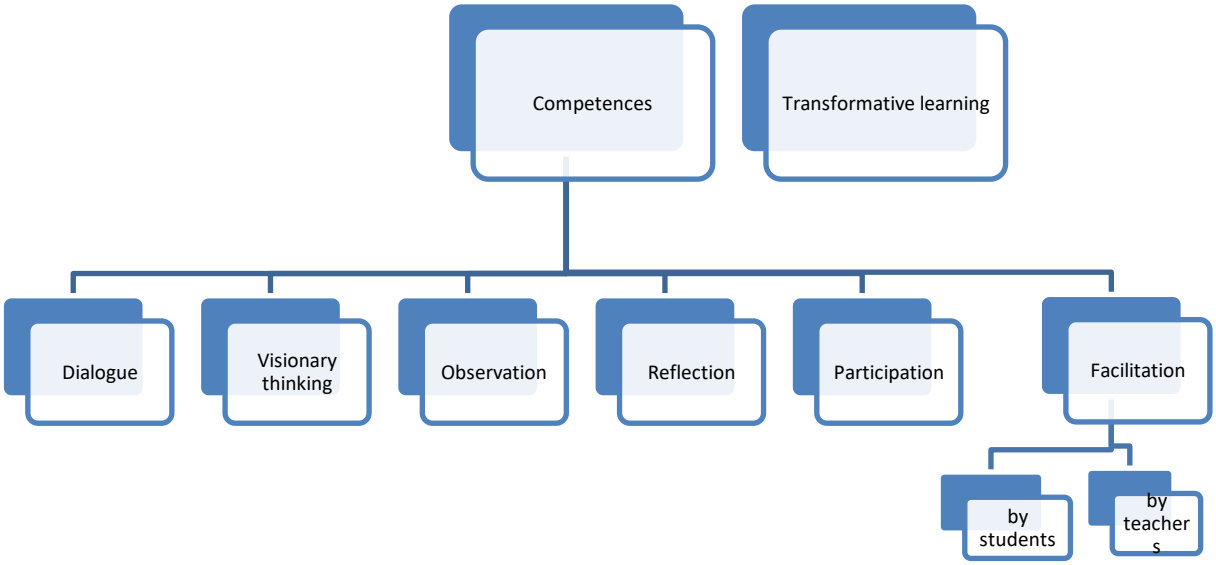

Figure 3 The Nextfood coding tree

To gain an overview of what the students saw as important competences needed for sustainable development, we created a code called 'Needed knowledge or skills' which the initial and final questions were coded for. In the next step, the clustered code for 'Needed knowledge and skills' was analysed abductively.

It should be stated that the analysis of the clustered data for this code is highly subjective and affected by the researcher's understanding of the competence definitions and their interpretation of the students' responses. For example, the students spoke of the need for communication skills and ability to listen actively. This has been coded to dialogue, as the researcher see these as being inherit qualities of having good dialogue, and dialoguing as such is linked to increased communicative abilities.

Nonetheless, the coding of the clustered data was summarized by running a matrix coding query in NVIVO, rating the knowledge, skills, or competences that the students value the most, based on the coding reference. The query was run separately for the four initial and five final questions, to say something about how these had developed. We also conducted a coding query in NVIVO, creating a hierarchical map of the most frequently referenced codes, with one map for each set of questions – start and end of the course. Similarly, the excerpts of text coded with 'Learning goals' or 'Learning outcomes' were clustered and then analysed as separate units of analysis by NVIVO queries and condensation of references. For each of the codes a word frequency query was conducted, mainly to validate the initial interpretation of the clustered data. These queries were represented in word clouds, using stemmed words, three character minimum, and 1000-word display.

The reliability of the results from the qualitative analysis of the clustered data for the above-mentioned codes, are to a large degree subject to the interpretation and views of the researcher. The cyclical analysis process was not as rigorous for the questions as for the students' reflection documents, as these were understood to be richer in content relevant to the analysis than the questions.

3.1.3.1.1.1.2 Self-assessment of competences

To track the students' development of the core competences, a self-assessment was conducted at the beginning and at the end of the course. The students were asked to fill in a questionnaire where they ranked their level of competence mastery on several statements related to each competence on a scale from 1 (Novice) to 9 (Expert).

These Likert scale data (Bernard 2006) were analysed bivariately using a paired, two-tailed t-test comparing the mean scaling per competence at the start and end of the course.

3.1.3.1.1.1.3 Students' final reflection document (individual)

As a part of the students' final course evaluation, they write individual reflection documents in which they are asked to demonstrate their abilities to link relevant theory to practice and to use experience from the course to do so. These documents thus contain valuable insights into both how the student experience the learning process and which educational activities they deem to support their competence development. The anonymized reflection documents were uploaded to the NVIVO 'master file', each individual document as one unit of analysis. Inspired by Creswell and Poth's "data analysis spiral" (Creswell and Poth 2018) the reflection documents were first read, and initial thoughts noted by the researcher, before coding the documents according to the coding tree and inductive content analysis. From the initial inquiry of the data, some emergent themes for additional codes had already emerged. The codes that were added later in the process, were re-coded for in documents surpassed, and this also served as an internal reliability check for the researcher – reapproaching the data material on several occasions. The new codes were 'Transformative learning'; 'Autonomous learning'; 'Systems thinking' and 'Online learning'. These were logged in a separate codebook and reviewed internally in the research team before application. The next step entailed further analysis of the clustered coding reports and was conducted by two researchers. The data was condensed by writing up a rationale per each unit of analysis (code), with the student learning research questions in mind.

3.1.3.1.2 Results

3.1.3.1.2.1 How do students experience such a learning process with respect to:

3.1.3.1.2.1.1 learning goals?

The five learning goals of the 'Agroecology: Action learning in Farming and Food systems' are:

1. Have knowledge of farming and food systems
2. Can handle complexity and change
3. Can link theory to real-life situations
4. Are good communicators and facilitators
5. Are autonomous learners.

Based on the students' reflection documents, their responses to the initial and final questions, and individual reflections on learning goals, the indication is that the student group had a

common goal that entailed facilitating change towards more sustainable farming and food systems. There seemed to be an overall motivation amongst the students to challenge the status quo, and to deal with and solve complex problems in the food system. The students approached these goals from different angles, and with different personal expectations. Some were interested in food sovereignty and social justice, while others were more eager to understand regenerative practices and other biophysical, on-farm processes. In terms of interpersonal qualities and goals, the students seemed to want to improve communication and dissemination skills, dialogue, and facilitation. A couple of students mentioned that they wanted to learn to talk about agroecology and sustainable farming confidently. The students also seemed to want to engage more in their own learning processes, to understand and be aware of how they learn, and to become lifelong and autonomous learners. Also, interacting and learning with and from farmers and stakeholders seemed to be important to them, working across disciplines and backgrounds, collaborating, and learning from one another.

In terms of their experiences, the students seemed to improve their skills in communication and facilitation during the course, which is intrinsically linked to the development for the dialogue competence. In their self-assessments, dialogue was the competence the students rated the most improved over the course, which resonates with the findings from the qualitative analysis. The students also seemed to embrace the systems thinking methodology as something that could help them make sense of complexity in farming and food systems, and to understand their place – and role – in changing them.

"Learning how to become a good communicator was something I really wanted to explore and learn more about. This was covered several times throughout the course, and I found the dialogue session especially useful."

Student 420_2020

Also, the learning community of which the students were a part of had an impact on their experience and learning through the course. The students seemed to appreciate learning from each other and the diversity of backgrounds and disciplines of which they represent. Several of the students' reflection documents contained descriptions of how experiences in the course were enhanced by interactions with their peers. Also, working together in different group constellations contributed to the students sharing knowledge amongst each other, and fostered individual learning development. The students facilitated their own "student-led open-space" online, where they arranged different sessions on relevant topics. This type of "collective autonomy" is something that particularly seemed to enable the students in reaching their personal learning goals.

The students seemed to value how the course is set up to enable them to become autonomous learners and to engage in their own learning processes. One student wrote about the course learning goals and competences: "I also like "Are autonomous learners" and "reflecting" very much because I'm uncertain about what exactly I'll be working with in the future, but these can be of value no matter what career I will have." (Student 415_2020).

Whenever students mentioned ‘autonomous learning’ in their reflection documents, it was in a positive tone, even regarding that learning goal as the umbrella under which all other learning goals come together. The students who mentioned autonomous learning all appreciated that they had been given the possibility to learn autonomously, and to develop this capacity. Moreover, students mentioned that the course enabled them to learn autonomously, both individually and in group, and linked that to becoming life-long learners.

While a few students emphasized the need to develop the competence of dialogue further to become even better autonomous learners, others link that improvement to the development of the competence of reflection, or rather the habit of reflecting frequently or continuously. Many students also linked autonomous learning to finding relevant literature and conducting literature studies on their own. This is a bit surprising given that literature search and study is only one (or two) aspect(s) of autonomous learning.

“Reflecting on my growth within these competencies and learning goals, it is clear that many of the competencies and learning goals overlap and connect with one another. Perhaps the most important area of growth for me, however, has been in becoming an autonomous learner. I think the disconnect myself and many of my classmates experienced from the course itself helped me to truly develop my skills in autonomous learning.”

Student 419_2020

“In my opinion the learning goal number 5 encompasses all the other learning goals. Being an autonomous learner is being able to adjust my knowledge about the farming or food system I’m working in. It’s being able to keep learning about an ever-changing world and linking it with my constantly evolving knowledge on the farming and food system. Sometimes it’s a macro level change that induces the need for new knowledge, but it can be the other way around as well. Dealing with this complex game of influence is only possible if I’m ready to challenge my own knowledge by exposing myself to new concepts.”

Student 422_2020

We have also collected student evaluations of the course, where we ask the students about whether they feel like they have achieved the course’s learning goals, amongst other things. These evaluations were not included as data material this cycle. Student evaluations are valuable data sources; thus, we will re-introduce these as part of the action research of the next Nextfood cycle.

3.1.3.1.2.1.2 view on competences needed for sustainable development?

Like mentioned above, the NMBU student group seemed to have a common learning goal of becoming change agents in agrifood systems and wanted to – through the course – find answers to how they could best contribute towards sustainable development. They wanted to know how to become agents of change, and what skills and knowledges – competences – were needed to do so. I.e. what is needed to approach complexity.

"I realized that I wasn't coming to this master's degree to answer specific questions. In fact, I am convinced that agroecology has concrete solutions to current problems. My questions are mainly about what makes agroecology a discipline that brings more than the others and by which means it really achieves it."

Student 421_2020

At the start of the course, the students valued knowledge and skills in systems thinking the most, followed by agronomy and ecology, facilitation, policy and power dynamics, reflection, and dialogue. The students also wrote about the importance of collaboration and working transdisciplinary, groupwork and knowledge on economy. The competences of visionary thinking and observation were less frequently mentioned in this data set.

At the end of the course, dialogue as a competence had moved to the top, and dialogue is frequently emphasized by the students as important in the other data sets as well. Trailing right behind dialogue is knowledge and skills in agronomy and ecology, systems thinking, reflection and facilitation. Hence, there were indicatively no big changes in the students' view on competences needed for sustainable development through the course. However, the other core competences (participation, observation and visionary thinking) travelled up the list, indicating that the students deemed these more important after learning about them in the course, which can also be linked to the students' familiarity with the course "vocabulary" and as such their "acceptance" of the core competences as integral for working with sustainability in farming and food systems. In general, the students who perhaps focused more on "hard" knowledges/skills at the beginning, at the end acknowledged also the importance of the "soft" aspects of complex systems.

	A : Needed knowledge or skill
Systems thinking	12
Agronomy and ecology	9
Facilitation	9
Policy and power dynamics	8
Reflection	7
Dialogue	7
Collaboration	5
Transdisciplinarity	4
Economy	4
Group work	4
Critical thinking	3
Adaptability	3
Visionary thinking	3
Observation	3
Technical knowledge	2
Health	2
Participation	2
Peer-to-peer learning	1
Consumers and markets	1
Autonomous learning	1

Table 1 Table of coding references start of course (4 initial questions)

	Needed knowledge or skill
Dialogue	12
Agronomy and ecology	11
Systems thinking	8
Reflection	7
Facilitation	6
Policy and power dynamics	5
Visionary thinking	5
Participation	5
Observation	4
Transdisciplinarity	3
Collaboration	3
Adaptability	3
Manual labor	2
Critical thinking	2
Group work	2
Technical knowledge	1
Health	1
Consumers and markets	1

Table 2 Table of coding references end of course (5 initial questions)

Many of the students spoke of the need to incorporate local and context-specific knowledge when working with sustainability in farming and food systems. The researcher has understood this as being directly linked to systemic intervention, action-oriented learning and research, and therefore didn't create this as a stand-alone code, but these segments have been incorporated in the already established ones – i.e., systems thinking, reflection or participation.

"To begin with some basic knowledge of Agronomy and forestry as well as ecology and methods of sustainable farming. […] It is also important to be humble and patient when meeting farmers and other stakeholders and ability to truly listen to the different actors involved. […] This makes communication, facilitation, and coordination skills very important, to be able to work in different context and ability to engage people to get involved and be willing to change."

Student 417_2020

The students also mentioned certain values, attitudes and personality traits needed by individuals working with sustainable development in complex agrifood systems, and most frequently mentioned in the students four initial and five final questions is – amongst others – openness, willingness (to change), humility, patience, continuous learning, and adaptability.

3.1.3.1.2.1.3 recognition of own competences and competence development?

Table 2: Students' competence self-assessments at the beginning and the end of the course in agroecology in 2020

Competencies	First day	Last day	Change	Sign.
OBSERVATION	**3,8**	**5,2**	**1,4**	***
Carefully observe a situation in the field	4,3	5,2	0,9	n.s.
Create a comprehensive overview of a complex situation	3,5	5,3	1,8	**
Allow for examination of the whole situation before drawing conclusions	3,5	5,1	1,6	n.s.
PARTICIPATION	**4,2**	**5,8**	**1,7**	***
Recognize values and goal conflicts of different stakeholders in society	4,1	5,5	1,4	n.s.
Participate in work "out in the field" with commitment and dedication	4,3	6,3	2,0	*
Empathise with the goals and feelings of stakeholders in the field	4,1	5,8	1,7	*
VISIONING	**3,2**	**4,9**	**1,7**	**
Have basic knowledge of factors that stimulate and block creativity in individuals	3,2	5,2	2,0	*
Understand the processes that enhance a group's ability to identify today's critical challenges and envision a desired future	2,9	4,9	2,0	*
Able to inspire change by helping a group develop and align around a shared vision	3,5	4,7	1,2	n.s.
REFLECTION	**4,4**	**5,9**	**1,5**	***
Awareness of the role of reflection in personal learning and development	4,4	6,5	2,1	*
Connect situations in the field to theory related to farming and food systems as well as to personal growth	4,0	5,5	1,5	n.s.
Connect experiences and theory to own personal development	4,7	6,0	1,3	n.s.
Ability to embrace self-guided learning	4,5	5,7	1,2	n.s.
DIALOGUE	**3,4**	**5,3**	**2,0**	***
Understand the differences between debate, discussion and dialogue	3,5	6,3	2,8	**
Can introduce a group to the purpose and guidelines for dialogue	2,7	5,2	2,5	**
Can identify and formulate questions which stimulate a dialogic approach	3,3	4,8	1,5	*
Can appreciate and explore a variety of perspectives and be able to identify and challenge the assumptions behind your own and a group's thinking	4,1	5,1	1,0	n.s.
Average	**3,8**	**5,5**	**1,7**	
Levels:1-2 = novice; 3-4 = advanced beginner; 5-6 = competent performer; 7-8 = proficient performer; 9 = expert				
All average changes are in positive direction				
Levels of statistical significance: * means p<0.05, ** means p<0.01 and *** means p<0.001, n.s. means not significant.				

The students' self-assessment of competences says something about their recognition of competence development and competence mastery. According to last year's self-assessments, the biggest increase in competence proficiency was in dialogue. Especially understanding the differences between debate, discussion, and dialogue. Also, the sub-competence of "can introduce a group to the purpose and guidelines of dialogue" was significantly improved. Visionary thinking as a competence also saw an increase in terms of starting from an average scaling lower than the competences of observation, participation, and reflection. This finding is like the previous year (2019), where dialogue and visioning were also the most improved on competences, according to the students themselves. When looking at learning outcomes, dialogue is a competence that seemed to have been significantly developed throughout the course, but also reflection appeared to be a competence that the students valued and emphasized as important in their learning development. This is not the most prominent in the self-assessments. However, the sub-competence of "Awareness of the role of reflection in personal learning and development" stands out, which resonates with the learning outcome-analysis, but also the reflection documents. As such, reflection seems to be the glue that connects all the other competences. The students described in their reflection documents how reflecting helped them identify room for further exploration – in learning, in competence development, and in the casework and group work. Reflection also helped the students identify and link their background and previous knowledge to the course activity and enabled them to engage in their own learning process. For example, the students spoke of how they through reflection learned to practice the other competences with intention and awareness, which again fostered competence development.

"Reflecting on my experiences throughout this course based on phenomenological theory has been a key tool in my growth […]. These reflections have served to help me identify the thinking patterns and basis for the way we learn and perceive things, giving us insight into our barriers for growth. Extending my reflections to include my learning within the larger context of our group work, the class setting, the larger academic setting, and the real-world farm and food systems Agroecologists are interested in understanding has allowed me to make connections about the barriers we have in learning, not only as individuals, but as a collective unit.[…] We've learned that Agroecologist need to learn as much about the farm and food systems we're trying to understand as we do about ourselves."

Student 418_2020

Additionally, some students also mentioned other competences such as (developing) humility, handling complexity, creativity, critical thinking, and autonomous learning (for example). Several students voiced how building the core competences will help them to deal with challenges, especially challenges related to handling complexity. Moreover, they also mentioned that building the competences further will be a life-long learning journey. Students appreciated that they built competences through the action-learning approach in general, and more specifically through the case work.

"I found that the case study not only led me to practice the competencies of the course (observation, dialogue, participation, visioning, and reflection) but also challenged my interpretation of agroecology and my role within 'wicked' problems.[…] With competencies of observation, dialogue, participation, visioning, and reflection, I will continue to build resiliency and further my learning autonomy."

Student 425_2020

Facilitation is a competence that several students reflected thoroughly upon too as one of the core competences for their future work and life. We found facilitation often described in relation to visioning sessions with farmers. Several students mentioned this workshop with farmers as the first (and only) time they fully facilitated a workshop/session. Other students mentioned also facilitating group work, or interviews with farmers during casework. Moreover, sometimes students mentioned that they felt not yet competent enough in visioning themselves to already facilitate a session for others. It appears that it wasn't easy for students to balance facilitation of and participation in a workshop, when facilitating a visioning workshop, for example. Facilitation by students was often co-facilitation in the sense that a few students facilitated together. This created both opportunities and challenges for the facilitators.

"Through these interactions, I experienced how one's quality of being as an agroecologist in the field and one's ability to communicate, establish trust, build relationships, listen, and be vulnerable were vital to agroecological practice. All of these skills require disciplined observation of one's internal state and of the social cues and information being offered during these interactions. I saw how observation and listening are the foundational social skills that form the base of agroecological practice and facilitation, because they enable us to integrate different perspectives, ways of knowing, and relationships."

Student 423_2020

3.1.3.1.2.1.4 transformation?

The course introduced a new way of thinking and understanding food and farming systems, but also learning itself. And this is a lesson in adaptability for the students from the beginning. The students were provided tools for self-exploration and critical thought, while also being encouraged to seek out relevant knowledge for themselves. This prompted them to investigate problematic areas within their own ways of learning. How the course facilitated autonomy in the students seemed to be clearly linked to transformative change. Like one student wrote in their reflection document: “Perhaps the most important area of growth for me, however, has been in becoming an autonomous learner.” (Student 419_2020) Action learning makes the students vulnerable, but by creating a safe learning community and cultivating the core competences this vulnerability can flourish and enable transformative change in an individual. For example, one student described using dialogue as a tool for improving their ability to engage with their classmates and overcome their fear of public speaking (Student 428_2020).

The casework experience, participating and interacting with stakeholders and peers in the group work, also led to students changing assumptions on for example ethical questions within agriculture. Like one student put it: “Initially, I assumed that there was a right answer to this ethical dilemma […] Now, I appreciate that there may not be a single correct answer […] and I am accepting that this question is open to continual reassessment.” (Student 423_2020). In the casework, the students were trained in approaching the complexity of food systems, while also being confronted with their own presuppositions. The core competences helped them make use of this and led to increased awareness. Using theory and systems thinking approaches in real life fostered transformation in how it enabled the students to organize and make sense of their experiences. Reflection in particular seemed to be intrinsically linked to transformative learning.

Not all students explicitly stated experiencing a distinct transformation in the course, however, the course nonetheless seemed to have an impact on their personal development, be it only from the sheer ‘unusualness’ of it. Students described entering the course as being challenging and “a transition period”, stating that “The course itself has thrown its own fair share of curve balls at us” (Student 419_2020). Nonetheless, this educational journey provided the students with ample opportunity to challenge their own knowledge, preconceptions, and assumptions, and for some this led to changes in attitudes and ways of thinking of the world.

In this regard, the students’ interaction with their peers was also tightly linked to the students being exposed to new ways of thinking and questioning existing knowledge and worldviews. “I am deeply thankful for the knowledge that different people shared with me throughout this course and especially for those that were based in shared experiences”, one student wrote. (Student 429_2020)

“To be honest I am not sure how much more I learned about food and farming systems, but one thing I am certain of is that I did not learn what I expected to learn.”

Student 420_2020

"This project's framework led me to analyse and engage in my epistemological curiosity. Maintaining my intentionality in my curiosity led me to question fragmented and reductionist points of view that are colonized forms of knowledge. Therefore, this course fostered opportunities for me to challenge the role of my identity within Agroecology, while provided tools and methodologies cultivated my practice in necessary skills to empower positive change."

Student 425_2020

"In general, the case work was an illuminating experience for me. […] I think that the case work has managed to both consolidate and solidify some of my earlier knowledge and open my eyes to further complexities when working with participants in the field. On a personal note, I think I have also learned which parts of field work I enjoy more than others and which gaps of knowledge I would like to fill in the coming months."

Student 429_2020

"Through the process of adjusting my mindset I began to see how differently I had perceived things before this course. […] This course has taught me that it is alright to be wrong."

Student 418_2020

3.1.3.1.2.2 To what extent does the education enhance the students' competences of:

Based on the students' reflection documents and their self-assessment of competences at the beginning and end of the course, it is possible to say something about their competence mastery and enhancement throughout the course and from the educational activity. Also, the above-mentioned learning outcomes could help triangulate these results.

3.1.3.1.2.2.1 observation?

Throughout the course, students are introduced to several tools for observation, amongst others observing a person eating, transect walks, and rich picturing. While most students highly appreciated getting acquainted with those tools and developing the competence of observation, some questioned the validity of unbiased observation, as well as its usefulness (Students 420 and 425_2020).

Importantly, students found it interesting to have learnt to distinguish observation from reflection and several regarded observation and reflection as necessary competences to develop and combine in order to deal with the challenge of the whole, along with the competence of dialogue. This can be confirmed by the results from the comparison of students' self-assessments of competences at the start and end of the course. For the competence of observation, on average students ranked their competence level significantly higher at the end than at the start of the course. This significant increase was mainly due to an increase in students' competence level to create a comprehensive overview of a complex situation, thus dealing with the challenge of the whole.

During their case works, students developed several competences at once. While some students found participating in the farm work useful for observation, and called it 'participant observation', others were of the opinion that participation in the farm work and participant observation involved a lot of talking with or interviewing the farmers, and thus did not leave enough time for observation.

"Rich picturing, themes, and systems maps provided a clear organized structure to avoid getting lost in the details. These tools were effective in categorizing observational data and conceptualizing the 'next step' for our case study."

Student 425_2020

"The approach to observation we had in this course was quite contradictory to what I was used to from before. During field work in previous education, we usually had very clear objectives of what to look for. In my mind there are some basic elements that is present within every farm case. I have a hard time using an approach where these elements are "rediscovered" every time."

Student 420_2020

"To be unassuming and nonjudgmental can be a large feat when you intend to evaluate for change. Within the classroom I found myself trying to rationalize the mechanism of pre-knowledge when your intention is merely sensory at the beginning. One of my peers posed an evocative question, 'how do you know what to observe when you don't know what you are observing?'. This question gave me pause providing an opportunity for further doubt my own ability to gather the 'correct' data. Is my pre-knowledge leading me to draw quicker conclusions and hindering me from seeing the obvious? How can I ensure that I, to the best of my ability, observe the necessary in order to address wicked problems?"

Student 425_2020

"Observation and reflection are two of the course competencies which I had ample opportunity to practice. The most important aspects of good observation that we discussed in class prior to the casework are that it is non-judgemental and contributes to understanding a greater whole. I would add that it is multi-layered with different depths of noticings, based on sensory experience, is nuanced yet succinct, and that the observer has an awareness of bias and pre-knowledge."

Student 416_2020

3.1.3.1.2.2.2 reflection?

Throughout the course the students' reflective capacity is continuously trained. They are encouraged to write their own reflection diary/log, as well as to reflect in class-led reflection sessions and together in their group work. At the end of the course the students write a reflection document, where they are asked to "relate your experiences in the course regarding both the ontology of farming and food systems and epistemology (the process of learning about these systems) to relevant theory, and to implications for your own personal development in

the area of sustainable agriculture and agroecology." Our findings indicate that reflection was the competence that linked all the other competences together. Like one student stated in their reflection document: "Out of all the things I learned throughout this course embracing reflection is one of the most important things" (Student 420_2020)

In the self-assessments, reflection was the competence that was rated the highest, right above participation, i.e. it's the competence the students felt the most proficient in. This echoes through the reflection documents, and the students' learning outcomes. As such, the educational activities, like mentioned in examples below, enhanced the students' competence in reflection.

Reflection seemed to help the students to be more present, aware, curious, while also confronting their assumptions. They wrote about how practicing reflection, or reflecting upon an activity/experience, enabled them to cultivate other competences and develop new knowledge. For example, reflecting on the experiences and exercises in the course, one student mentioned the "talking stick"-exercise, and how this helped them become a better listener, i.e. better at dialogue (Student 419_2020). Another talked about how reflecting on the eating observation-exercise enabled them to improve their ability to observe (Student 429_2020), while a third spoke of how the process of creating a rich picture was "highly reflective" and helped to understand the casework system (Student 416_2020). For one student the diversity icebreaker-session served as a catalyst for reflecting on group dynamics.

Moreover, reflection led to increased awareness – of presuppositions, attitudes, positions, and ethics – and could lead to transformation of opinion and thinking patters. Both related to group work and collaboration with others, but also in terms of personal development and learning. The casework and group work provided fruitful bases for reflection, and helped the students evaluate their assumptions. One student mentioned how reflecting on the observations from the farm case was essential to make sense of the findings and to converge the information. The same student also voiced how reflecting on the experiences in the field highlighted the validity of action research and the value of participation (Student 419_2020). I.e. reflection seemed to be a way for the students to gain a holistic understanding of experiences and complex situations and enabled them to see the bigger picture. Hence, connecting reflection to systems thinking.

The reflection document seemed to be a particularly useful exercise that provided ample opportunity for reflection. The task of writing the final reflection document, helped the students put their past reflections and experiences in perspective, and to further connect these to new experiences, theory and other related activities and insights. Like one student stated, processing past reflections is "exhausting" (Student 415_2020). Another said it more mildly, in how returning to and re-evaluating past reflections was a useful and valuable experience (Student 429_2020). The students described reflecting on learning in several contexts, and how linking experiences with theory was a key part of their growth. One student described the intention that comes with reflection, and that they were "constantly thinking about what I'm doing and why" (Student 415_2020). Reflection was a way for the students to better understand "something", be it phenomena, concepts, or theory, and is "rarely a task you complete" (Student 415_2020). Practicing reflection could also be characterized as a type of

"meta-learning", in how the students reflected on their own learning, and contextualized past knowledge and experience in this new learning landscape. This seemingly enabled them to engage more in their own learning development and become more autonomous learners. Reflecting "internally" enabled the students to identify room for further development, and to challenge assumptions and suspend judgement. One student described reflection as a "critical internal dialogue" or a way to maintain "epistemological curiosity" (Student 425_2020). Arguably, a common denominator is how reflecting on reflection itself enabled the students to understand better how they learn and perceive things – a key to becoming agroecologists and life-long learners.

Finally, reflecting together and in a group work setting seemed to be very valuable for the students to better understand group dynamics and to become aware of their own strengths and weaknesses in collaboration with others. The class-based reflection sessions also seemed to be very helpful, and it put a structure to the act of reflection and prompted the students to reflect on a regular basis. The student-led reflection sessions were not only a way for the students to practice reflection itself, but also a way for the students to practice facilitation and improve group work. The learning community of which the students were a part of, and peer-to-peer learning and interaction also seemed to enhance their competences. Like one student stated, their competence development in reflection, facilitation, critical thinking and self-awareness was "not a direct result of the course, but more a result from being in a close and intimate cohort of agroecology students and through creating our own highly stimulating learning environment" (Student 419_2020).

"This course has truly taught the me value of slowing down and take time to reflect over my experiences and literature in the course. […] The weekly reflection sessions were very helpful to inspire my reflection and to share with my classmates. Reflecting together in the breakout room gave me insight to other perspectives and further opened my mind for reflection. I would make sure to write down the questions and take notes of our dialogues, so I could go back later to further reflect on them."

Student 417_2020

"Learning about reflection and how to reflect, makes me wonder and test out how I can integrate the practice of reflection in my life. I am reaching another level of patience and awareness of who I am and what role I am filling in group work, in conversations with others or to myself."

Student 417_2020

3.1.3.1.2.2.3 visionary thinking?

During the casework, most students did a visioning session about the future of the farm they were working on. Several students described their visioning session with the farmers to be very intense, in a positive, motivating way. One student mentioned a completely failed visioning session whereby the student conducted a visioning session while the participants continued working with chain saws. However, most students were very excited about visionary thinking and about having learned how to develop a vision. This was also reflected in a significant

average increase in students' self-assessment of their competence level for visionary thinking at the start and end of the course.

Several students mentioned that they felt like they didn't have enough time to build the competence of visionary thinking, let alone how to facilitate a visioning session. Or they mentioned that they did not have enough time to come to a full-fletched vision for the farm they were working on given limited time for and experience with visioning. In that regard, some students experienced it to be difficult to facilitate a visioning session without bringing in too much of their own ideas. This was also reflected in students' self-assessment of the competence, where the increase observed was not significant for the aspect of being 'able to inspire change by helping a group develop and align around a shared vision'.

Some students were very skeptical towards visioning at first and then became very enthusiastic about it. Others were at the end of the course, when writing their reflection document not yet convinced that a visioning session as taught in the course, were the best way to develop a future vision and plans with farmers.

""Okay so we are drawing, but we are also meditating in class? what have I gotten myself into?" I remember thinking at the start of the visionary thinking workshop. This is the competence I feel I had the least understanding and experience of, but maybe the one that has been the most exciting to learn and practice."

Student 417_2020

"More specifically, I learn about visionary thinking competence and its importance in a transformative process. I would like to improve my own ability to do it but also my ability to improve the visioning of stakeholders I will be working with. I think that the lack of experience and knowledge in this field didn't allow me and my group to extract all the potential ideas out of the farmer's imagination."

Student 422_2020

"While our case work group did an excellent job in going from this relaxation exercise into creating a vibrant, diverse, and dynamic vision for our dream farm in the year 2030, I didn't necessarily find the relaxation portion in of itself completely necessary or helpful for coming up with ideas for our 2030 vision. Moreover, utilizing good dialogue and creative thinking techniques while discussing our 2030 vision seemed to be far more helpful in sparking vision in our group. We left the visioning sessions nervous and unsure of how to actually implement this visioning technique with our farmers. Luckily, the the farmers were incredibly open-minded and we had built enough of a comfortable relationship with them that our group decided it would be possible to try a visualization exercise with them despite these hesitations."

Student 419_2020

"Vision is part of my way of thinking and is not a skill in itself, it is a constant need that helps me build my life, understand my desires and priorities. But thanks to the lessons, I realized that seeing can become a complex process. It can begin with a guided meditation

which calls upon the sounds, colors, smells, images, of our imagination. I remembered that it is important to create an empirical view, because it is easier to build on something that exists, while moving mentally into a future situation. Geir's guided meditation exercise worked very well for me as I am used to meditating, however, I remain skeptical of those who are not used to it, and most farmers do."

Student 428_2020

3.1.3.1.2.2.4 participation (engagement)?

The real-life, on-farm, open-ended casework provided a valuable opportunity for the students to practice and understand the importance of participation as a competence and a part of action research and systems thinking. The students voiced how they gathered information about the farm system by participating in on-farm activities, having informal conversations, and conducting interviews with the farmers and stakeholders. One student wrote that taking part in the farm work and workshops made them feel more "on the same level as the farmers", learning and exploring together with them (Student 417_2020). Another stated that the farm system participation made them feel more connected to the local farm, and others seemed to agree in how they felt participation gave them "deep insight" to the farm life and that this also made them more engaged in the casework. It was also "fun and exciting" (Student 419_2020). In contrast to the online pre-casework the students had been a part of, the real-life case put into perspective the importance of the competence and experiential learning. One student stated that they during this hands-on experience in the casework hadn't learned facts, but practiced skills "important for dealing with complex and new situations" (Student 415_2020). Another student wrote that the casework provided them to test out "everything we thought we knew against the backdrop of reality" (Student 418_2020), attempting to put into practice knowledge they had acquired throughout the course so far and thus also develop the core competences. Participating in the farm system and "physical landscape" was also a way for the students to identify their gaps in knowledge and provided them with "far richer and more tangible opportunities to learn more about farming and food systems", and opportunities to re-contextualize what they already know (Student 429_2020).

The competence of participation is seemingly linked to many, if not all, of the other competences. Like how this one student experienced how their behaviour had a direct influence on the farmers' willingness and openness to participate in the visioning session, or how the students' interaction with farmers were crucial to develop the dialogue competence. Also, participation in the casework was not only a great way to practice methods, but also a way to clarify students' impressions from observations. The combination of participation and reflection seemed particularly important for the students to understand the complexity of the casework systems and 'messy' situations, i. e. linked to systems thinking. In addition, participating in the casework provided ample opportunity for the students to place themselves within Kolb's learning cycle and to enter all stages of it. Participation seemed to make the students feel like 'insiders' rather than 'outsiders' and made them realize how they were not a "distant researcher in a lab", but an active participant in an agroecosystem. (Student 423_2020)

In terms of learning and competence development, the students seemed to value participating together with their group in the casework, as well as in other activities with their peers. Actively engaging with their classmates in the groupwork, 'break-out rooms', or in other settings –

learning and exploring together – helped them develop the competence of participation. One student characterized participation as the “social dimension of learning” (Student 427_2020), while another called it the “3rd dimension to our 2-dimensional perception of a real situation” (Student 418_2020). For one student participation was so crucial that they would have postponed their studies if not for the casework experience.

While one student expressed how the online casework helped them understand and move forward with “confidence and precision” in the on-farm casework (Student 428_2020), a second student, on the other hand, felt ill-equipped to conduct stakeholder interviews based on the introduction given in class. This student expressed wanting more experience with the methods and competences prior to entering the casework. There seemed to be some agreement amongst certain students that the time spent participating in the casework was not sufficient to fully understand and experience a “real iterative process” (Student 422_2020). Also, there was some ambiguity about the students’ role as both participants and facilitators in the casework systems, and they seemed to struggle with balancing and navigating this duality. For example, when facilitating visionary thinking sessions, many of the students expressed being very aware of how they might influence the farmers’ future vision if they were to share their ideas. One student questioned how the farmers were not able to establish common ground with the students in the casework, in how they were not given agency over the methods used, but somewhat forced to follow a set ‘program’. This student wanted more opportunity to line students’ and farmers’ expectations to foster both learning and change. The core of this can seem to be how the students perceive the casework, their participation in the food system, and their role as ‘Agents of Change’. While some understand the casework as merely an opportunity to practice what they have learned in class in a real-life, open-ended case, others seem to perhaps have higher expectations of their impact on the farm system in terms of change processes. Like one student wrote in their reflection document “Engaging in real-life situations will enhance the transferability of learning outcomes to future professional life” (Student 415_2020), thus understanding the casework as a learning activity. On the other hand, one student wrote:

“Even if we manage to have a good relationship with the farmers and to observe the main aspects of the farm system, we can’t say that we were involved in any decision making. It was certainly interesting, but it might not be enough to understand the real work organization and thus identify the real change needed to successfully manage the farm”

Student 422_2020)

, hence adding more seriousness to the outcome of the casework.

Nonetheless, there certainly seemed to be an overall high appreciation amongst the students for the opportunities presented in the casework to engage and participate in real-life farm and food systems. Further, the experience in the field enhanced their understanding of the concepts and competences and made them easier to comprehend. In their self-assessments, participation as a competence is rated second highest, and the improvement over the course is also in the top range. Participation as a competence needed for sustainable development was increasingly valued by the students through the course, it seemed. As such, participation is an important competence to train, and as an educational activity the casework is at the core of enhancing it.

"I feel this involvement with the farmers and working with the animals makes us work with our findings and writing the stakeholder document in a much more engaging way."

Student 417_2020

"She was overwhelmed with emotion, and in these moments, I experienced how I was not a separate researcher in a lab, but an active participant in the agroecosystem. The way my group and I behaved had a direct influence on her openness and willingness to be vulnerable and participate in the visioning the future of the farm. Through these interactions, I experienced how one's quality of being as an agroecologist in the field and one's ability to communicate, establish trust, build relationships, listen, and be vulnerable were vital to agroecological practice."

Student 423_2020

3.1.3.1.2.2.5 dialogue?

Developing good communication skills seemed like something the students valued in terms of personal learning goals. Like one student said: "learning how to become a good communicator was something I really wanted to explore and learn more about. This was covered several times throughout the course, and I found the dialogue session especially useful" (Student 420_2020). Other students mentioned how the class session on dialogue improved their theoretical understanding of dialogue as a concept and competence, and a couple of students reflected on how they related past experiences with dialogue to their recent introduction to the concept. Like one student stated: "It wasn't until this course that I understood that most of my experiences in 'dialogue' in school or with friends was actually debate" (student 418_2020), while another wrote "…the session on dialogue was quite helpful for me in putting words to concepts I had previous experience with" (Student 419_2020). The students also facilitated their own session on Non-violent communication, and this provided the class with more tools for dialogue and contributed to enhancement of the competence. While the theoretical introduction to dialogue, and the opportunity to practice dialogue in the classroom ("talking stick"-exercise) increased the students' understanding, an obstacle seemed to be to apply it in real-life. One student talked about how the online setting helped them to practice dialogue, while others mentioned the group work as a large contributing factor. The common thread being that the course provided a learning environment where the students could practice dialogue in safe surroundings. One student wrote "The chance to practice in groups brought to my attention the importance of one's own assumptions" (Student 427_2020), and this seems to be a take-away for more students; that dialogue requires intention, acknowledgement of assumption, awareness and active listening. In the casework, dialogue seemed to help the students understand the complex, "soft" (human) properties of the farm and food system. One student talked about how practicing dialogue is important when balancing different roles and interests, taking time to build trust and local cultural competence, and reflected on how communication skills are important to support purposeful change. Hence, connecting dialogue to several other competences like participation, visionary thinking, facilitation, and reflection, but also systems thinking/dealing with the challenge of the whole. Like one student wrote: "[…] reflection really helps being a better communicator." (Student 422_2020).

In the self-assessments, dialogue had the largest increase from the start of the course to the end, which considering the above-mentioned findings indicates that the course educational activities in many ways contributed to enhancing the students' competence of dialogue. These results can also be triangulated by looking at the students' learning outcomes, indicated in their final questions and reflection on learning goals, which also highlight how dialogue was a competence significantly trained and cultivated throughout the course.

"One specific tool that I have found strategic in this course is the breakdown of productive dialogue. With the interpretation of 'dialogue' in this course, I have found new meaning to what an exchange can potentially create."

Student 424_2020

"Before this course I didn't was aware about the importance of dialogue and use to consider it just as a conversation to share ideas but for example never though that guidelines were needed to have an effective dialogue, now after the experience I had by using them, this has a lot of sense. I understand now that dialogue is a powerful tool through which we explore difficult questions from different perspectives that enable us to gain deeper understanding in the interested matter."

Student 426_2020

3.1.3.1.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

One finding that echoed through the reflection documents of the students was that the tools and methods of systems thinking provided a framework for approaching complexity, both in relation to the students' casework, but also for conceptualizing and give structure to the "messiness" of the novel learning environment they've been made subject to. One student underlined how systems thinking requires intentionality related to the core competences, in that they are always thinking about what they are doing, and why. The students also described how acknowledging assumptions and suspending judgement is crucial to systems thinking, and how this has been an important learning outcome. In the casework, the iterative process of visualizing and mapping the case systems increased the students' understanding of the system at hand, and one student spoke of how it was an opportunity to "explore the interconnectedness of systems". The casework was important for the students to cultivate the core competences as a part of a systemic inquiry, and this was essential to understand the importance of systems thinking. Another student spoke of how this highlighted the validity of action research as a valuable methodology. Rich picturing as a tool seemed to be particularly helpful to make sense of the cases. Making clear connection between competences like visioning, participation, and systems thinking in the casework context made one student understand that "agroecological work is not merely an academic exercise". The casework gave the students the opportunity to utilize the systems thinking methodology acquired through theory, classroom activities, and lectures. One student wrote that the tools and methods provided "alleviate the feeling of being overwhelmed", while another called in a "guiding set of tools within the cyclical pattern of learning". As such, practicing the competences contributed to enhancing the students' ability to think systemically. For example, reflection and observation served as a way for the students to gain a holistic understanding of experiences and complex situations and enabled them to see the bigger picture, while participation put into perspective the importance of experience in understanding complexity. Being able to distinguish between

reflection and observation was an important learning outcome for the students, and they saw these competences as necessary to develop and combine in order to deal with the challenge of the whole. The students seemed to embrace the systems thinking methodology as something that could help them acknowledge and make sense of complexity in farming and food systems, and thus understand their role in changing them.

"While we learned about and practiced Armson's (2012) methods for systemically understanding messy situations in the online block, it was extremely useful to have the chance now to apply these theories to our case work. It also highlighted the challenges of applying systems thinking to the "real-world" as we struggled to come up with themes and systems maps that we felt fully encapsulated the whole picture of the farm. These challenges highlighted for me the validity of action research as a valuable methodology for understanding complex and wicked problems. Upon reflection, I realized that without the participation of the farmers themselves in our analysis and understanding of the present situation, our themes and systems maps would continue to feel as if they were made by outsiders looking in. Similar to the distant feeling I got during the online block using Armson's (2012) systems thinking tools to understand an abstract messy situation from afar, without the input and participation of the farmers themselves, our analysis seemed to be missing pieces of the big picture."

Student 419_2020

"After this course, the role of an agroecologist has become much clearer to me. The course emphasized becoming agile thinkers, learners, and communicators, to handle the never-the-same, complex nature of real-life situations."

Student 418_2020

"I think I could have acquired a lot more information about the farming and food systems if I had spent more time reading about it, but I would never have acknowledged the true complexity of it, hadn't it been for my hands-on experiences."

Student 415_2020

3.1.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.1.3.2.1 Methods of data collection and analysis

3.1.3.2.1.1 Teacher reflection document

The NMBU case did not collect teacher reflection documents this year. This is something we will try to incorporate in the coming cycle.

3.1.3.2.1.2 Course reflection focus group/interviews

After the end of the course in January the teachers decided to conduct a two-part reflection workshop/focus group with an external facilitator familiar with the course structure and educational approach, like mentioned above. These sessions took place in March 2021 and

were attended by the core teaching team, an external facilitator, and two Nextfood researchers. The sessions were recorded, but not transcribed. The analysis was based on the workshop minutes and the researchers' notes.

The analysis followed a similar structure to that of the students' data material, i.e. qualitative content analysis using the NVIVO 12 software (QSR International 2020). However, the data was approached more inductively from the start. While applying the coding tree, we also looked at the codes 'Requirements (from students / from teachers)'; 'Successes'; 'Challenges'; 'Online learning'. Further analysis of these clustered codes provided the basis for answering the research questions related to the case development process. However, the data from teacher reflections and on general case development were lacking in this cycle. This is partly due to the unique global situation in 2020, which we will address further below. Even though the reflection sessions addressed challenges and successes, no structured force field analysis was conducted, and this also affects the validity of the results presented. Notwithstanding, the Norwegian Nextfood case has over several years worked with developing an action-oriented course in Agroecology, with an educational approach in line with the Nextfood model, and based on cultivating the five core competences of reflection, participation, observation, dialogue and visionary thinking. The below presented results are also triangulated by the findings on student learning. For example, while analysing the students' reflection documents the code 'peer-to-peer learning' emerged, which fed into the results on the shift from 'from lecturing to co- and peer-learning'. Also, the code for 'Facilitation' applied to the reflection documents was incorporated into the reporting on the shift 'from lecturer to learning facilitator'.

3.1.3.2.2 Results

3.1.3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.1.3.2.2.1.1 From lecture hall to a diversity of learning arenas

The course in the Norwegian Nextfood case centres around a real-life casework that provides the basis for the students' learning activities. The experiential learning arena of farm and food systems as such guides the need for other learning arenas to be introduced. In addition to case visits "in the field" of the farm and food cases, the students have weekly reflection sessions, and other interactive classroom sessions exercising the core competences. The course also consists of literature seminars, field visits, presentations, and guest lecturers, of which the content is prompted by the students' casework process.

In terms of novel learning arenas, this last Nextfood year was a unique one. The Covid-19 pandemic and its global impact to a large degree affected the content, structure, and context of the course. The course was organized as partly online, with some students attending only virtually as they could not travel. The ones who were "on-campus" also had to be part-time on screen, and the first four weeks of the course consisted of an introductory online farm-case. Throughout the semester, the travel and social distancing restrictions influenced how, and in what learning arenas, the different educational activities could be conducted. In spite of these, the on-campus students were able to conduct a real-life casework on farms in the university area, and the online students did their own versions of this with local farmers in their home countries. Nonetheless, the course was different this year, and action-oriented learning in an online learning arena, has provided many take-aways for the future.

3.1.3.2.2.1.1.1 Supporting forces and how to build on them

The students seemed to value the introductory online farm casework in how it gave them the opportunity to practice systemic inquiry, the competences and group work prior to the real-life casework. Like one student stated: “The foreword with the online-block helped me understand what we were going to do.” (Student 428_2020). As some students voiced a wish to spend more time participating and doing case inquiries, having an introduction and a “trial run” like this, could give the students some more time to become familiarized with the action learning approach, the concepts and methods, and thus better prepare them for the farm and food casework.

Disregarding the online setting, the students seemed to appreciate the shift to a diversity of learning arenas, and especially the experience in the farm cases. Participating in the case systems and interacting with the farmers and stakeholders was something the students voiced as integral to their learning experiences in the course. This was perhaps further enhanced by the fact that they had been “stuck” online and at home for several weeks prior to going out in the field. It seemed to give the students a boost to finally be able to engage in experiential learning, which they had spent weeks talking about the benefits of.

As for other learning arenas, the students appreciated the reflection sessions, guest lectures and “student led-open space”. The latter gave the students the opportunity to explore topics of their own choosing, in sessions facilitated by the students themselves. Giving the students this space for “collective autonomy” seemed to enable cohesion building, peer-to-peer learning, and competence development in for example facilitation and dialogue. Also, the flexibility provided in an online setting, and the ability to connect across borders, times, and location, is a definite opportunity one could build on in the future, for example as a supplement to mostly physical learning arenas.

3.1.3.2.2.1.1.2 Hindering forces and how to deal with them

Despite how some felt more prepared from the online course introduction, the students were also disappointed to start the course this way, but also with the online mode in general. Especially with the lack of opportunity to engage and interact physically in the learning community. One student philosophically called it “floating in the abyss of online meta-learning” (Student 419_2020), while another reflected on how the online format hinders deep conversations. It seemed to frustrate the students to read and learn about the benefits of action learning without being able to experience these first-hand. Online action-oriented learning is challenging, and as such the biggest hindering force for the shift to a diversity of learning arenas this last cycle was the pandemic. Like one teacher pointed out, some of the exercises like transect walk are easily transferrable, while others – like the ones connected to actual participation and casework – are perhaps more complicated. The online format also seems to require more individual support, coordination, and time spent, on part of the teachers.

A decentralized and semi-virtual learning community, like the one experienced this last cycle, could also require more institutional support in terms of conducting casework in a diversity of locations and contexts. For off-campus students, assistance from their institution could be beneficial, if not crucial, to help them build trust with their stakeholders.

"If NMBU was to pursue more on-line work, it would be very helpful to provide some "academic" weight in support of the students that facilitates relationship building with the farmers."

Teacher O1_2020

3.1.3.2.2.1.2 From lecturing to co- and peer learning

The students seemed to appreciate the learning community, building relationships, and learning from each other and the diversity of backgrounds and disciplines of which they represent. Several of the students' reflection documents contained descriptions of how experiences in the course were enhanced by interactions with their peers. For example, one student talked about how sharing reflections in weekly reflection sessions were very helpful to inspire reflections. Arguably, enabling peer interaction is important for individual growth and learning, and discussions with peers enabled new thinking, reflecting on both past experiences and dreams for the future. A couple of students emphasized the peer feedback as particularly helpful, "I learned so much from my peers, creating a supportive agroecological community I can rely on" (Student 425_2020). According to the teachers' reflection sessions they too recognized how the students supported each other and interacted and learned from one another. However, they also reflected on the need to support the students more individually, not leaving too much of the personal welfare and development up to the peers and class community. "The students are more vulnerable than we think", one teacher stated. (Teacher T1_2020)

"The weekly reflection sessions were very helpful to inspire my reflection and to share with my classmates. Reflecting together in the breakout room gave me insight to other perspectives and further opened my mind for reflection. I would make sure to write down the questions and take notes of our dialogues, so I could go back later to further reflect on them."

Student 417_2020

"It did not take long for a dynamic learning community to be established within our class. Upon reflection, I began realizing that through the organizational and facilitative work I and my classmates were doing, I was serendipitously building up many of the core course competencies and learning goals in a far more visceral and tangible manner than postulated by the coursework alone. What began as simply attempting to fill social and community needs during a pandemic, turned into a fantastic opportunity to build up my skills in autonomous learning, communication and facilitation, and handling complexity and change."

Student 419_2020

"The passion from my fellow mates with the course motivated me and strengthened my desire of being an agent of change."

Student 426_2020

3.1.3.2.2.1.3 From syllabus to supporting literature/a diversity of learning sources

The PAE302 course has no fixed syllabus but encourages the students to seek out relevant literature and knowledge on their own volition. What the students need to learn depends on

their previous knowledge, as well as their casework process. The aim is to allow for the experiences to guide their exploration of learning material, and for literature to support the casework inquiry, thus they are encouraged to seek a variety of sources. However, certain readings about the fundamental ontological and epistemological topics, and additional literature on demand for more specific case-related matters are recommended. To cultivate the students' ability to seek relevant supporting literature, literature seminars are arranged throughout the semester. This enables the students to seek information that they find relevant and interesting, dependent on their own background, their casework and their personal interests and learning goals.

The general assumption is that the students appreciate the opportunity to take charge of this process. However, last year there seemed to be some conflicting thoughts amongst the students related to the introduction of concepts and theory, navigating how much is enough, and how little is superficial. Like some students mentioned; they would've liked more introduction of concepts to be confident when practicing them. On the other hand, others felt like there was limited time to practice the skills/competences introduced. Some students wanted the content to teach them more about technical agricultural knowledge, and several students voiced the need for a more critical exploration of the course content and material, especially in terms of ethical considerations and cultural and socio-political aspects. One student talked about this in relation to the use of meditation methods for visioning, while another underlined the importance of having a "critical lens on who is generating knowledge". There is a need for more communication with the students to make them trust in the approach, and in their own ability to seek out relevant and necessary information and knowledge.

3.1.3.2.2.1.4 From textbook to a diversity of teaching aids

The complexity of real-life casework necessitates a diversity of sources of information. Like for the shift towards a diversity of learning sources, a diversity of teaching aids, requires the students to increasingly trust in their own ability to seek out and evaluate different sources of information and knowledge. By encouraging students' autonomy and cultivating the competence of reflection, the teachers enable the students to think critically when evaluating information and where it comes from. Due to the vastness of available literature, it is nearly impossible for the teachers to keep up with all the relevant, reliable, and applicable literature. Hence, supporting the students' capacity in separating valid sources from invalid ones, while also encouraging them to trust in their own abilities to make these evaluations, becomes a crucial task.

While last year's students seemed to understand and appreciate this rationale, one student mentioned how there is a need for a more common understanding of the fundamental principles and theory behind sustainable agricultural practices, and that even though every farm and food system is complex and unique, certain truths should be understood. They fear that the big responsibility the students are provided with can cause "unnecessary confusion". However, the students generally seemed to understand that the course material's lack of certain specific knowledge helped them to identify gaps and room for further exploration. When shifting to a diversity of teaching aids it is important to facilitate students' unlearning in relying on a textbook as the "course encyclopaedia". Cultivating and exercising the core competences, like reflection and dialogue, is important when establishing a common understanding between individuals in food and farm system interventions.

"The field of agroecology consists of many different fields of knowledge, as food and farm systems are complex. I think it would be unrealistic for each person to be equally knowledgeable on each field. However, I would say that it is crucial for all of us to have a common understanding of some basic principles, to be on the same page for how to move towards a better future. […] I am afraid that leaving us with the responsibility to gather this knowledge ourselves may cause unnecessary confusion and uncertainty between the actors working within the field of agroecology."

Student 420_2020

3.1.3.2.2.1.5 From written exam to a diversity of assessment methods

One of the main objectives in the NMBU Agroecology course is to enable the students in becoming autonomous and life-long learners, i.e. for them to actively engage in their own learning process and development. As such, this is also the basis for how the students are evaluated through the course. The students are evaluated on their participation in the learning community, casework group reports, individual reflection documents, and an oral exam. The impression from the students is that they highly appreciate being given the opportunity to take charge of their own learning in this way. However, a challenge for the teaching team is the amount of time needed to conduct these types of assessments. Also, certain factors might be harder than others to measure, like participation in the learning community. Like qualitative research this type of qualitative assessment methodology requires reflexivity, awareness, and generally a high reflective capacity in the teachers. Since the course is so focused on autonomy in the students, and the fact that it revolves around the casework, there are also many aspects of the learning processes of the students not available for the teachers to observe or participate in. A way to overcome this could be to involve some kind of peer evaluation.

3.1.3.2.2.1.6 From lecturer to learning facilitator

In this Nextfood cycle the novel online learning arena was something the students brought up in relation to the teachers' ability to facilitate their learning and competence development. Some students mentioned that the Zoom-classroom limited "deep conversation", and that they felt like the facilitators were not able to participate as much in the online sessions. However, the fulltime online students seemed to have a somewhat different experience and a couple of these mentioned how meeting in the online classroom increased cohesion amongst both students and teachers. It would also seem like the teachers in the online class spent more time on individual follow-up, also confirmed by the teachers' reflections. One student talked about how the online setting is contradictory to action learning, and that this led to them feeling frustrated. Nonetheless, several students mentioned how the online casework, prior to the actual real-life casework, was a great way to be introduced to the concepts of agroecology, the systemic approach, core competences and action research, like mentioned above.

Some students also talked about wanting more participation and feedback from the teachers in general. One student expressed being disappointed by the teachers' lack of participation and interaction, especially after being introduced to the Nextfood action research project and its focus on student learning outcomes. Many students talked about the freedom and responsibility of the casework but adjusted to it in different ways. Some appreciated the trust

and responsibility given to them, while others lacked clear guidelines, more follow-up, and felt like they were being left too much to their own devices. Some students talked about lacking feedback from the teachers, and the teachers also mentioned this in their reflections as being a product of time limitations. One student expressed gratitude towards the teachers' vulnerability in the course, in how they are "submitting themselves to the rigors of students […] exposing themselves to open critique for discussion".

On part of the teachers, adjusting to the online learning arena had its challenges. One teacher talked about how the ability to interact spontaneously with the students and "correct misconceptions" was lost in the online classroom, along with the ability to "monitor what's going on". In addition, a lot of time was spent on part of the fulltime online teachers, doing individual follow-up and coordination. The campus teachers voiced how they would want to interact more with the students, and give them more attention, not leaving this solely "up to the peers". This is in line with the frustrations some of the students voiced. One important challenge for the teachers in the NMBU case to address, is how to facilitate enthusiasm, while at the same time deal with the diversity in class, and the reluctance some of the students show towards this novel educational approach. Like one teacher voiced in the reflection session "I think we need to have more conversations with them".

"This meta-research situation made me excited to partake in a course paying such close attention to the learning outcomes of its students. However, I have been struck by the contradiction in the lack of participation and constructive feedback from the teaching team throughout the semester. In any case, interacting and participating on farms near campus has played a crucial role in my development as an agroecologist. If it were not for this casework opportunity, I would have postponed my studies due to the corona virus situation."

Student 416_2020

"I was impressed by the massive "webcase" document on an organic farm in Denmark. We worked closely in small groups to create rich pictures and system maps for the current situation at this farm. We then completed a force field analysis and crafted an action plan on a particular aspect of the farm. I found this to be excellent practice for the live casework that followed – both in introducing us to systems inquiry methodology as well as the dynamics of working in a group."

Student 416_2020

3.1.3.2.2.1.7 What such a change requires from teachers, students and institutions

In the past cycle there were some very specific requirements that are connected to the unique learning situation both the teachers, students and stakeholders were put in due to the pandemic and its restrictions. I.e. the decentralized learning community, where some students were conducting the casework on their own and finding farmers and food system stakeholders without the assistance of the institution. One institutional requirement in such a case is to provide support for the students outside of campus, to help them build trust with their stakeholders.

A recurring theme across all levels of both facilitation and requirements, seemed to be communication. There is a clear need for improved communication between and amongst teachers and students. “How can we communicate so that we are on the same page when we are doing something together”, one teacher put it. This seems to be at the core of some of the issues the implementation of the educational approach brings – how to ensure the correct balance of specific “push” and “pull” factors. In terms of student diversity and ambiguity of expectations, but also in terms of facilitating autonomy and agency, while at the same time providing support and guidance.

The dilemma is perhaps how to navigate the students’ openness to the approach and their ability to adapt, while at the same time reflecting on the teachers’ own willingness to change. Nonetheless, the teachers are required to mindfully communicate with and facilitate the student group, to ensure their acceptance to this novel educational learning environment. The teachers also voiced a need for more dialogue with the students, individual follow-up, and continuous feedback: “To mediate along the way, explain, dialogue about expectations.” (Teacher T2_2020) This requires organizing, strategic planning and structure, while at the same time leaving room for flexibility as there is a different set of individuals in class every year. Overall, in terms of practical requirements, the teachers need to structure the work so that they use less time on ad hoc activities, like voiced in their reflection sessions.

“Communication. The diversity is not necessarily a problem if we are better to communicate. The confusions arise when we don't speak the same language, or if we don't know if we're speaking the same language. Simplification and over-simplification of diversity and confusion. How can we communicate so that we are on the same page when we are doing something together - would save time.”

Teacher T3_2020

“If NMBU was to pursue more on-line work, it would be very helpful to provide some “academic” weight in support of the students that facilitates relationship building with the farmers. This might increase the chance for the visioning workshop. Is it possible to compensate the farmers if students do more than the rich picture exercise with them?”

Teacher O1_2020

In terms of implementing the action learning approach, one recurring requirement from teachers seemed to be commitment to the approach and more focus on the teachers themselves “practicing what they preach”, so to speak. This seemed to be a challenge for the teaching team, due to time limitations and competing tasks. However, they all seemed to agree that it would be useful for them to “do some of the same exercises as the students do”. Especially, the teachers spoke about practicing reflection on a regular basis – both collectively and individually, and the need to institutionalize and formalize reflection. Like one of them said: “As action researchers we commit to make this a common practice.” (Teacher E1_2020).

During the past cycle the teaching team became more familiarized with action learning and research in an online setting, and how this requires more rigorous planning (time and timing)

and facilitation (making adjustments). In terms of course content some students, but also one teacher, spoke of how the course perhaps required more specific content on (agro-) ecological practices. The teacher said: “From more of an outsider perspective, it appears that the honing of the course to its essence around systems practice might inadvertently have led to too little of this kind of content within the classroom context.” (Teacher O1_2020) This can be linked to another issue voiced in the teachers’ reflection sessions, namely the diverging expectations of the students when entering the course, and their different understanding of what an action learning course entails. Perhaps, there is a need for more clarity of what is expected of the students, but also what the course has to offer. This requires mindful facilitation from the teachers, but also clear communication.

The action learning approach also seems to require teachers to be aware of their limitations and to be open to critique. It requires vulnerability and transparency, and awareness of what you can and cannot do or control.

“I can agree to many of the points that O1 brings up. I do think it would be really useful for us to do some of the same exercises as a group as the students do.”

Teacher T2_2020

“Just asking how do I in a fair way evaluate my own skills development, when we had limited chance to practice them all and got limited feedback from teachers throughout the course? How do I know I am on the right course?”

Student 417_2020

“Experiential learning courses usually means a bit of chaos, somewhat vague guidelines, and a lot of self-organized activities by students. This requires autonomous and well-structured work, something I struggle to stick to.”

Student 417_2020

From last year’s cycle in Nextfood, it seems like the requirements connected to the changed educational approach are not only connected to the approach itself, but also the circumstances of which it was implemented in 2020. The online learning environment required the teachers and students to be more flexible and adaptable, while also accepting a less action-oriented experiential learning experience. Notwithstanding, the approach generally requires students to trust the process, the teachers, and themselves. It requires them to be open and willing to participate, and to take charge of their own (continuous) learning. From what the students write in their reflection documents, they seemed to appreciate how they are invited to actively engage in their own learning process, and that they appreciate being taught how to become life-long learners.

3.1.3.2.2.2 Teachers´ perception of the greatest challenges to achieving such a change

In terms of planning and implementing the Nextfood approach, the teaching team voiced especially time constraints, group dynamics, and student connection as being key challenges. Improving communication internally amongst the teachers, but also towards the students was something that came up during the teachers' reflection session. Diversity among students in terms of expectations towards the course, can prove to be a challenge for the teachers to navigate, and these diverging expectations can at times be damaging to the learning process, according to one teacher. There were some disagreements amongst the team about how to solve this issue. The conundrum seemed to be how to help the students figure out what they want out of the Agroecology M.Sc., but also how to better connect with the students in general.

In terms of the teamwork amongst the teaching team, one challenge voiced in the reflection workshop was that there were too many ad hoc activities and conversations. Ad hoc activities, competing tasks, and time management in general are factors that all are damaging to the planning, execution and organizing of the work. There is a need for more structure to the work.

Another challenge is related to the students' casework and balancing the students' learning with the impact and usefulness of the work provided for the farmers/stakeholders. Like stated in the reflection session "Should the cases be more like a learning activity instead of trying "to change all of Norway"? Have we bitten over more than we can chew?" (Teacher E1_2020) I.e., can the students be agents of change, facilitate farmers' learning, and at the same time grow as learners themselves?

"Students sometimes have a different idea in mind about agroecology than ours."

Teacher T3_2020

"I do think that not all have the same interest or desires for working together, or do not have the same goals in the group. We should work on that and identify that."

Teacher T2_2020

"How do you deal with not feeling welcome in the classroom? Some students don't welcome you at all through the semester."

Teacher T1_2020

3.1.4 Concluding remarks on the case development since the previous reporting

3.1.4.1 *The most useful and inspiring experiences (supporting forces)*

It was a useful and good experience to use a web-case (a very well developed one that had been used in a Nordic online course cooperation for years) at the beginning of the course. This provided time to continue planning and organizing the following major part of the course.

When ‘forced’ to use online tools, like Zoom, it was a positive experience to see how it could work very well for certain activities. One example is reflection sessions with discussion among students in small groups. When in the breakout-rooms in Zoom, the students would not have many other distractions, and could concentrate well on their group discussion. Maybe in some instances better than in a classroom with many others present. The possibility of the teachers to visit the various groups and the following reporting from the breakout rooms in plenary also worked well.

It was understood that the best solution was that the online students did casework with local farmers in their home countries. This way they got first-hand experience to conduct their own real-life casework in a manner that no other hybrid version could have given them, such as for example connecting online to the casework among the on-campus students.

It is each year inspiring that some students report on transformative learning and experiences, appreciate the course’s emphasis on autonomous learning, see the link to becoming life-long learners, and appreciate the usefulness of the competences.

3.1.4.2 *Main obstacles/challenges encountered (hindering forces)*

Adjusting to the online learning arena was perhaps the main obstacle this last cycle. Extended planning was needed, and this shift brought challenges for facilitating action learning. Trying to combine mostly online sessions, with classroom sessions, in addition to having full-time online students (the “A-team”) in different time-zones made for extra organizational work and planning. It also limited the number of shared sessions for the students.

One important finding from the last cycle, was that interaction in person cannot be compared to that of an online setting. The online screen-format also challenged concentration and made it difficult to be present in the same way as in a classroom. To overcome these hinderances, teachers would have to arrange for individual guidance or follow-up in a less spontaneous way. Moreover, the “A-team” students were unable to attend casework groups in Norway, for several reasons; not being present for one, but also the time difference was too great to have them participate in an online fashion in real-time. Accounting for this was also a big hindering force, and the teachers who were “assigned” to the A-team spent a lot of time doing additional follow-up of these students and their casework at local farms in their home countries.

3.1.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

After reflecting on the challenges, the team at NMBU are considering including some online sessions in the campus course. As experienced during this last cycle, certain types of activities work well in an online format. Online sessions also open for the possibility to invite participants into a session or workshop that otherwise could not have been included, for example due to long distances or a busy schedule.

The challenge of having students conduct casework on different continents was solved in an adequate way by including the local teachers, and by some of the campus teachers having

weekly sessions in the afternoons with the online students, in addition to written exchange and distribution of recorded sessions and instructions for these. Even if this solution worked out this past cycle, it is not likely to be repeated for the next one. This is mainly because ideally the case work is done in groups, interacting, and learning with peers, and not individually. It was also quite resource-consuming with the additional teachers both abroad and at campus for it to work in a satisfactory manner.

3.1.4.4 *Plans for how to move forward into the next cycle*

For the next cycle the NMBU team are planning to start the course on the regular date, in the middle of August 2022. Last year course start was delayed due to the circumstances, but it looks like things will be "back to normal" come this fall. Moreover, the next course is planned for students who can attend in person at NMBU. In the period leading up the Norwegian summer break, the team are preparing for casework on farms and in the food system, making necessary arrangements with stakeholders, to avoid causing stress by having to deal with these tasks in August. In addition, teachers and course contributors will continue to deal with the challenge of facilitating action learning in a way that accommodates the diversity of students and their needs.

We will continue dealing with the challenge of facilitating action learning in a way that accommodates for our diverse students and their needs.

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3.2 University of Oradea (UNIOR)

3.2.1 ID card

Title: Students and farmers taking food innovations from idea to market

Level: Other

Language: Romanian

Institution: University of Oradea

Leaders: Lect.dr. AdrianTimar

Assoc.prof. dr. AnamariaSupuran

Timeline: 31.05.19: Course start
15 .10.20: Course end

Learners: 24 total (12 highschool students, 12 students)

Number of students starting the educational activity (male and female):

Total of 24 students; 20 females and 4 males

Number of students passing the educational activity

All the 24 students have passed the educational activities until present.

Educational background of students (high school, bachelor, master, PhD)

Highschool students: 12

Bachelor students: 7

Master: 5

Number of students with more than three years of experience in the field/business

University students: 10

3.2.2 Extended summary of development of the case since the previous reporting

3.2.2.1 *Actions taken since the previous report*

3.2.2.1.1 Planning

The most useful aspect of this phase was that we all became aware that the students need continuous guidance when undertaking a career in the field of agri-food production starting from high-school and continuing with the University (BSc, MSc, PhD). The education provided in high-school needs to be completed and deepened by the university studies and several internships in the specific factories so that the future specialists in the agri-food sector have the necessary skills and competences to adapt themselves to the continuously changing labour market.

When it comes about challenges, the main obstacles were the rigid curricula that we are used to follow in our educational system and giving up to years of teaching in a certain way. We had to change our mindset and come up with new, interesting and practical topics and also with a stimulating set of teaching aids. We also had to internalize the transition from lecturer to facilitator. Other challenge was related to level of skills and knowledge of the high school and

university students due to different level of understanding and preparation in the case of each participant.

One of the lessons learnt was that it was not easy to change our role from a lecturer into a facilitator, but it was also not impossible. Some of us were already using elements specific to a facilitator but we were not always aware of them.

The initial planning was satisfactory but we learnt, after the course started, that a too detailed planning (from facilitator's perspective) led to a large number of changes due to the free choice of the participants in some cases and sometimes due to results/data of different evaluations and reflection questions applied to students.

3.2.2.1.2 Implementation

The most useful aspect was related to the discovery of personal skills of the participants and co-working in teams. It was also very important that teams were set up by the participants based on common interests and mutual empathy. However, the most inspiring aspect was the active involvement of the students during the whole course.

One important challenge during the implementation stage was the schedule mismatching in the case of highschool and university students that put pressure on the participants and staff from the synchronisation point of view.

Summer holiday was a very important disturbing factor. Students start courses in October and the highschool students start in September. It was a month that was difficult to be managed.

Later on, the pandemic situation brought other challenges and moved all the courses on-line. The beginning was difficult until all the teachers, students and stakeholders got used with the on-line platforms (Microsoft Teams) but soon everybody was able touse them. During certain periods when face-to-face meetings were allowed, we organized group meetings inviting only the members of one group at a time to the faculty so that to have a direct contact with them. With all the efforts, there were delays in organizing and ending the course. The same situation has been recorded in the case of data collection.

3.2.2.1.3 Reflection

Teachers and Stakeholders met twice per month in order to analyse the current situation and decide upon the next steps. All the data collected (questionnaires, reflection questions, etc) from students have been analysed in parallel with the implementation of the course.

There were common decisions regarding the teaching methods and instruments used in the classroom or on-line and there was a continuous preoccupation for further improvement of the course, relationship with the students and relationships among students in order to create a co-working environment and the principles of action learning to be successfully implemented.

3.2.2.2 *Research results since the previous reporting*

3.2.2.2.1 Students', teachers' and other stakeholders' experiences and learning

During the first cycle there have been collected the documents recommended by NMBU and they consisted in the choosing 3 questions from a set of questions that we should send to our students at the beginning and at the end of the course. The questions were making reference

to the goals and expectations of the students but also to the skills they would like to train/improve.

The second step was the self-assessment of the students' competences which consisted in a questionnaire of 14 questions conceived by both teachers and stakeholders. They had in view the five core competences (observation, dialogue, visioning, reflection, participation) but also some other competences such as group work, critical thinking, communication and decision making.

Other relevant research results have been obtained by analysing the students', teachers' and stakeholders' reflection documents. Valuable data that prove the shift towards the Nextfood model have been extracted from these documents.

3.2.3 Data on the development of the case since the last reporting

3.2.3.1 *Students' responses, learning and competence development*

3.2.3.1.1 Methods of data collection and analysis

At the beginning of the course, the students were asked to provide answers on three questions related to their understanding of the course topics, their contribution potential and expectations to the course, summarized in the answers to the following questions:

- What would I like to learn in this course?
- What are the questions I´d like to find answers to in this course?
- Which skills and competences do you want to train/improve in this course?.

The learners answered to the three questions as a take-at-home assignment where they could reflect on the questions and have enough time to answer.

At the end of the course, the students were asked again to answer to the following questions in the same manner:

- What would I learnt in this course?
- What are the questions to which I received an answer at the end of the course?
- Which skills and competences have you trained/improved in this course?

Both assignments were in a written form sent by e-mail to all the students.

3.2.3.1.1.1 Self-assessment of competences

The self-assessment of students' competences was accomplished at the beginning and at the end of the course. The questionnaire was designed by the facilitators and included 14 questions that had in view five core competences (observation, participation, dialogue, reflection and visioning) but also competences such as critical thinking, communication, group work and making decisions. In the case of the core competences there have been allocated 2 questions per competence while for the other competences it was allocated only one question per competence.

The questionnaire was sent to students by e-mail and they were asked to fill it in by ranking their level on the respective competence on a scale from 5 to 1 (5 = strongly agree, 4 =agree, 3=neither agree/nor disagree, 2=disagree, 1= strongly disagree). The full version of the questionnaire can be found in the Annex 1.

Dialogue

The development of the dialogue competence presented the most significant increase starting from a mean value of 3.583 at the beginning of the course and reaching to 4.500, meaning that there was an increase of 0.917 (20.377%) with p = 0.01.

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
Dialogue | Start	48	0	48	2.000	9.000	3.583	1.108
Dialogue | End	48	0	48	4.000	5.000	4.500	0.505

t-test for two independent samples / Two-tailed test:

99% confidence interval on the difference between the means:

(-1.383 , -0.451)

Difference	**-0.917**
t (Observed value)	-5.216
|t| (Critical value)	2.653
DF	66
p-value (Two-tailed)	**< 0.0001**
P	**0.01**

The number of degrees of freedom is approximated by the Welch-Satterthwaite formula

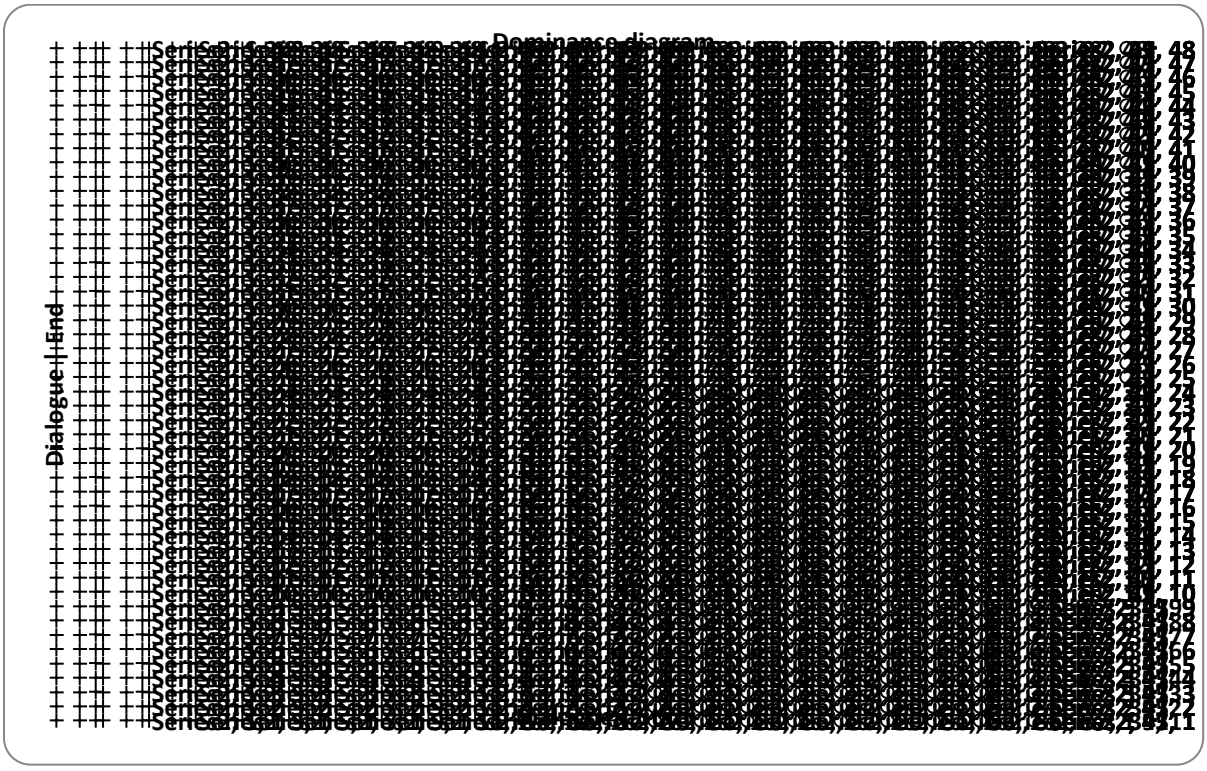
Test interpretation:

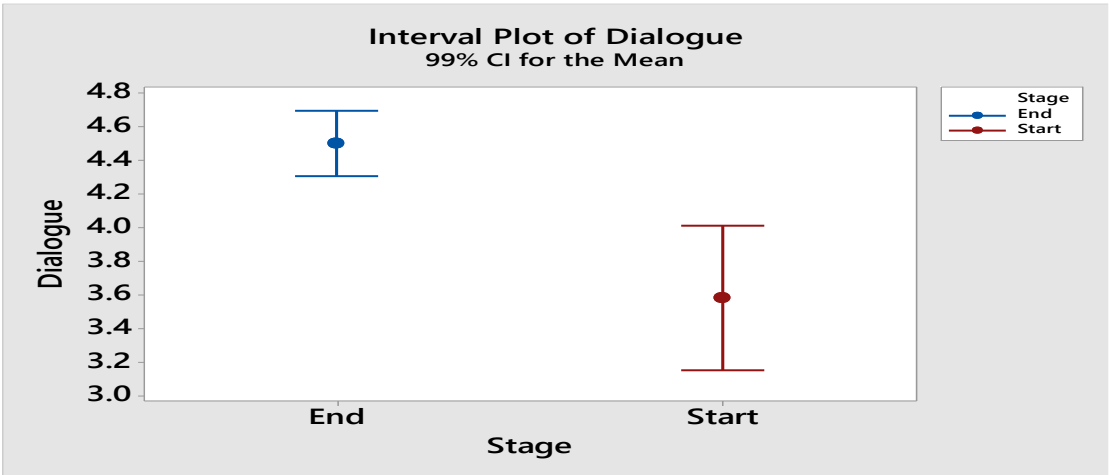
H0: The difference between the means is equal to 0.

Ha: The difference between the means is different from 0.

As the computed p-value is lower than the significance level alpha=0.01, one should reject the null hypothesis H0, and accept the alternative hypothesis Ha.

The risk to reject the null hypothesis H0 while it is true is lower than 0.01%.





Observation

A significant increase of 0.5417 (12.895%) was also recorded in the case of observation starting with a mean value of 3.667 at the beginning of the course and reaching a mean value of 4.2008 with p=0.01.

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
Observation | Start	48	0	48	2.000	5.000	3.667	0.834
Observation | End	48	0	48	3.000	5.000	4.208	0.459

t-test for two independent samples / Two-tailed test:

99% confidence interval on the difference between the means:

(-0.905 , -0.178)

Difference	**-0.5417**
t (Observed value)	-3.9426
|t| (Critical value)	2.6447
DF	73
p-value (Two-tailed)	**0.0002**
alpha	**0.01**

The number of degrees of freedom is approximated by the Welch-Satterthwaite formula

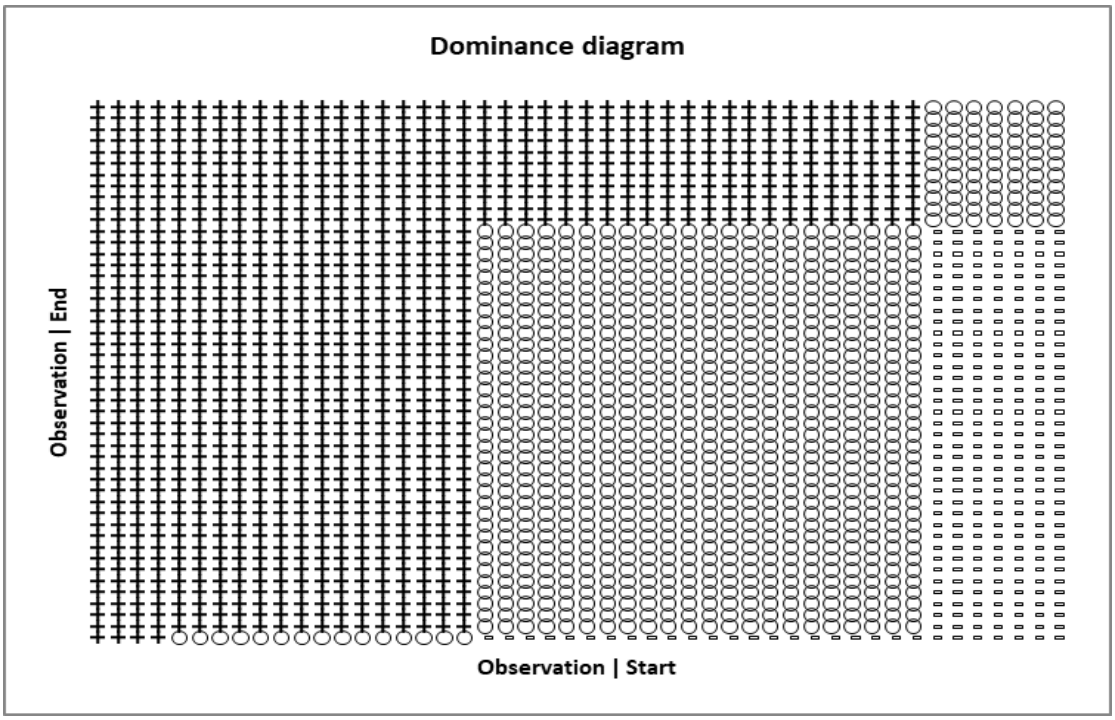
Test interpretation:

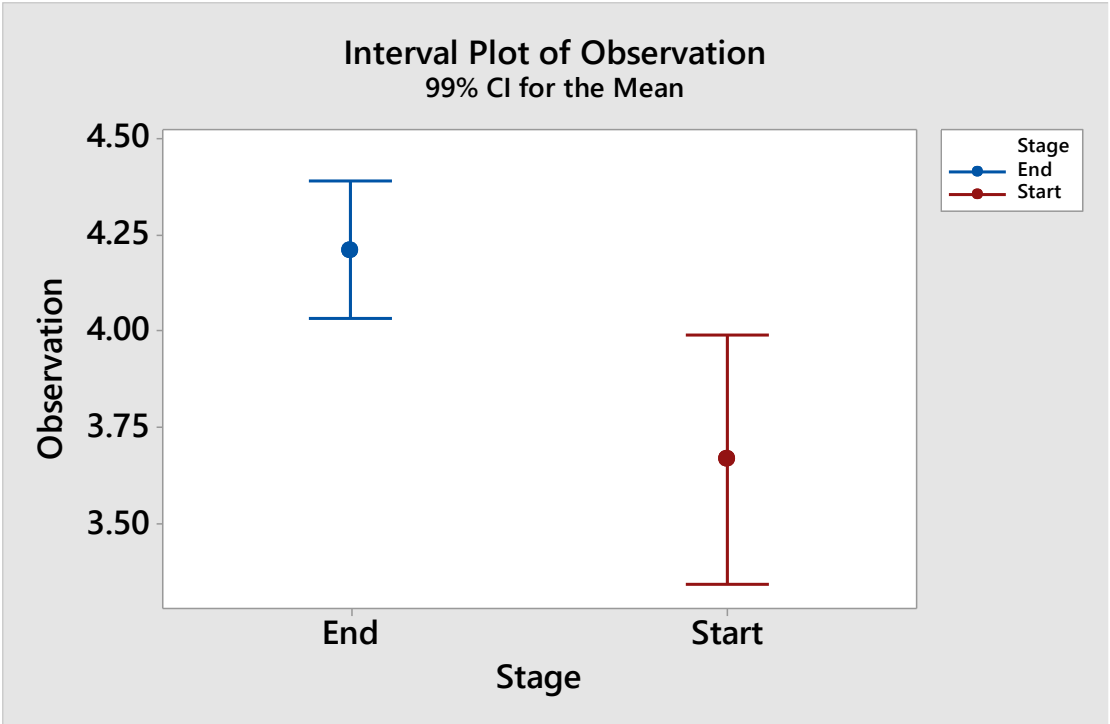
H0: The difference between the means is equal to 0.

Ha: The difference between the means is different from 0.

As the computed p-value is lower than the significance level alpha=0.01, one should reject the null hypothesis H0, and accept the alternative hypothesis Ha.

The risk to reject the null hypothesis H0 while it is true is lower than 0.02%.





Participation

The participation competence recorded an increase almost similar with that of observation of 0.5625 (14.050%) starting from a mean value of 3.438 (one of the lowest) and ending with a mean value of 4.000.

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
Participation | Start	48	0	48	2.000	5.000	3.438	0.823
Participation | End	48	0	48	3.000	5.000	4.000	0.546

t-test for two independent samples / Two-tailed test:

99% confidence interval on the difference between the means:

(-0.938 , -0.187)

Difference	-0.5625
t (Observed value)	-3.9473
|t| (Critical value)	2.6374
DF	82
p-value (Two-tailed)	0.0002
alpha	0.01

The number of degrees of freedom is approximated by the Welch-Satterthwaite formula

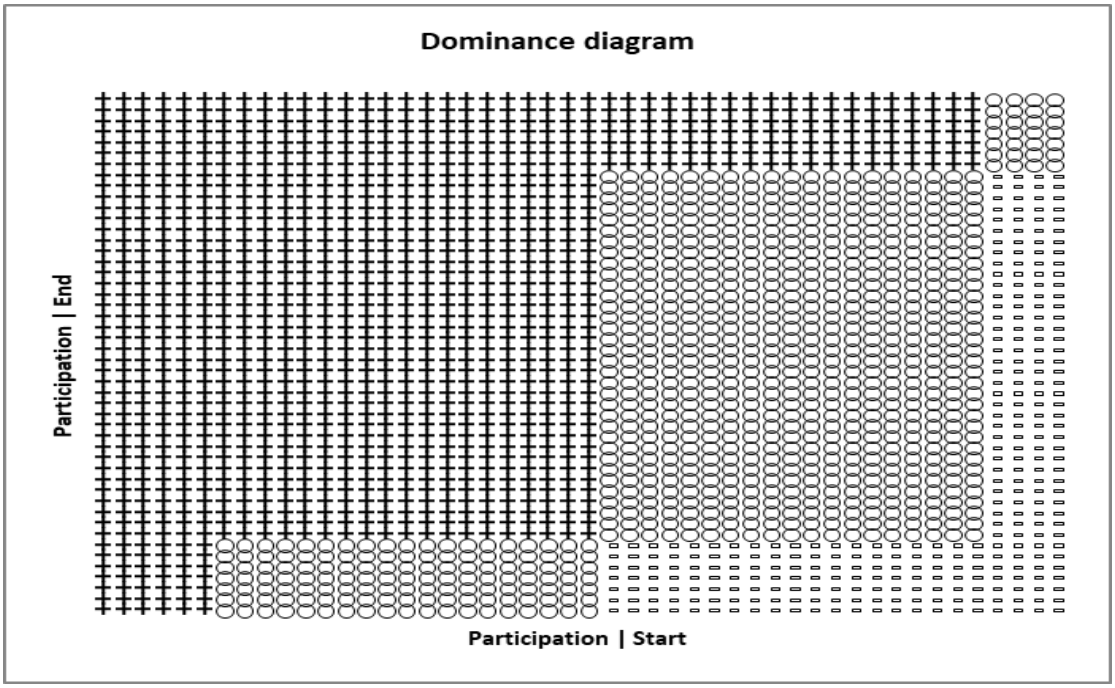
Test interpretation:

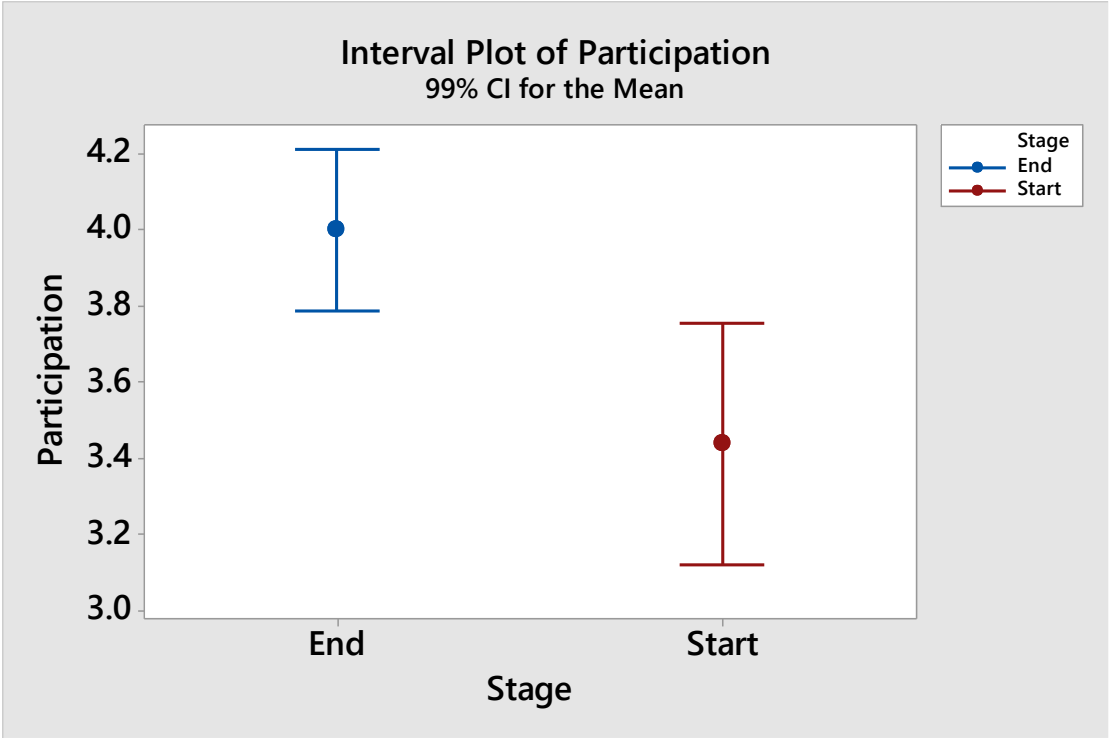
H0: The difference between the means is equal to 0.

Ha: The difference between the means is different from 0.

As the computed p-value is lower than the significance level alpha=0.01, one should reject the null hypothesis H0, and accept the alternative hypothesis Ha.

The risk to reject the null hypothesis H0 while it is true is lower than 0.02%.





Reflection

Just like the competence of dialogue, that of reflection recorded one of the most important increases of 0.8542 (19.161%) starting from 3.604 at the beginning of the course to 4.458 at the end of it.

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
Reflection | Start	48	0	48	2.000	5.000	3.604	0.707
Reflection | End	48	0	48	3.000	5.000	4.458	0.582

t-test for two independent samples / Two-tailed test:

99% confidence interval on the difference between the means:

(-1.202 , -0.507)

Difference	-0.8542
t (Observed value)	-6.4638
|t| (Critical value)	2.6291
DF	94
p-value (Two-tailed)	< 0.0001
alpha	0.01

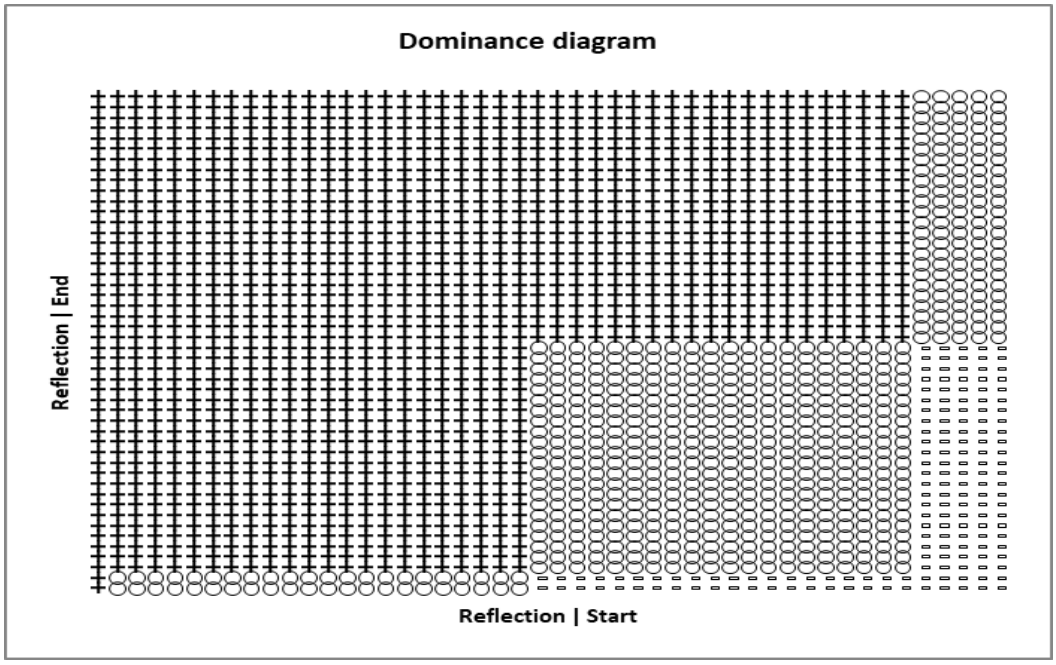
Test interpretation:

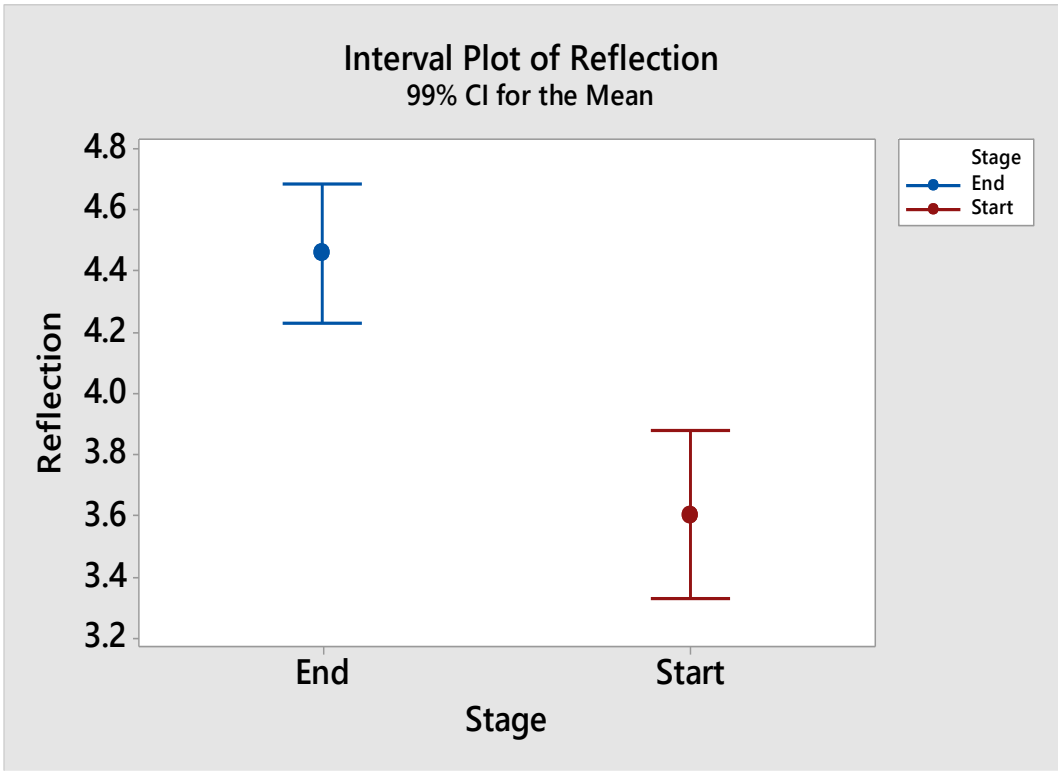
H0: The difference between the means is equal to 0.

Ha: The difference between the means is different from 0.

As the computed p-value is lower than the significance level alpha=0.01, one should reject the null hypothesis H0, and accept the alternative hypothesis Ha.

The risk to reject the null hypothesis H0 while it is true is lower than 0.01%.





Visioning

The only competence that recorded a lower progress of 0.4792 (11.059%) was that of visioning. Even so, the increase is still significant starting from a high mean value of 3.854 and ending with a mean value of 4.333.

Summary statistics:

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
Visioning | Start	48	0	48	3.000	5.000	3.854	0.684
Visioning | End	48	0	48	3.000	5.000	4.333	0.595

t-test for two independent samples / Two-tailed test:

99% confidence interval on the difference between the means:

(-0.823 , -0.135)

Difference	-0.4792
t (Observed value)	-3.6610
|t| (Critical value)	2.6291
DF	94
p-value (Two-tailed)	**0.0004**
alpha	0.01

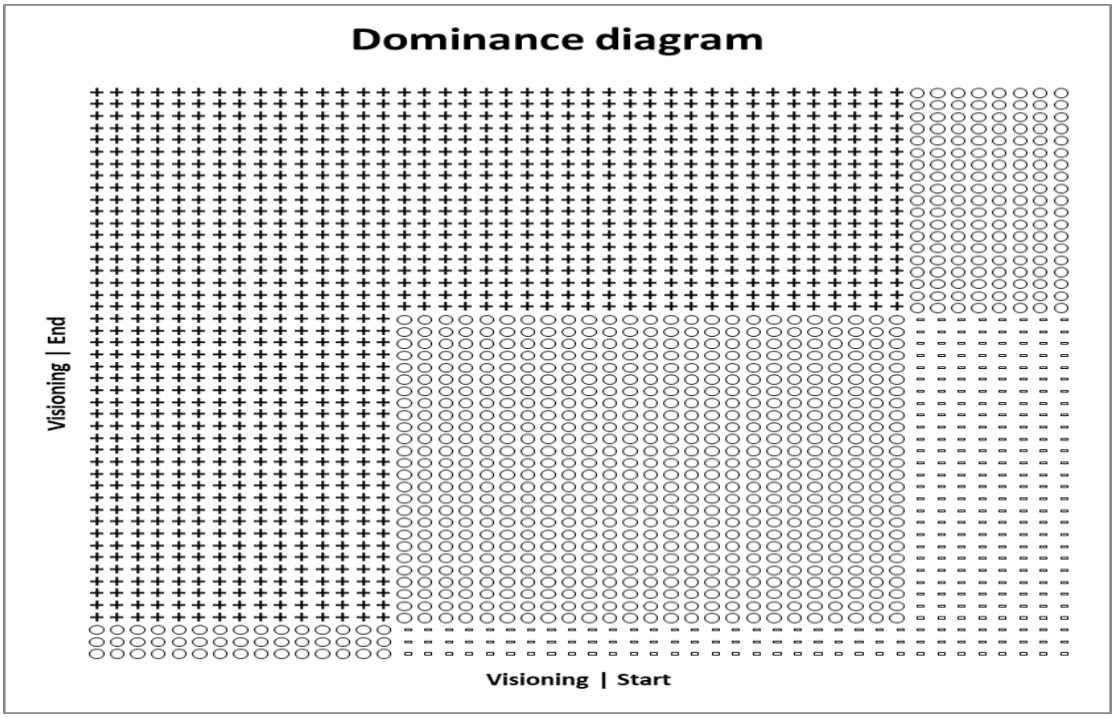
Test interpretation:

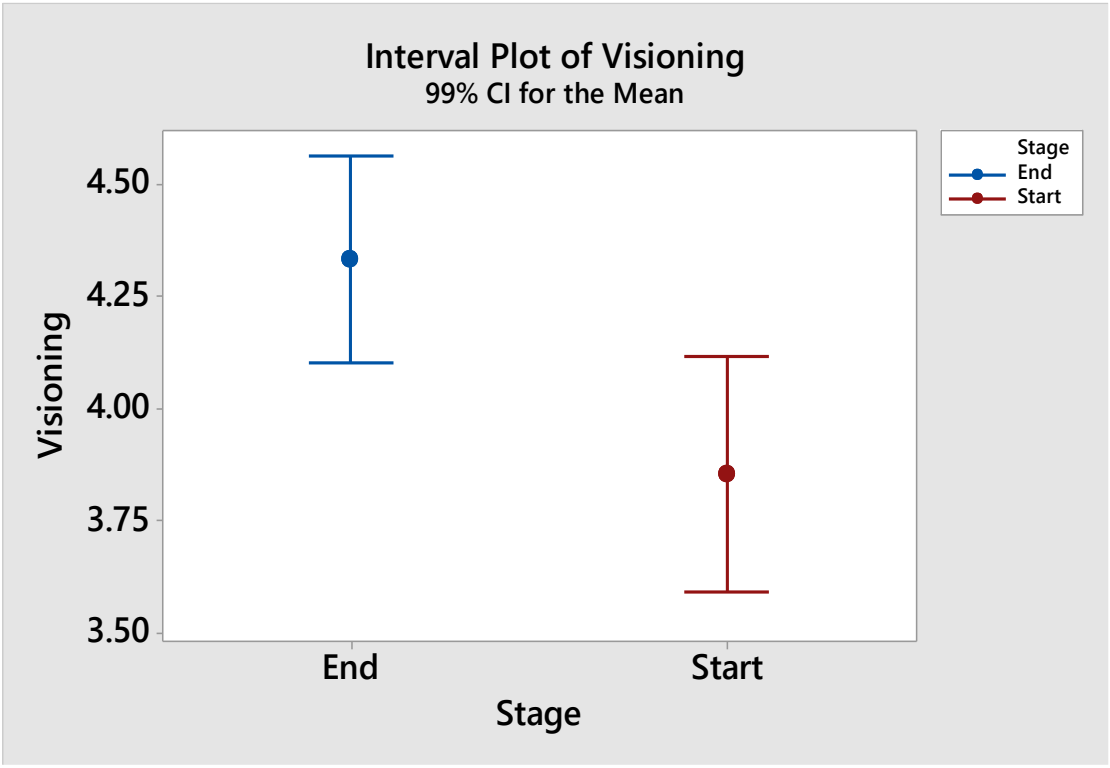
H0: The difference between the means is equal to 0.

Ha: The difference between the means is different from 0.

As the computed p-value is lower than the significance level alpha=0.01, one should reject the null hypothesis H0, and accept the alternative hypothesis Ha.

The risk to reject the null hypothesis H0 while it is true is lower than 0.04%.





3.2.3.1.1.2 Students' final reflection document (individual)

The reflection documents include valuable insights on the way in which students experience the learning process and how they perceive several activities within the course that could support the their competence development.

The documents collected from the students were firstly made anonymous, each student receiving a code of the following type LRD_S01_2019 (Learner Reflection Document – Student01_2019), the they were manually coded according to a pre-defined coding tree based on the core competences of Nextfood project.

Observation

In the case of observation competence, most students considered it as very important from the very beginning when it comes about their future jobs in the field of food industry or technology. More than this, most of them considered themselves competent enough in practicing this competence when they were asked to apply it (during the two field trips at Bicaci bakery and Mierlau Dairy Factory). Many of the observed details during these two visits were later mentioned in their reflection documents when dealing with the course in Production Flows or the Sensory Analysis of some certain food products. Together with the stakeholders that were part of the teams (2 workers in the two companies) could bring into discussion important aspects of the production process by recollecting moments of the respective visits.

Many students' reflection documents mention that the interaction with the representatives of the two companies were very valuable in improving the competence of observation.

At the dairy factory, the students received an observation sheet to help students to observe independently and consciously several stages of the production process but also several aspects related to the analysis of the ingredients and of the final products.

«The visit to Bicaci bakery was not really what I expected from the organizers, considering that it is a bakery in the countryside and I was convinced that there aren't many interesting things to see. However, after the visit, I can admit that I was wrong. Even if in the countryside, the bakery was a modern facility with very well-prepared and dedicated employees. Every stage of the production process was very well-organized and monitored, the employees were complying with the safety regulations starting with the cleanliness of their equipment and ending with the handling of equipment used in the production process.» (LRD_S11_ 2019)

«The practical activities that we have undertaken today, that is the sensory analysis of some dairy products made me remember all the experience we had during the field trip at the beginning of the course. Many observations that we have made today on the chosen dairy products in order to fill in the observation sheet provided by facilitators, were also observations discussed at the dairy factory. I can say that the experience during the visit as an introduction to the course we had today.» (LRD_S09_2019)

Participation

Participation is one of the competences that was mentioned in most of the reflection documents of the students either related to the challenges posed by the action of getting involved in a certain situation (especially at the beginning of the course) or the accomplishment of overpassing these challenges at the end of the course. The challenges identified by the

students were fear to communicate, fear to be wrong, not to be accepted by the other members. Most of students admitted that these fears reside from the fact that the Romanian educational system doesn't encourage active participation but rather the passive observation of processes, activities, phenomena.

However, towards the end of the course, many students succeeded in exceeding these challenges and they considered themselves efficient group members by bringing their contribution to the group project, efficient communicators and able to have a dialogue with the other members of the group. Co-learning and group learning were other situations in which participation was practiced extensively.

«Today, my greatest fear was that I will be asked to present my group's ideas in front of all the other participants. Fortunately, the facilitators didn't oblige anybody to do it but they allowed those who wanted to speak for their group. Anyway, I am aware that there will be one moment when I will also need to contribute to the activities within the group.» (LRD_S02_2019)

«The last meeting ended today and I can say that one of the greatest achievements of this course was that I'm not the passive person that I used to be at the beginning of the course. Without even noticing, I have made a great progress in co-operating with the other members of the group, I have started to ask questions and find answers, and more than this to guide others in the learning process when they needed it.» (LRD_S07_2019)

Visioning

The learners' reflection documents that include information about the competence of visioning, speak about it as something new that they didn't have the chance to experience in schools or in other learning environments. Many documents reveal the fact that visioning is an appreciated competence when used in several sessions in which the students had to imagine a new food product in order to establish the topics of the future projects (at the beginning of the course) or the sessions in which they had to imagine their food product at present (with the basic information that they aquired until that moment) and in the future (considering the product as an ideal food product). At the end of the course, the students also appreciated the comparison made between the envisioned food product during the course and the final product, followed by a reflection session.

Other important aspect that can be derived from the learner reflection documents is that students associate visioning with reflection, both competences being considered triggers of innovation in the design of of new food products. Given the fact that the Romanian case is based on the creation of innovative food products, the two competences can be considered the driver competences that could lead us to success.

«When we were asked to imagine the perfect food product that we would like to consume from the point of view of taste, smell, texture and aspect I was very surprised. I felt myself as if I am at a yoga class, meditating on the positive aspects of my life. Of course, my envisioned food

product was a sweet cake combining red and yellow colours, with a strong taste of vanilla and strawberry and with flower-like smell. I was so immersed in this exercise that I felt sorry when we had to open our eyes.» (LRD_S10_2019)

«It was interesting to review the information that we have written during the visioning exercise that focused on the present state of the product and how we would like it to be at the end of the course. An interesting fact was that at that moment we included only a few aspects of the respective food product related to observable aspects (connected to our senses). Later, during the course, some other in-depth aspects were considered – quality of the ingredients, the aspect of developing a functional food or not, the technological process, environmental aspects (consumption of resources, the reusage of the by-products under a different form, the materials from packages). This difference between what we wrote at the beginning and what we wrote at the end showed me how much I have learnt inbetween and how ignorant I have been at the beginning of the project.» (LRD_S02_2019)

Reflection

The learner's reflection documents include many references regarding the competence of reflection especially at the beginning of the course when the students were not familiar with practicing this competence. Their diaries reflect their worries and fears regarding the possibility of not being able to write valuable reflection documents. Most of the time they incriminate the fact that they do not have the necessary vocabulary and the correct style when they write. Many documents also present the fact that the support offered by facilitators (information on how to write the diary, examples in the classroom or sent via e-mail) is helpful and start to ease their situation.

There are also many comments on: is it necessary to practice this competence for so many times because most of them consider it time-consuming and also in close relation to the mood of the student at the respective moment.

Towards the end of the course, the negative reflection-related comments are not as many as at the beginning, possibly because the students are already familiar with this competence and they have already understood its importance not only for the Nextfood project but also for themselves.

«Being at the end of the course, I can say that the most practiced competence was that of reflection. The facilitators put a lot of work and effort in explaining us its importance and provided us with all the necessary materials in order to help us write our document. I am happy that I succeeded in doing a good job.» (LRD_S08_2019)

«After our first meeting within the course, I was not happy with the amount of work that I need to put into it. It seems that the course is not just about the creating new food products but also about improving some competences that our teachers need to analyse continuously. I have already filled in an evaluation of the competences and there is also an assignment that we

need to do for the next time related to answering to some questions. But the worst thing is that we were asked to write down a document with all our insights, thoughts, perspectives on what is happening during each activity. I just hope that I will be able to manage this extra work.» (LRD_S20_2019)

Facilitation (by students, teachers and stakeholders)

Facilitation is one of the competence to which the students do not make many references in their documents. However, it is mentioned in connection with the group activities and evaluations.

Many students and stakeholders mention the strategy that each group had to develop at the beginning of the course related to finding the answers to some questions. This strategy is about elaborating some stages which must be followed by the group when they have unanswered questions before addressing them to the teacher. First they need to ask the colleagues in the group (including the stakeholder), secondly, they can ask other colleagues from the other groups, the third stage is to look for the information on the internet and lastly if they cannot find an appropriate answer or they need further information, they can address it to the teacher. This strategy was very appreciated by the students even if they considered it time-consuming. They realised that collaborating one with each other in the group and sometimes empowering some certain members to look for pieces of information was rewarding.

The evaluation process also involved the facilitation by allowing the students to organize themselves, to find their own voice and transfer the roles among themselves.

The stakeholder's reflection documents mention even in their case how difficult it was for them to take the control and support and the activities within the group.

«My group had to make a strategy on 3 to 4 steps that we needed to follow before asking the help of a teacher. It was extremely difficult to apply it because of the time that we needed to spend in order to get an asnwer. At school it is easier – you just ask the teacher and you have the answer. In our case, we needed to discuss within the group and most of the time we were asking the stakeholder given the fact that he had more experience than us. Sometimes, we could find the answer immediately, but some other times we had to spend more time by reading a lot of documents, articles and courses» (highschool student)(LRD_S24_2019)

«Today I was in the position of facilitating some activities within the group and I must admit it was very difficult for me to do it. Indeed, I know many things in my field of study, but being in the shoes of the facilitator was not easy. I realised that to be a good facilitator you need to have some skills such as: to be a good communicator, to be able to observe the members of the group and to intervene when it's the case, to guide and assist the group when they need it.» (LRD_S22_2019)

3.2.3.1.2 Results

3.2.3.1.2.1 How do students experience such a learning process with respect to:

3.2.3.1.2.1.1 Learning goals?

The answers collected for the three questions at the beginning of the course reveal a multitude of things that the students would like to learn, starting from knowledge related to their field of activity: how to design a new food product, to learn about bakery, pastry, meat products, functional food, natural additives and environmentally-friendly packages, how to make bread, how to begin a business in the field how to release a food product on the market, about the whole food chain, environmental aspects along the food system and ending with ways of learning: to learn in a different settings, to work on projects in teams, to learn new things by using practical methods.

At the end of the course, many students mentioned that they have got the answers to their questions directly or indirectly, but there were also some students that remained with answered questions. However, they didn't regret their participation in the course because they had the chance to learn many practical and useful things.

The skills and competences that they wanted to train at the beginning of the course were: team-work, participation, reflection, visioning, but also dialogue, making decisions, problem solving and critical thinking.

As the end of the course, the students admitted that they succeeded in practicing extensively competences like: reflection, participation, group work and critical thinking but they would have liked to practice more visioning-related activities which they considered it very useful in a course that has in view the design of new food products.

3.2.3.1.2.1.2 View on competences needed for sustainable development?

The analysis of the students' self-assessment of competences reveals that some of the core competences had in view such as dialogue and reflection record a very significant increase from the beginning to the course until the end of it. Considering that many students at the beginning of the course couldn't make the difference between communication and dialogue, this increase is surprising but in the same time it is the result of the continuous engagement of students in activities where dialogue was very important. When speaking about reflection, the situation is not surprising anymore, but it represents the common effort that both students and facilitators invested in this course. The numerous reflection moments corroborated with the extra time spent on learning how to write the reflection documents are reflected in this increase.

Other two competences, observation and participation, recorded also significant increases. In the case of participation, this increase can be explained by the high level ofstudents' motivation throughout the course but also due to the teaching/learning methods selected by the facilitators that were meant to stimulate the active participation of the students. In the case of observation, the mean value at the beginning of the course is one of the highest and this is explained by the fact that the Romanian students are very familiar with this competence due to our traditional

passive way of learning/educating. Even in this case, the increase shows that there is always space for improvement and deepen understanding.

The last competence that of visioning recorded the lowest increase but it is important to observe that the mean value at the beginning of the course was the highest. The low increase can be explained by the fact, that facilitators didn't introduce too many activities where visioning to be practiced on a regular basis. The reflection documents of the students reflect this regret of not having the opportunity to practice this competence more.

Regardless the increase, we may conclude that all these trained competences will ensure the sustainable development of our students.

3.2.3.1.2.1.3 Recognition of own competences and competence development?

The students' reflection documents represent a very important mirror in which the students can identify the competences they have, the level of proficiency when using them, the development of these competences and the transformation processes that determined the improvement of some certain competences.

Thus, during the course, they were able to better understand what each competence represent, what its role is and how it can be improved in time. More than this, they became aware of the importance of these competences and they started to write about them in their reflection documents either in a positive or a negative manner besides other aspects of the course.

More detailed information on the recognition of own competences and competence development found in the students' reflection document can be found in section "Students' final reflection document (individual)."

3.2.3.1.2.1.4 Transformation

The process of transformation is revealed especially by the statistical results when analysing the students' competences. In the case of all five competences, the evolution of competence development is significant and encouraging.

However, the transformation is also reflected in the students' reflection documents when mentioning aspects connected to participation, reflection, dialogue and facilitation.

Participation is one of the competences that was mentioned by several students as being a challenge at the beginning of the course due to their fears. However, until the end of the course, most of the students have overpassed this feeling and they considered themselves active participants within the group.

A similar transformation was encountered in the case of reflection which at the beginning was perceived as a time-consuming activity as in the end to be well-appreciated due to the new insights and perspectives that this reflection time offered to them.

Other type of transformation was recorded in the case of the students that considered the facilitators as resource persons. If at the beginning of the course, the students had the tendency to ask different questions to the facilitators, in the end they became independent learners due to the strategies developed by both facilitators and students.

Other transformation was related to the competence of visioning. At the beginning of the course, the facilitators were convinced that introducing too many visioning exercises will not bring the expected result. It was a conviction derived from our traditional mentality – that visioning is a not a serious competence to be considered. However, the results of the students' self-assessment of competences and the students' reflection documents contradicted facilitators' opinion and brought a desirable transformation.

In the case of teachers and stakeholders, there was recorded an important transformation when making the switch from lecturer to facilitator. According to the teachers' and stakeholders' reflection documents, this transformation was not an easy one. Sometimes it was even necessary to impose some time limits regarding the speaking time of the facilitators. This process required planning, implementation, reflection moments and re-planning.

3.2.3.1.2.2 To what extent does the education enhance the students' competences of:

3.2.3.1.2.2.1 Observation?

Considering the results after the application of t-test (see section Self-assessment of competences), the following conclusions have been drawn:

Even if the increase is not as high as in the case of other competences, it is important to mention that observation is one of the competences that is extensively practiced by the Romanian students during the classes and most of the time, the students are transformed into passive observers. If we look at the mean value of 3.667 (which is very high) recorded at the beginning of the course, it is noticed that the students are already aware that they are proficient in using this competence. Even in this case, there was a significant increase of the trained competence.

3.2.3.1.2.2.2 Reflection?

Considering the results after the application of t-test (see section Self-assessment of competences), the following conclusions have been drawn:

Just like the competence of dialogue, that of reflection recorded one of the most important increases. This increase suggests that the strategies applied by the facilitators – by adopting several ways of implementing reflection within the course (short session after each face-to-

face meeting, reflection assignments at home, reflection workshop, explanations offered on the learner's reflection document), were efficient and finally successful.

The meaning of reflection skills evolution suggest that organised reflection sesions are very efficient.

3.2.3.1.2.2.3 Visionary thinking?

Considering the results after the application of t-test (see section Self-assessment of competences), the following conclusions have been drawn:

The only competence that recorded a lower increase was that of visioning. This evolution can be explained by the fact, that there have been only a few sessions that included visioning exercises and the competence was not practiced in a constant manner. However, a surprising fact is that the mean value recorded at the beginning of the course is the highest in comparison with other competences even if many students wrote in their reflection documents that the visioning sessions represented something new for them.

3.2.3.1.2.2.4 Participation (engagement)?

Considering the results after the application of t-test (see section Self-assessment of competences), the following conclusions have been drawn:

The participation competence recorded an increase almost similar with that of observation. Even if we are tempted to rate this increase similar to others, it is an important increase for the Romanian case considering that participation was not encouraged in the Romanian educational system in the past. At the beginning of the course, the students were not eager to answer to different questions, to ask questions, take part actively in several learning process, to co-operate within the group- fact which is revealed by the lowest mean recorded at the beginning of the course.

3.2.3.1.2.2.5 Dialogue?

Considering the results after the application of t-test (see section Self-assessment of competences), the following conclusions have been drawn:

The development of the dialogue competence presented the most significant increase. This fact can be explained that if at the beginning of the course not all the students could make the difference between communication and dialogue, after several practical activities (group activities, co-working and co-learning within the group) and explanations offered by the facilitators, the students could exercise more consciously the competence of dialogue. This result also reflects that the comfort zone created within the group became more and more obvious with every organized meeting until the end of the course.

3.2.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.2.3.2.1 Methods of data collection and analysis

3.2.3.2.1.1 Reflection by the teacher/stakeholders

The reflection documents collected from the teachers and stakeholders make many references to the way students were involved in several activities within which observation was crucial. Among the most important activities mentioned here were the visits where the observation process was a guided through the observational sheets shared with the students by the representatives of the companies (stakeholders). The objective of providing the students with these observation sheets was to help the students to focus on the key aspects of the production flow, on the equipment, food safety, etc. One other reason of these sheets was level up the differences in knowledge and competences among the high school students and university students. In fact, these documents reflect the fact that teachers and stakeholders always considered the possible differences among the two categories of students when they designed the theoretical courses and other different activities.

"From the first day when we had to decide on the way we are going to introduce several activities from the perspective of action learning education, we paid increased attention to the differences in understanding certain concepts/notions, in perceiving different aspects of the same subject that could exist among our students. One example was the introduction of the observation report designed together with the stakeholders with the aim of supporting the high school students in understanding the production processes and technology used in their companies."

(TRD_T26_2019)

3.2.3.2.1.2 Participation by the teacher/stakeholders

One of the most commented competences in the teachers/stakeholder's documents was that of participation. This fact can be explained by the fear of the teachers that the students will not actively engage within the activities of the course. This fear is valid from their point of view considering that the past Romanian educational system didn't encourage the real participation of the students in the class. Very often, the students were encouraged to observe things rather than to act. The teachers could bring several examples in front of the students to make them understand the information/processes but they were not allowed to experiment themselves, to succeed or to fail in what they were doing.

The same documents mention the fact that after an adaptation period marked by the development of a safe environment within the group or class, the students succeeded in getting involved more and more and finally become active members of the group.

" I remember that when I first found out about this project and about the concept of action learning that lies at its basis, I was not very convinced that it will be successful in the case of our students, regardless they are learning in high schools or universities. I know how difficult it is to make even little changes in the way the teachers teach or introduce new tools in the educational process. Making the students to get connected to certain subjects and finally

get involved in the process is even harder. There is a natural resistance from both students and teachers that comes after years of teaching/learning according to the old school."

(TRD_T25_2019)

3.2.3.2.1.3 Visioning by the teacher/stakeholders

During the planning period of the course, the teachers and stakeholders didn't give the right credit to the visioning exercises being convinced that the students will not enjoy getting involved in such exercises, this conviction being influenced by a mentality full of pre-conceived ideas. In the past, the Romanian educational system didn't allow space for exercises that were stimulating the creativity and imagination of the students, because these competences were not values during communism. The communist doctrine was embracing the idea of all the people to be equal in all aspects of their life. Those that were creative and imaginative were considered rather exceptions and different from the others. Years after the disappearance of communism, the perception remained still the same because many of the students at that moment are the teachers of today. Thus, introducing such exercises was considered innovative and revolutionary but also risky from the teacher's point of view.

However, the reality contradicted the teachers and the general remarks included in their reflection documents confirm this fac.

"I didn't quite agree with the other teachers when they decided to introduce a visioning exercise when the students had to imagine their perfect food product. I considered childish and time-consuming. At the end of the day, I proved that I was wrong because all the students enjoyed it"

(TRD_T25_2019)

3.2.3.2.1.4 Reflection by the teacher/stakeholders

All the reflection documents of the teachers/stakeholders reflect their "struggle" to introduce reflection in the classroom as often as possible, starting from detailed information offered to students so as they should be able to write their diaries, continuing with short reflection sessions after each meeting and ending with the organization of a reflection workshop.

According to these documents, this "struggle" was more obvious and difficult at the beginning of the course when the students needed the biggest amount of support which then started to decrease little by little to the end of the course when the students were already familiar with reflection. The phenomenon can be explained by the remark: the proficient the students became, the less support they needed from teachers.

"An important part of my time today was spent on offering support to all the students in writing their reflection documents. Even if several documents meant to exemplify the style the students need to adopt or the vocabulary they need to use, have been sent to them, many students needed extra validation on the text fragments they wrote at home." (TRD_T25_2019)

3.2.3.2.1.5 Dialogue by the teacher/stakeholders

One aspect that was mentioned for many times in the reflection documents was the competence of dialogue. These comments were made in connection with the activities within the groups but also referring to the dialogue between the facilitators and students and sometimes between high school students and university students.

The teachers and stakeholders spent a lot of time to explain to the students the differences between communication, debate, monologue and dialogue and they admitted that it was not an easy task to fulfil.

Stakeholders also had difficulties in having a real dialogue with the students at the beginning of the course, being in the position of the team member. However, after a certain period of time, the differences in age, status and knowledge were overpassed and the promotion of the dialogue within the group was central to the group.

"After many years, today I stayed again at the desk in the classroom together with my new colleagues. I felt like a student again. It was a nice feeling to be part of a group of students. Some of them were very young of 18 years old but some others were of 20-22 years old. If I make a comparison I can say that I am much older and there were moments when I felt like an intruder.The students were also not very enthusiastic about me considering me like a spy in their group. I think that after a while, they will accept me as their colleague and things will go better."

(SRD_S27_2019)

3.2.3.2.2 Results

3.2.3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.2.3.2.2.1.1 From lecture hall to a diversity of learning arenas

3.2.3.2.2.1.1.1 Supporting forces and how to build on them.

The facilitators together with the key stakeholders involved in the project (representatives of food production companies and state institutions) planned as the learning arenas to be diversified starting from the lecture hall where the face-to-face sessions took place, continuing with organizing field trips in the factories (dairy product factory, a mill that also included a bakery) and ending with the virtual environment that supported our theoretical activity (theoretical courses were given in a digital format) and also the collection of data for improving the teaching/learning process (e.g. initial questionnaires on skills assessment, the set of questions intended to help the facilitators in mapping the learners' learning goals and competence development, collecting the feedback from stakeholders, etc). Other learning arenas connected with the learning process have been the conferences halls where different events have been organized (*Ecotrophelia* and *Innovativa* conferences) and the canteen of the "MihaiViteazul" Vocational School where highschool students and university students took part in a food contest where they practiced sensory analysis by tasting several food products and deciding the best recipe of the contest. The participation in two conferences offered the students the opportunity to practice their communication skills such as speaking in a foreign

language (English), asking the right questions, presentation skills, etc. After the face-to-face sessions, the students had the possibility to move in a reflection classroom where they could answer to the reflection-related questions and also to fill in the evaluation short questionnaire (questions on the content (2) and activities (2)).

The students felt comfortable with changing the learning environment. They even considered it as stimulating and motivating. Repeatedly, the students have mentioned with enthusiasm (in formal and informal discussions) that they enjoyed changing the setting - making visits, virtual environments, etc.. Many students have even mentioned in the learner's documents this aspect.

3.2.3.2.2.1.1.2 Hindering forces and how to deal with them.

The most important obstacles encountered when changing the learning arenas were those related to the travelling of high school students to Oradea from distances of 40 km or to their attendance in the field trips (we needed several documents signed by their parents), fact that made the process more difficult.

We also encountered delays due to the fact that the holidays and study period for the high school students were different from those for the university students. The course duration was too long and it was difficult to follow the schedule. Delays in performing the last sessions were also caused by the Covid 19 situation and restrictions imposed by the Romanian government. Since the first week of March 2020, all the schools and universities were closed in Romania with a short exception in September 2020 when the high school students attended the courses face-to-face. Starting with the second week of October 2020, all the students started the courses on-line again.

The way in which we tried to overcome the above mentioned obstacles in the second cycle were: the course duration was shortened because instead of organizing only one or two meetings per month, we organized 3 or even 4 when it was needed, the number of participants decreased in order to avoid the mismatching of the schedule but it was also a natural process being influenced by the pandemic situation.

3.2.3.2.2.1.2 From lecturing to co- and peer learning

3.2.3.2.2.1.2.1 Supporting forces and how to build on them.

One of the most claimed shifts mentioned by the students was "to take into account the student's voice", fact that made us consider the student at the centre of the whole educational process. For this reason, the facilitators decided to allow the students to be the main actors and take the control of the discussions within the groups they are learning/working. They changed the roles up to a certain point by learning to ask the right questions (after reading the theory at home, the students were asked to come with 5 questions that they had to discuss within the group, being assisted by the facilitators), by answering to the questions within the group (university students could answer the questions that the highschool students had) and from time to time the facilitators and key stakeholders offered advice or guidance to the students in their learning process (learning by discovering). However, the highschool students

felt more comfortable when taking part in organizing practical activities within different events, such as fairs, food contests, etc.

The key stakeholders also found new updated information on certain topics from the facilitators and the facilitators in turn found had more access to the practical experience of the key stakeholders.

Other important aspect was that the continuous guidance provided by the facilitators (high school and university) and key stakeholders was also vital in the students' orientation for their future jobs: some of the high school students decided to continue their studies in the university after graduation and get a Bachelor Degree in the field within the Faculty of Environmental Protection, while the university students decided to continue their studies with a Master degree or even a PhD degree. More than this, co-working and co-learning with the key stakeholders could turn the students into their future employees.

3.2.3.2.2.1.2.2 Hindering forces and how to deal with them.

The obstacles that interfered with this co-working/co-learning environment were the lack of time that the key stakeholders had during the sessions. Sometimes they missed the face-to-face sessions but they always encouraged the students and facilitators to send their questions and thus keep the contact with them either by e-mail, phone or other social media groups.

3.2.3.2.2.1.3 From syllabus to supporting literature/a diversity of learning sources

3.2.3.2.2.1.3.1 Supporting forces and how to build on them.

The learning sources proposed by facilitators consisted in an updated and practical information included in the topics of the course (e.g. how to put an innovative food product on the market), the relevant reading materials (print or digital) that can be found in the academic library, the access to international databases, the information that the facilitators and key stakeholders could offer to the students.

The main learning in this case consisted in the fact that: if the sources are selected carefully in accordance with the specificity of each group and its corresponding project, the learning activity can be successful and rewarding.

3.2.3.2.2.1.3.2 Hindering forces and how to deal with them.

One of the most discussed topics at the beginning of the course (by our students, facilitators and key stakeholders) was the fact that our curriculum and syllabus are not adapted to the present needs of the labour market. There is a clear disconnection between the theoretical aspects included in the syllabus and the practical activities a future employee should perform at his/her workplace. Because the change of syllabus is difficult to perform due to some certain limitations (curriculum/syllabus are regulated by the Ministry of Education for all the vocational schools and universities) and to have an immediate real connection with the labour market, many suggestions were related to students taking part in extracurricular activities (e.g. our course) to acquire more useful knowledge and practical experience for their future jobs and

to have access to an infrastructure that allows them to undertake practical activities (eg. educational farms, internships).

3.2.3.2.2.1.4 From textbook to a diversity of teaching aids

3.2.3.2.2.1.4.1 Supporting forces and how to build on them.

During the course, there have been used several teaching aids, starting from texts in digital format (word or ppt), worksheets, quizzes, evaluation sheets, projects to using innovative technologies like smartboards, videos illustrating technological processes, softwares/applications that supported the communication among the students within the group (the usage of Zoom and Teams due to the pandemic situation), among the groups themselves or with the facilitators and by using educational/serious boardgames (e.g. Simplycycle – on the importance of choosing the right materials for packages). The role of all these teaching aids was to *make the learning process easier, more interesting, dynamic and comprehensive.*

We have all learnt that the most diverse the teaching aids the most interested the students were in continuing their activity.

3.2.3.2.2.1.4.2 Hindering forces and how to deal with them.

There were no real obstacles in using these teaching aids. It just took some time for the facilitators to learn how to use some certain applications (Zoom, Teams), the serious game Simplycycle and to identify the most useful aids for the groups they guided.

3.2.3.2.2.1.5 From written exam to a diversity of assessment methods

3.2.3.2.2.1.5.1 Supporting forces and how to build on them.

The formal assessments methods used during the course were under the form of four open-ended questions (2 on the content and 2 on the activities) at the end of each face-to-face session. There was also a mid-term evaluation under the form of project presentation followed by a session of questions proposed by the facilitators but also by the students.The students' activity was continuously formally or informally assessed when participating in the face-to-face sessions, conferences or food contests and lately in the on-line environment.

The final evaluation consisted in: a written test (9 questions+SWOT Analysis, see Annex 2) applied not individually but per group and an oral presentation of the projects followed by questions and assisted by an external evaluation committee. The written evaluation sheet included questions related to the eco-innovator aspect of the product, if the package is ecological or suitable for industrial production, what is its nutritive advantage, if it contains allergens and what organoleptic characteristics could have, followed by the SWOT Analysis of the product.

The evaluation performed by the Evaluation Committee was based on a methodology that had in view: GDPR, chance equality, environmental protection, sustainability, community oriented, professional performance, free access and creativity. The evaluators were external being invited either professionals working in specific companies or representatives of the state institutions such as Agricultural State Department and Agency of Consumer's Protection. The

evaluators graded the project of each team and also their products. The first stage consisted in the evaluation of each product from a technical point of view while the second stage was related to the insertion on the market and within the community of the respective food products according to general European rules. The grades were between 1 and 5 (1=the lowest score; 5=the highest score) as it can be seen in Annex 3. According to the results collected from students and the decision of the Evaluation Committee, the projects with the highest score were the biscuits with lupinus seeds and the yogurt with bear garlic, followed by the biscuits with wheat germs and the bread with potatoes and grape seeds. The last positions were occupied by the whey drink and bagels with mustard seeds.

3.2.3.2.2.1.5.2 Hindering forces and how to deal with them.

The challenge regarding the evaluation method was to actually organize it, given the fact that we were already during the pandemic period. We waited for several weeks as the restrictions to cease and to be able to organize a face-to-face final evaluation.

The most appreciated aspect of evaluation was the existence of an external Evaluation Committee that could judge neutrally each project presented by the teams.

3.2.3.2.2.1.6 From lecturer to learning facilitator

3.2.3.2.2.1.6.1 Supporting forces and how to build on them.

Both teachers and stakeholders decided to play the role of the facilitator and for this reason the teachers had to provide more information to stakeholders on what it represents to be a facilitator, what is its role and how he/she needs to act in front of the students. We all agreed that that the facilitator shouldn't be a resource person for students as the lecturer is usually perceived. For this reason, different strategies were designed so that the students to be able to cope with possible questions within the group and only after several trials to ask the help of the facilitator.

The main learning was that with a relaxed, informal atmosphere accompanied by a set of rules established together with the students, all the challenges were overcome.

3.2.3.2.2.1.6.2 Hindering forces and how to deal with them.

The main challenges at the beginning were to keep facilitators' talk time to less than 40% to encourage participation within the group, to control distractions or sometimes even distracting persons and to keep the focus on the conversation/situation/issue. However, this situation changed once the activities started to be on-line. The students were reticent to getting involved actively in discussions due to the fact that they were not familiar with the platforms (Zoom and Teams). Once they got familiar with these platforms, the students started to act and speak as usual and the talk time of the facilitators started to decrease.The benefits were that our students felt free to ask questions, to speak more on some topics and exchange ideas.

3.2.3.2.2.2 What such a change requires from teachers, students and institutions

Such a change requires a lot of time spent by teachers/facilitators on designing a course based on action learning (planning, implementation and reflection); motivation, determination and engagement from facilitators' part; participation and dialogue of both students and facilitators.

3.2.3.2.2.3 Teachers´ perception of the greatest challenges to achieving such a change

One of the challenges in achieving a change in the case of the learning arenas was the pandemic situation which limited the teachers in choosing a diversity of learning arenas due to the governmental restrictions. The field trips were forbidden as well as the face-to-face meetings regardless the place. Thus, for a certain period the only learning arena was the on-line platform.

Other challenge related to the shift from lecturing to co- and peer learning was to change the perception of the students that the teacher or stakeholder in front of them was a facilitator and not a resource person.

It was also difficult for teachers to support the stakeholders in becoming group facilitators but with a lot of time spent for co-working thus challenge was overpassed.

Other important challenge from teachers' point of view was to make the shift from the classic teaching methods to the action learning teaching methods. There was a continuous work of searching for new teaching methods and instruments, adapting them to our needs but also to students' needs and sometimes even creating new ones.

3.2.4 Concluding remarks on the case development since the previous reporting

3.2.4.1 *The most useful and inspiring experiences (supporting forces)*

The most inspiring experiences were those related to the hard work of identifying, adapting and creating new materials that we introduced during our course and the positive attitude of the students towards them.

Other inspiring moments were related to the visioning of the products that the students needed to develop until the end of the course and the engagement of the students during the whole learning process.

The final evaluation of the 6 projects was also inspiring for all the persons involved, making us believe that our course was a success.

3.2.4.2 *Main obstacles/challenges encountered (hindering forces)*

1. The organization of the course together with the high school students was difficult due to the differences in schedules (semesters, holidays,exam sessions). For this reason, the first

cycle lasted almost 9 months (2 meetings per month). In the case of the second cycle, we organized more meetings per month and it lasted only 6 months.

2. The pandemic situation prevented us from organizing face-to-face courses and field trips with the whole group of students. Even the application of action learning principles was quite difficult to apply during the time when we had to meet only on-line. The number of the students (especially high-school students) decreased in the second cycle due to the disconnection between teachers and students, teachers from high school and those from university and teachers and stakeholders.

3. Difficult contact with stakeholders due to the pandemic situation but also due to other problems related to swine and aviary pest. Thus, the field trips were more difficult to organize.

4. Challenge in teaching students how to write their learning document. A lot of time spent on giving examples and instructions.

5. Challenge in determining the students not to consider their teachers as the only source of information available.

3.2.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

We should continue to organize the further cycle by including the high school students regardless the many the challenges that we encountered due to their inclusion in the course. We had the great satisfaction as persons that started the first cycle as high school students to finish the course as university students.

Regardless the pandemic situation, we succeeded to adapt the course to the new situation and to continue our work with the students.

With a lot of determination from the facilitators' and students' part, the results (the six new food products) of the course brought us a lot of satisfaction.

3.2.4.4 *Plans for how to move forward into the next cycle*

The planning process for the second cycle was a continuous process by looking at what went well and what went wrong from the facilitators and stakeholders point of view. After the final evaluation of students that took place in October we had two months in order to review all the collected documents from the students and stakeholders and to discuss on the changes that we need to make in the second cycle.

Given the fact that many challenges were connected with the organization of the face-to-face meetings and bring together the highschool students and university students, the first decision made was to organize 3-4 meetings per month and thus to finish the second cycle in May. Thus, we could avoid the different schedules of the highschool students and university students. Other decision had in view the partner vocational schools that we brought in the first cycle. Unfortunately, we needed to give up on our collaboration with the vocational schools that are from the countryside for two reasons: the bureaucracy in the case of minor students (many documents to be signed by the parents – for transport from home to Oradea; for the visits, etc) and also because of the pandemic situation which determined our government to impose restrictions on the free travel among localities or in other cases there have been restrictions related to the time that people can spend outside their house (e.g. after 6 o'clock pm we were not allowed to be on the streets).

Small changes have been made in the content of the course: such as the introduction of a theoretical course in food packages from an environmental perspective that supported some practical activities on biodegradable and environmentally-friendly materials that can be used in food packages and the usage of new teaching/learning methods and tools (e.g. visioning exercises, new serious games, etc) meant to motivate and stimulate the participation of the students.

The food products that are designed by the 4 teams of students are different from those designed in the first cycle.

The implementation of the second cycle can be considered much easier, given the fact that we received a lot of support from the NMBU team and the working groups organized on Microsoft Teams regarding the documents that we need to collect and analyse from students, the usage of Nvivo or T-test. More than this, there is a better understanding of each stage of the course and how some certain learning methods operate when applied to students.

3.4 ISEKI-Food Association

3.4.1 ID card

Course title: *FoodFactory-4-Us* – NextFood Case 4 Supply Chain Innovation Competition

Level of the course: Master Students from food(related) studies

Language: English

Host Institution: ISEKI-Food Association (IFA)

Course leaders: Line Friis Lindner, Katherine Flynn

Timeline of the activities covered in this report

Cycle 2: Reflection Workshop

- 26 May 2020: Cycle 2 online reflection workshop with participation of the advisory board.

Cycle 3: Initial planning

- 17 June 2020: online planning workshop with the advisory board and selection of the competition topic.
- July-August 2020: Design and development of training material (learning outcomes, contents), definition and planning of the online trainings. In parallel, development of final rules, procedures, timing of the competition as well as dissemination materials.

Cycle 3: Implementation

- 1 August – 7 October 2020: Opening of the call for student teams.
- 7 October 2020: Deadline for applications, Advisory Board evaluates team applications
- 14 October 2020: Acceptance of the teams
- 15 October 2020 – 26 January 2021: Complimentary online trainings:
  - Introduction to the Competition - 15 OCTOBER 2020
  - Student Presentation - 28 OCTOBER 2020
  - “Virtual Visit” - 12 NOVEMBER 2020
  - Project Review - WEEK of 30 NOVEMBER 2020
  - Student Suggestion - WEDNESDAY 13 JANUARY 2021
  - Soft Skills - TUESDAY 26 JANUARY 2021
- 31 January 2021: Deadline for submission of project reports
- 1 -10 February 2021: Evaluation of the project reports by the advisory board
- 18 FEBRUARY 2021: Final Virtual Conference

Cycle 3: Reflection and planning again

- 1 April 2021: Cycle 3 online reflection workshop with participation of the advisory board.

Learner categories and number per category (demographics)

When we closed the call for teams in October 2020, 25 teams (with a total of more than 75 students) applied to the competition. After evaluating the incoming project proposals, 10 teams were accepted (36 students of which 28 were female and 8 male). 1 team (with 5 students) dropped out and at the end of the competition there were 31 students of which 23 were female and 8 male.

3.4.2 Extended summary of development of the case since the previous reporting

3.4.2.1 *Actions taken since the previous report*

3.4.2.1.1 Planning

The planning phase of cycle 3 began in June 2020, immediately after the reflection workshop of cycle 2 on 26 May 2020. The main outcomes of the reflection workshop were to place more emphasis on the shift from lecturing to peer-learning and the shift from lecturer to facilitator. The need to focus more on interaction among teams and to use learning methods that foster interaction and collaboration among students from different teams were brought forth as suggestions to more actively facilitate interaction and peer-learning. Furthermore, a central theme was the role and workload placed on the advisory board as a hindering force and that more efforts should go into communicating at an earlier stage the amount of work expected and the specific roles and expectations of the advisory board. With these main «take-home» messages, the planning of cycle 3 of FoodFactory-4-Us began focussing on moving further up the ladder of learning arenas and placing greater emphasis on peer-learning. As regards technical means, a change was made from GoToMeeting/GoToWebinar which does not allow for setting up break-out groups, to Zoom which has this interactive feature. The cycle 3 planning workshop was held in June 2020 with representatives of the advisory board and we agreed on the topic of valorizing food biodiversity. Thereafter, we began drafting the call text, settng up the website and disseminating the call.

3.4.2.1.2 Implementation

Following the cycle 2 online reflection workshop held 26 May 2020 with the participation of the advisory board, participants reflected on the 6 shifts. For the shifts rated higher (Q2 Reflection Workshop), the use of a variety of assessment methods and that students are evaluated not only on written reports but also on oral presentation skills, and participation in online trainings, were given as reasons for rating the shifts higher. Also, varied teaching methods and tools and facilitator role were reason for rating shifts higher. Here, peer-learning was a reason for the higher rating, both peer-learning among teams but also the supervising faculty member selected by the teams. For the shifts rated lower, participants were asked what can be done to improve them (Q3 Reflection Workshop) and here the need to focus more on interaction among teams and to use learning methods that foster interaction and collaboration were stressed. For instance by more actively facilitating questions during online trainings or peer-learning thereby moving further away from typical webinar formats where linear learning prevails and towards learning arenas that foster teamwork and interaction. Thus, at the planning workshop held 17 June 2021, concrete steps based on the May reflection workshop were taken to foster higher interaction among students . When structuring the single online trainings in the planning phase, specific attention was paid to the provision of interactive sessions – breakout rooms - where students from different teams reflect together on what they observed in the preceding informative and exploratory sessions to foster peer-learning through the co-creation of inquiries with students from different parts of the world.

Focussing on fostering interaction and peer-learning, the online trainings in the competition are structured in a way that supports students' collaborative work on their project reports while improving the skills that are essential for today's job market. The structure of the online trainings follows that of facilitated activities where students are 1) informed of the objectives of each online training; 2) go into informative and exploratory sessions practicing the core competences on topics related to the competition; 3) placed in breakout groups with 4-5 students from other teams to practice participation, dialogue, facilitation and reflection; 5) and finally in plenary we follow-up on the work in the break-out groups. From the student data, students express the importance of skills related to communication , team work and interpersonal skills. The main obstacles encountered in cycle 3 were the difficulty of engaging industry in the online trainings and to widen the scope of stakeholders part of the advisory board. In cycle 3, there were less examples of "the world out there" from external stakeholders in the form of virtual company visits. Instead, teachers found examples and presented these to students but without the possibility of students asking questions to the source. In cycle 3, there were greater difficulties of engaging external stakeholders in the implementation of the competition. In cycle 1 and 2 the competition was organized in collaboration firstly with UNIBO and secondly with ICC, both collaborative formats rich in resources. This was not the case with cycle 3 where ISEKI-Food Association was supported to a much lesser extent by the advisory board. On the other hand, this allowed the planning of online trainings focusing more on the practice of the core competences. It is the aim to continue with this structure in cycle 4 but incorporating external input into the informative and exploratory sessions to a larger extent.

In the FoodFactory4-us international student competition, student action learning revolves around improving practical ability in identifying and solving real problems in sustainable food production / processing related to the valorization of food biodiversity (the topic of cycle 3). Throughout the competition (duration approx. 4 months), students participate in the following online trainings:

1. Introduction
2. Student Presentation
3. "Virtual Visit"
4. Project Review
5. Student Suggestion
6. Soft Skills

All online trainings are interactive, fostering the development of the core competences and peer learning. In for example the "student suggestion" training, students in breakout groups commonly agree on one question to be posed to the expert, choose a rapporteur, and have the possibility to engage with the expert stakeholder. Furthermore, in the "peer review" meetings the facilitators meet with team members to discuss their project report, pose questions and receive feedback. Similarly, in the "student presentations" one student from each time shares a practical experience and others observe, reflect and write in an online storyboard one aspect they liked about the shared experience.

3.4.2.1.3 Reflection

After each online training, teachers gather to firstly reflect individually on the training by filling in the "Teacher Reflection template" as provided by NMBU in the document "Further research development", followed by a short session where each teacher shares her/his reflections. This was a productive way of not only reflecting in writing and orally on the methodology and students' reactions but also looking into the future and proposing changes.

3.4.2.2 *Research results since the previous reporting*

3.4.2.2.1 Students', teachers' and other stakeholders' experiences and learning

To answer the questions how students experience the learning process with respect to the learning goals, we have analysed the answers to 3 of the 4 initial questions, where students mentioned that 1) General questions related to sustainability; 2) Topical questions related to the competition topic (valorising food biodiversity); 3) project-related questions; and 4) personal questions they would like the competition help them find answers to. Within the category "General questions related to sustainability", the questions were very broad ranging from sustainable farming practices to food waste. Within "topical questions related to the competition theme", questions were also broad ranging from own contributions towards the aim of valorizing food biodiversity, to learning more about the topic, and to more critical questions about the constraints of valorisation. Finally, "personal questions" concerned student abilities in communicating with other students from other countries, but also curiosity about others' contributions. After the competition, students were asked what are the questions they are now asking themselves. Here topical questions related to the competition theme and questions related to their projects were raised equally often, followed by team-work questions, personal questions and lastly general questions related to sustainability. Within the category "topical questions", how to valorize biodiversity, and what is biodiversity were ones that students found an answer to. Within the category "project-related questions", students mentioned that they found out how to identify problems and find multiple solutions. Within the category "team-work", which was not identified by students at the beginning of the competition, students mentioned that they found answers to dealing with cultural barriers, and better ways of working in teams.

3.4.2.2.2 Outcome of the case development process, including effects of making the essential shifts

During the competition, students participate in 6 online trainings. All are interactive, aiming to implement the essential shifts.

3.4.2.2.2.1 From lecture hall to a diversity of learning arenas

Online trainings have moved from "talking head" webinars to a diversity of online arenas. Students are first informed of the objectives of each online training. In sessions practicing the core competence of observation (e.g., the "student presentation" training where students shared a practical experience and the "student suggestion" training where an expert shared the findings of a publication), 4-5 students from different teams are placed in breakout groups and practice participation, dialogue, facilitation and reflection. In "student suggestion", student-led reflection was practiced when students in the break-out groups agreed on roles (1 facilitator, 1 presenter, 1 timekeeper) and on 1 question to the external presenter.) Furthermore, in the "soft skills" training, students practiced student-led reflection after a guided a visioning to «travel» to April 2022 where they gave an elevator pitch of their project and then wrote a reflection on the experience. The reflection learning arena began early in the

competition when students prepared a reflection document and were regularly encouraged to keep a reflection log.

This shift towards practicing the core competences through interaction among teams is appreciated by most of the students. We can see in the data that students express the importance of skills related to communication and teamwork and that especially at the end students emphasise interpersonal skills before problem-solving skills.

3.4.2.2.2.2 From lecturing to co- and peer learning

An outcome of reflection workshop cycle 2 was to focus more on interaction among teams. As one facilitator said *"more interactive communication e.g. discussions between teams"* (Facilitator 21212431). We addressed this by incorporating interactive sessions in the online trainings where students are in breakout groups with students from other teams. In the "student suggestion" training, breakout groups agree on one question to be posed to the expert, Similarly, peer commenting is systematically used at "student presentations" where students share a practical experience and fellow students observe, reflect and write anonymously in an online storyboard one aspect they liked about the shared experience. And finally, a last form of peer-learning is characterised by the role of faculty members which each time is asked to appoint. Indicators of peer and co-learning's effectiveness come from students' answers to the 5 final questions where they list the skills that contributed mostly to the learning community. Especially, interpersonal skills such as interaction within and across teams, openness to other perspectives, and eagerness to learn, were mentioned and which we consider as indicators of peer-learning. While we, as facilitators, could not observe in all breakout groups students' motivation and commitment to the shared responsibility of peer-learning, we did "jump" into the rooms to see if instructions were understood and could see that students overall were actively engaged in the peer and co-learning processes.

3.4.2.2.2.3 From syllabus to supporting literature/a diversity of learning sources

The shift from syllabus to a diversity of learning sources is a shift from theory as the main source of knowledge to an approach with theory, experience, reflection etc. equally valued. This shift necessitates a focus on gaining the competences to learn from a diversity of learning sources, such as the ability to link real-life experiences to relevant theory and to observe and reflect. The FoodFactory4Us competition is an extracurricular activity and we have never had a true syllabus. Instead we identified relevant webinars and presented these to the students. Now, we ask students what they want to learn about and we listen to their previous experiences. In developing their project reports, students use scientific literature as support for their solutions, working independently in their groups.

3.4.2.2.2.4 From textbook to a diversity of teaching aids

As we do not use, nor have we ever done so, teaching aids or ask students to consult certain learning materials, we have decided to leave this shift out of the reflection workshops where facilitators are asked to rate the moves in each of the six shifts, but to focus only on five shifts.

3.4.2.2.2.5 From written exam to a diversity of assessment methods

At application, written project proposals are evaluated for innovation, application to industry and impact (social, environmental and economic). At the end of the competition, teams are evaluated for 9 criteria: the final project reports on 1) Quality of the strategy and development

(against problem description); 2) Overall clarity; 3) Match to the competition aim; 4) Innovation and Application to Industry; and 5) Impact (social, economic &/or environmental). The teams' presentation slides are evaluated on the basis of 6) overall quality and clarity. At the final conference, the teams' 7) ability to convey message to audience and their 8) response to questions by all team members is evaluated. And finally, 9) student attendance at online trainings and completion of assignments is part of the final evaluation for the winning team. It has recently been suggested to ask student teams to evaluate or assess other teams' performance during online trainings or their written assignments while it was also suggested to provide team's with written feedback to the evaluated criteria. [1]

3.4.2.2.2.6 From lecturer to learning facilitator

In cycle 3, all traditional lectures have been replaced by short introductory and exploratory presentations given by students, external facilitators and internal facilitators, triggering student-active processes. In breakout groups, through student-led reflection, in student workshops reviewing project progress and by following student suggestions, the role of the facilitator in FoodFactory4Us has changed. Students now assign roles and select facilitators, timekeepers and presenters in their groups. At the student suggestion training, we practiced student-led reflection and afterwards we asked students to fill in the student reflection document and return this in writing. Focussing more on training student facilitation skills and thereby fostering interaction among students independently of their teams, is definitely a methodology we want to continue with. It is also a methodology we can use in combination with the better inclusion of external stakeholders as this type of methodology provides for a learning frame that fits a variety of learning inputs. Also on the part of facilitators, we can see that facilitators are getting more experienced with facilitation, not only during the implementation phase of the online trainings but also in the planning and reflection phase where planning and reflection workshops are held.

3.4.2.2.2.7 Supporting and hindering forces for implementing the Nextfood model

At the reflection workshop in cycle 2[2], facilitators mentioned interaction with the students and their willingness and open-mindedness towards playing an active part in the competition as a supporting, factor. Furthermore, the involvement and active role played by external stakeholders such as professionals from industry providing practical examples of problems is mentioned as a supporting factor. And finally, financial means available to support the transition towards the Next Food model through e.g., the use of break-out rooms or online tools. Among the hindering forces, mentioned in the cycle 2 reflection workshop was the workload placed on the advisory board. From the reflection workshop in cycle 3, educational and financial support from NextFood, technical support, engagement and experience of facilitators, and the size and international dimension characterizing the competition were mentioned as supporting forces for implementing the competition in line with the NextFood approach.

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1 Reflection workshop cycle 2

2 Reflection workshop Cycle 2 held 26 May 2020

3.4.3 Data on the development of the case since the last reporting

3.4.3.1 *Students' responses, learning and competence development*

3.4.3.1.1 Methods of data collection and analysis

Data from students, teachers and stakeholders were collected throughout the case (including the cycle 2 reflection workshop, implementation, through to cycle 3 reflection workshop) and were analysed qualitatively in NVIVO and quantitatively in Excel.

3.4.3.1.1.1 First week (day) & last week (day) of the course

3.4.3.1.1.1.1 Student's understanding, contributions and expectations

4 initial questions: All data were coded inductively and visualized in a hierarchy map.

Q2.1: What are the knowledge and skills we need to support sustainable development in agrifood and forestry systems?

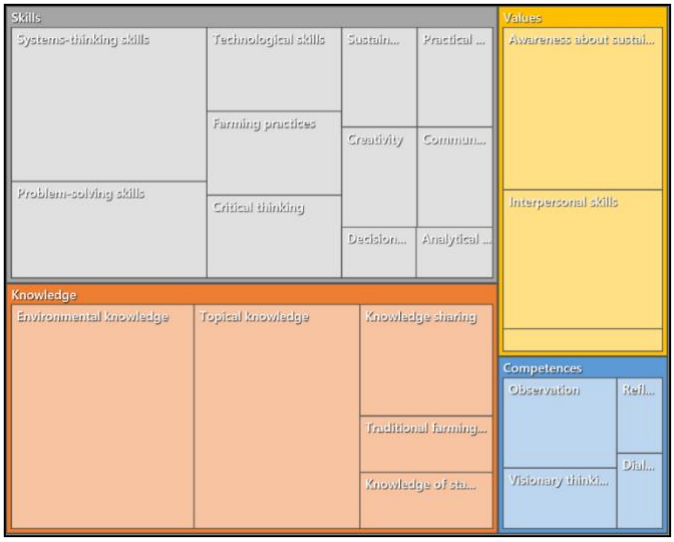


Figure 1: Q1 in 4 initial questions

(figure 1). Data were coded in knowledge, skills and values and an additional 1st order code "Competences" was added. Skills mentioned most often were systems-thinking skills and problem-solving skills followed by technical skills, practical skills in farming, and critical thinking, creativity, communication. Within knowledge, knowledge about the environment, topical knowledge (about the topic of the competition, namely biodiversity), knowledge-sharing, knowledge of stakeholders and actors in the food chain to understand their needs, and knowledge about traditional farming practices. Values were added as a third 1st order code and here awareness about sustainability was mentioned most often, followed by interpersonal skills (such as "open-mindedness", "human awareness") and protection of cultures and practices.

Q2.2: What experiences and competences do I bring to the competition to make it a success (for myself and/or for my team)?

(figure 2). Data were coded into the 1st order of skills, knowledge, experience, competence and values. Skills were mentioned most often and here interpersonal skills such as self-awareness, self-management, curiosity, creativity, enthusiasm); followed by communication and team-working skills. Practical experiences were mentioned and here experiences especially at farms and within the food industry. Knowledge was mentioned in relation to food technology and farming practices. The competences of observation, visionary thinking, reflection and participation were mentioned as competences students bring to the competition.

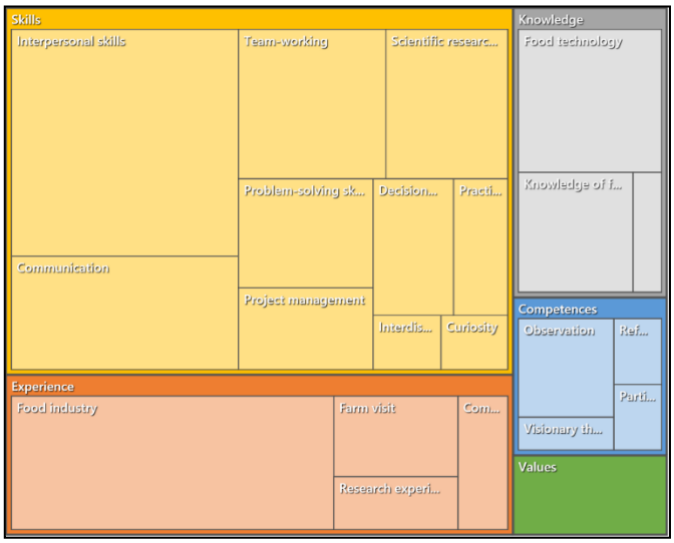


Figure 2: Q2 in 4 initial questions

Q2.3: What are the questions I would like this competition to help me find an answer to?

(figure 3). The following 1st order codes were found: 1) General questions related to sustainability; 2) Topical questions related to the competition topic (valorizing food biodiversity); 3) project-related questions; and 4) personal questions. Within the category General questions related to sustainability, the questions were broad ranging from behavioural change in sustainable agriculture to food waste. Within the category topical questions related to the competition theme, questions were again broad ranging from own contributions towards the aim of valorizing food biodiversity, to learn more about the topic, and to more critical questions about the constraints of valorisation. Also questions related to the projects themselves were raised to the data collection process, to the assessment. And personal questions concern mainly students' own abilities in communicating with other students from other countries and curiosity about others' contributions.

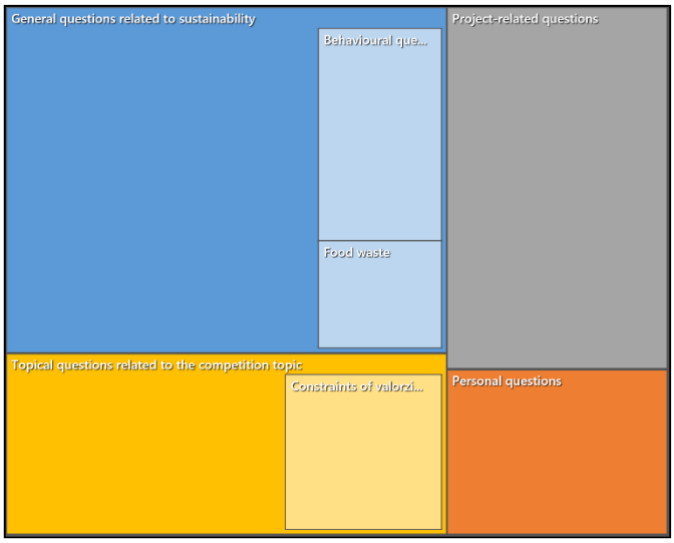
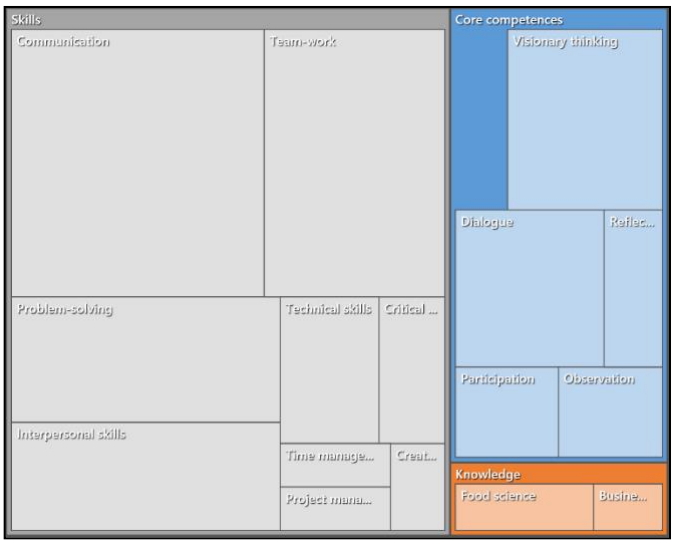


Figure 3: Q3 in 4 initial questions

Q2.4: What are the competences I´d like to train and improve significantly by participating in this competition?

(figure 4). It is very clear that students, at the beginning of the competition, would like to train and improve their communication and teamwork skills, followed by problem-solving skills and interpersonal skills. Also the 5 core competences were explicitly mentioned as competences students would like to improve and train.



Figur 4: Q4 in 4 initial questions

5 final questions:

Q3.1: What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agrifood and forestry systems?

(figure 5). Here it is clear that values connected with the environment are important. As examples "*Social and environmental thinking, futuristic thinking*" and as one student put it: "*We need to know that farms with knowledge and capacities are the key for starting a sustainable chain, so it is necessary to involve them in the project for ensure the success and sustainability of it."* Within the skills code,

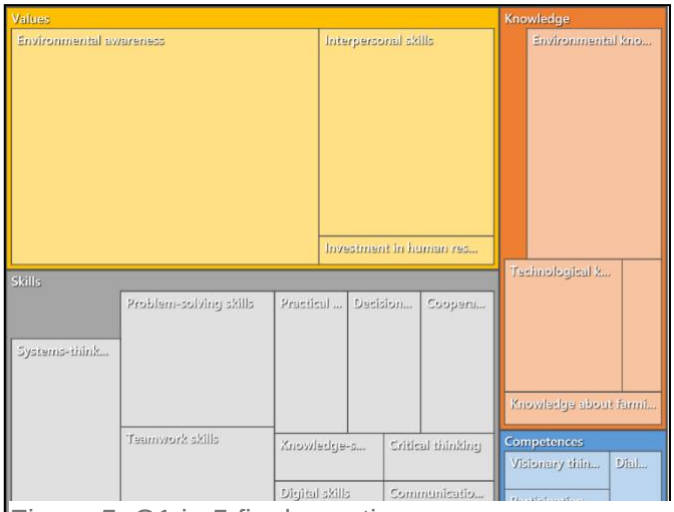


Figure 5: Q1 in 5 final questions

systems-thinking skills and problem-solving skills were mentioned as important, followed by teamwork skills, decision-making skills and cooperation skills.

Q3.2: Which of the experiences and competences that I brought to the competition contributed the most to the learning community?

(figure 6). The same 1st order codes as for the initial questions were used. Skills were mentioned by students contributing mostly to the learning community, and especially interpersonal skills such as interaction within and across teams, openness to other perspectives, and eagerness to learn, followed by communication and presentation skills, problem-solving skills and teamwork.

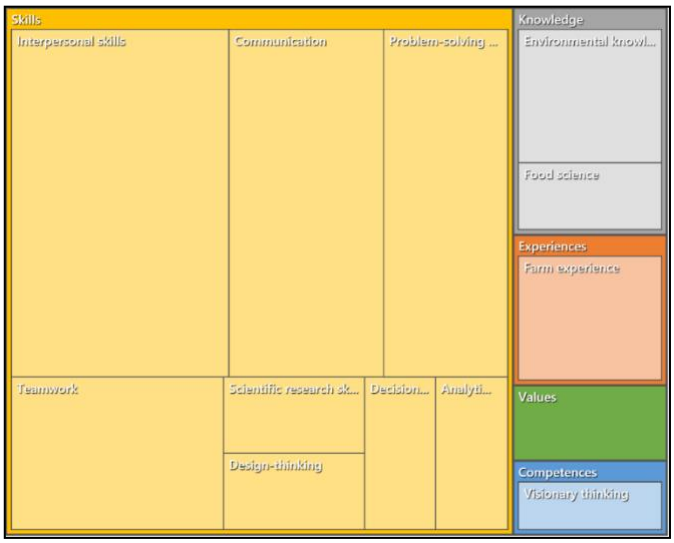


Figure 6: Q2 in 5 final questions

Q3.3: What questions did this competition help me find an answer to?

(figure 7). The same 1st order codes found to Q3 in the 4 initial questions were identified but a 5th code was added, namely teamwork. Here, equally often, topical questions related to the competition theme and questions related to the projects were raised, followed by team-work questions, personal questions and lastly general questions related to sustainability. Within the category topical questions, questions on how to valorize biodiversity, and what is biodiversity were mentioned as questions students found an answer to. Within the category project-related questions, students mentioned

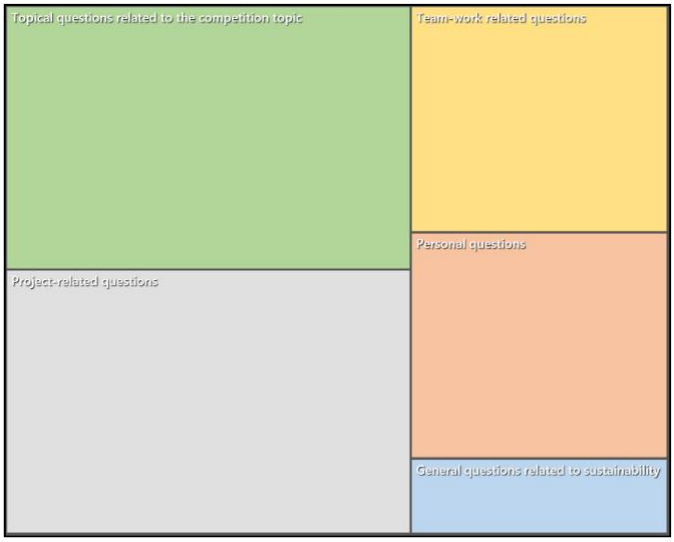


Figure7: Q3 in 5 final questions

especially that they found answers to questions on how to identify problems and find multiple solutions. Within the category teamwork, which was not identified in the questions posed by students at the beginning of the competition, students mentioned that they found answers to dealing with cultural barriers, effective and better ways of working in teams.

Q3.4: Which competences did I train/improve significantly by participating in this competition?

(figure 8). The same 1st order codes found to Q4 in the 4 initial questions were used but Knowledge was not mentioned as competences trained or improved at the end of the competition. Skills related to communication, teamwork, interpersonal skills, problem-solving skills and digital skills were mentioned as skills students trained or improved significantly by participating in the competition. Also students expressed that they trained the 5 core competences.

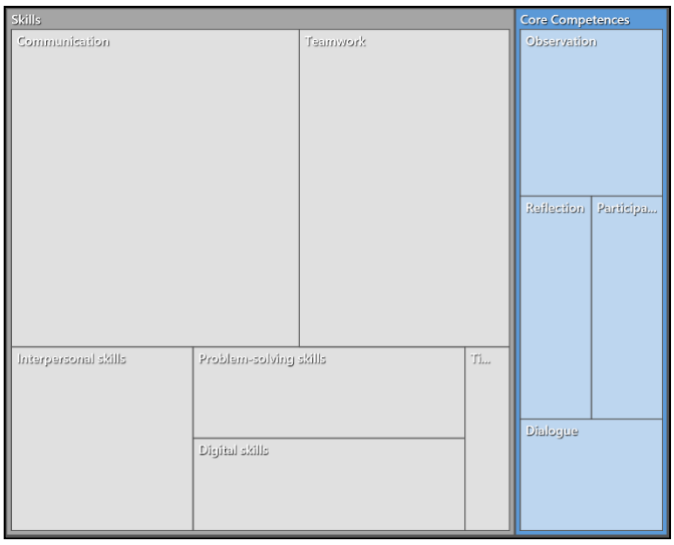


Figure 8: Q4 in 5 final questions

Q3.5: What are the questions I am now asking myself?

(figure 9). The following 1st order codes were found: 1) Project exploitation; 2) Topical questions; and 3) Skills. Questions related to the exploitation of students' projects and their further development and implementation were by far the category with the most questions. Also more general, open but also personal questions related to valorization of biodiversity were raised, such as "am I living a sustainable life, how can I help to increase biodiversity?" or "What next to

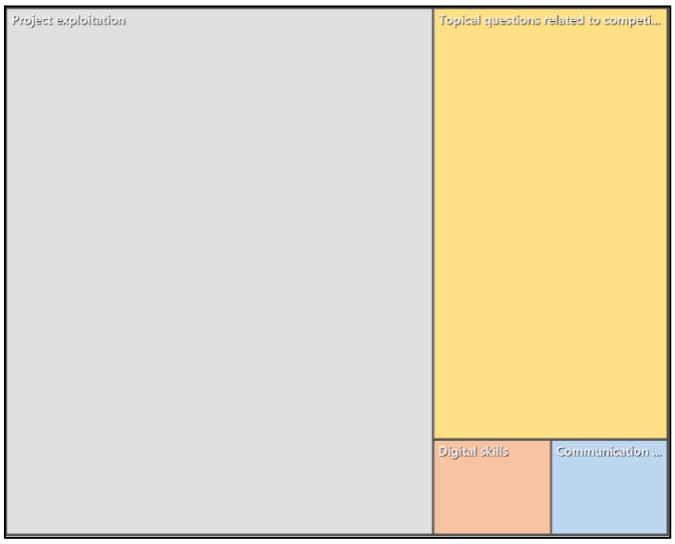


Figure 9: Q5 in 5 final questions

follow the steps of this competition and how can I contribute to make the planet more sustainable?".

3.4.3.1.1.2 Self-assessment of competences

3.4.3.1.1.3 Students' final reflection document (individual)

We do not collect a final reflection document, but we are considering how to do this in cycle 4.

3.4.3.1.2 Results

3.4.3.1.2.1 How do students experience such a learning process with respect to:

3.4.3.1.2.1.1 learning goals?

To answer how students experience the learning process with respect to the learning goals, we analysed the answers to 3 of the 4 initial questions, where students stated that 1) General questions related to sustainability; 2) Topical questions related to the competition topic (valorising food biodiversity); 3) project-related questions; and 4) personal questions were questions they would like the competition help them find answers to. Within the category General questions and Topical questions, the questions were very broad. After the competition, students were asked what are the questions they are now asking themselves. Here topical questions related to the competition theme and questions related to the projects were raised equally often, followed by team-work questions, personal questions and lastly general questions related to sustainability. Within the category topical questions, questions on how to valorize biodiversity, and what is biodiversity were mentioned as questions students found an answer to. Within the category project-related questions, students mentioned especially that they found answers to questions on how to identify problems and find multiple solutions. Within the category team-work, which was not identified in the questions posed by students at the beginning of the competition, students mentioned that they found answers to dealing with cultural barriers, effective and better ways of working in teams.

3.4.3.1.2.1.2 view on competences needed for sustainable development?

When looking at students' assessments of the skills and knowledge needed to support sustainable development in agrifood and forestry systems and comparing their responses given at the start and end of the competition, teamwork skills, cooperation skills with external stakeholders, and digital skills were noted at the end but not at the beginning of the competition. Additionally, students noted values and especially values and awareness connected with the environment more at the end of the competition. All in all, we can say that more generic skills – problem-solving and critical thinking skills - and knowledge were rated higher in the beginning of the competition, whereas in the end students were more aware of values and interpersonal skills such as teamwork and collaboration as competences needed to support sustainable development.

3.4.3.1.2.1.3 recognition of own competences and competence development?

When comparing students' assessment of the experiences and competences they bring to the competition at the start and the end of the competition, it is worth noting that practical experiences play a larger role in students' assessments at the beginning of the competition where more students emphasised that their practical experiences within farms or the food industry will contribute to the learning community. At the end, practical experiences are hardly mentioned as contributing to the learning community.

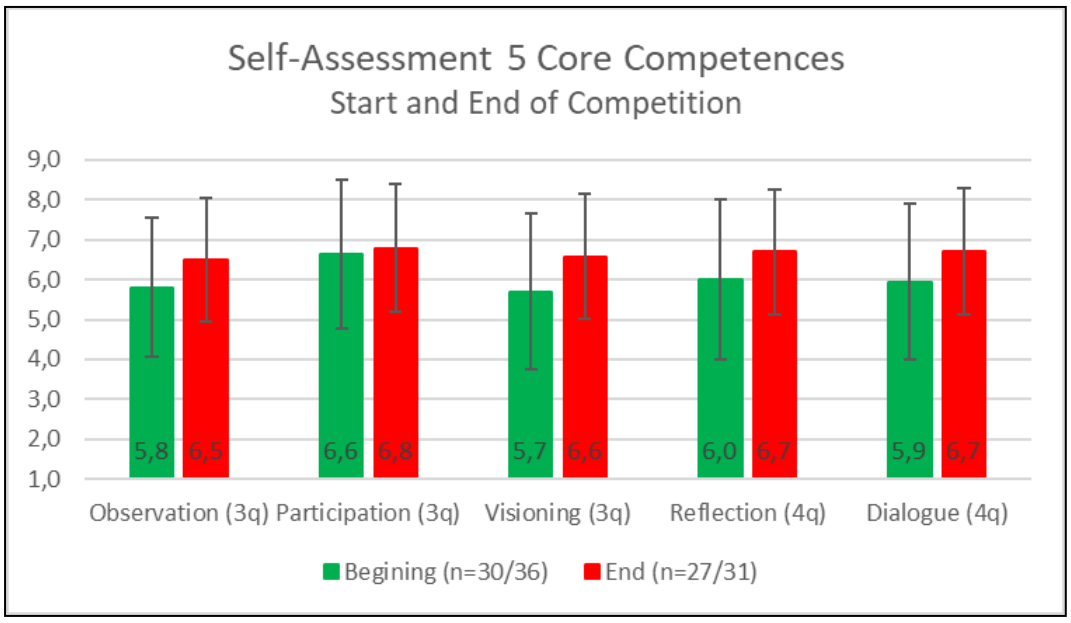
Also when comparing students' formulation of the questions they would like the competition to help them find answers to in the beginning of the competition (Q3 in the 4 initial questions) with the question on what questions the competition helped students to find an answer to, it is evident that questions are more topical and related to the competition theme and to their developed projects at the end of the competition. In the beginning of the competition, questions were more generally related to sustainability and to personal constraints, whereas in the end, students formulate questions in plural emphasizing the role of teamwork and collaboration.

3.4.3.1.2.1.4 transformation?

When comparing students' expression of the competences they would like to train or improve, at the start of the competition, with the competences they did train or improve, the picture is similar. Both at the beginning and at the end, students express the importance of skills related to communication and teamwork. In the beginning of the competition more weight is given to problem-solving skills and interpersonal skills, at the end students emphasise interpersonal skills before problem-solving skills and also digital skills which were not mentioned in the beginning. Also worth noting is that the training and improvement of the core competences are given more weight in the end but that students only mention 4 of the core competences, where observation, participation, reflection, and dialogue are mentioned as competences trained in the competition. In the beginning, all 5 core competences were mentioned as competences students would like to train and improve and here especially visionary thinking and dialogue were mentioned.

3.4.3.1.2.2 To what extent does the education enhance the students' competences of:

To compare development of the core competences, students self-assessed their competences on a Likert scale from 1 (novice) to 9 (expert). Figure 11 shows self-assessment of core competences of observation, participation, visioning, reflection and dialogue at the beginning (green) and end of the competition (red). At the beginning, students were most confident in their mastery of participation and reflection. At the end, students ranked themselves higher on all competences with the largest increase in dialogue.



Figur 10: Students' self-assessment of competences cycle 3 - comparison start and end

Student t-test	Average scores			Significance
Competences	**Start**	**End**	**Diff**	**P value**
Observation	5,81	6,51	+0.70	0.036*
Participation	6,62	6,79	+0.17	0.807
Visioning	5,70	6,58	+0.88	0.011*
Reflection	6,01	6,69	+0.69	0.020*
Dialogue	5,94	6,71	+0.77	0.003**

*p-value < .05, **p-value < .01. ***p-value < .001

Results of a paired, two-tailed, Student t-test

Four of the 5 competences were self-assessed as significantly higher at the end of the course than at the beginning, p<.05. Dialogue was the only competence to be significantly higher with confidence of p<.01. Only Participation was viewed as not significantly improving. Interestingly, Participation was ranked highest both at the beginning and at the end of the course, 6.6 and 6.8 out of 9, respectively. We don't know if this is significantly different from the rankings for other competences, an ANOVA or other multiple comparison test would be needed.

Students were not asked, as in other cases as part of their final course evaluation, to write individual reflection documents, but were asked to reflect on one single online

training, namely the Soft Skills online training, held 26 January 2021, by filling in the so-called “student reflection document”3 consisting of 6 questions:

1) What, exactly, did I see and hear? What exactly happened and what did I experience (reflecting both on the content and the process of the online training)?
2) What did I feel/think about it?
3) What did I learn?
4) What are the questions I am asking myself?
5) What will I do to find the answers?
6) What are the implications for my own development?

1. Students were already at the introductory online training in October 2020 introduced to reflection and encouraged to keep a reflection log. After the soft skills training, students written student reflection documents were anonymised and imported into NVIVO for coding into the 6 core competences with formulations triggering codes (1) where participants explicitly mention they practiced a competence or learned about a competence; (2) where participants describe their own actions or experiences related to the competence/transformative learning (without explicitly referring to it); (3) where participants describe others' actions or experiences related to the competence/transformative learning (without explicitly referring to it).[4]
2. Following, the core competences are presented with quotes from the students. We received 18 student reflection documents. None of the formulations triggered the codes dialogue and facilitation.

3.4.3.1.2.2.1 observation?

In 13 of the 18 reflection documents, formulations triggered the code observation which is the competence of carefully examining situations in the “world out there” with which you are confronted, before you make any judgements about the situation. This has the intention of an unbiased examination.5 Students described what they had seen and experienced without referring to what they had learned from the experience. As one student described it “*First, I saw the presentation about soft and hard skills, communication skills, the elevator pitch. I listened to 2 examples of an elevator pitch: one from a social student, one from the host. Then I experienced the guided visioning exercise: Relaxation and Imagination. Lastly, after discussions with my teammates, we*

3 Workshops hosted by the WP2 NMBU team Tuesday September 15 2020 and Thursday September 24 2020.

4 From Instructions for data analysis prepared by NMBU (2020)

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presented our project's elevator pitch to the host and the other team" (student 30132332).

3.4.3.1.2.2.2 reflection?

Reflection was the competence that was triggered most often in the student reflection documents. 54 formulations triggered the code reflection which is the process of exploring and examining ourselves, our perspectives, attributes, experiences and actions and interactions. It helps us gain insight and see how to move forward. It increases our ability to link our own experiences to theory and to personal development.[6] Some examples of formulations triggering the code reflection:

- "*I thought it was very interesting and rewarding. I really liked the guided visioning exercise, it motivated me to summarize ideas and point out key points more easily"* (Student 30132332)
- *"I feel that being in the right state of mind, the mind think widely, brings inspiration for innovation and seeing new frontiers for development. I feel and think that my mind is a powerful tool which if used judiciously is capable of bringing change. I believe soft skills are important and needed as much as other life skills to succeed and reach the apogee of my career as well as impacting and changing the world."* (Student 30232271)
- *"The relevance of soft skills to my growth, how much I think these skills can influence my future career growth and interpersonal relationships. How these skills can alter my goals in the right direction and path."* (Student 30232271)
- *"It was a wonderful experience to feel my own inner peace and also to imagine the future of us winning the competition. I could really experience the joy of winning the competition. Also, I could understand elevator pitch in detail."* (Student 30332912)
- *"I feel it is extremely important to know how to frame something like an elevator pitch, as it is useful not just in this project but also in other realms of life. It was an interactive session and I feel really good after attending it."* (Student 30622332)

3.4.3.1.2.2.3 visionary thinking?

18 formulations triggered the code visioning which is the process whereby we activate our insight and imagination, connect with our values and sense of purpose and create mental images of a desired future state.7 One student wrote to the question what are the questions I am asking myself: "*I am asking questions about the general state of dairy farmers in our country. Would they be able to survive the major disruption plant-based milk products will cause in the future? If not, how can they adapt and pivot their current busines model to stay in relevant in the marketplace. Will dairy farmers and*

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7 *D2.1 – Research protocol for NEXTFOOD case studies*

processing plants invest in plant-based milks, or will they see it as a threat?" (Student 30222278). And another student wrote to the question what I learned from this *"I learnt about how much inspiration and view/hold of the future I can get when I am in the right frame and state of mind, right environment and right posture. The power of calmness and tranquillity in imagining how the future can be."* (Student 30232271).

3.4.3.1.2.2.4 participation (engagement)?

Seven formulations triggered the code participation which is the competence of participating in work in the field, not as a distant observer, but rather with personal commitment and dedication in interaction with different stakeholders.[8] As one student put it: "*Motivated to be a part of a community with a mutual focus on sustainability and global food security and loss*." (Student 30832331) or another student "I *learnt that visualising is a wonderful tool to think outside of the box. By seeing a story unfold, I realised which parts of the project will significantly impact the agricultural sector in my country. It is also a great way to spot gaps in research or questions which could be asked requiring some further investigation. "* (Student 30222272).

3.4.3.1.2.2.5 dialogue?

None of the formulations triggered the code dialogue.

3.4.3.1.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

The data was not coded with "systems thinking" as part of the coding tree.

3.4.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.4.3.2.1 Methods of data collection and analysis

3.4.3.2.1.1 Teacher reflection document

Results teacher reflection documents cycle 2 (n=6):

Q1. Which skills did you improve by participating in the organization of this course? Overall, facilitators improved their online interactive facilitation skills and their knowledge of the competition topic, sustainable cereals, their digital skills, communication, and time management.

Q2. Did we successfully integrate the NextFOOD action learning model (that is participatory rather than passive learning) into the course? Several facilitators mentioned that «*the webinar system does not favour interaction. It is set up for passive learning"* (Facilitator-ID 13231332) and that students take a passive role, especially in the virtual visit training where they watch videos, however, it was emphasized that

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students engaged actively in the discussion following. Also the soft skills training was highlighted as a training where students actively engaged. Furthermore, the student presentation training was put forth as an example of a training where students presented freely. As one facilitator put it: *"I think so, yes. In the student presentation webinar one member from each team was asked to present shortly a practical experience they had on the cereal sector. Thus, the students were given clear instructions but still given the flexibility to explain and present freely and also to put words on the skills and knowledge they learned during the experience*." (Facilitator-ID 14231432). The project review meetings were highlighted as an example of students appreciation of hands-on and individual feedback on their project reports and presentations.

Q3. Did we integrate the action learning model in a way that students could easily participate in an action learning and participatory course? How could we improve our instructions? Do you have other suggestions for improving our communication with the student teams? Here facilitators highlighted that the instructions given to students on the website and in preparation for the online trainings contributed to a good communication flow between students and facilitators. As one facilitator put it: *«From my point of view it was easy for the student teams participating in active learning and a participatory course. Your instructions were clear and helped achieving the real good results of the competition."* (Facilitator-ID 21212431). At the same time, it was mentioned that *"Students could probably use more of an 'active' introduction to what active learning is. Our instructions now are given as a lecture! Exactly what we are saying Not to do.* " (Facilitator-ID 13231332). In general there was agreement that the contribution of experts could be improved.

Q4. In what way did the student projects indicate that students were active participants in the action learning course? While it is difficult to find indicators of action-learning in the responses to this question, a few of the responses are summarised here: two facilitators were of the opinion that the questions and discussions in the online trainings were indicators of active participation whereas anothr facilitator was of the opinion that the students could have been more active. One facilitator expressed his/her acknowledgment of the teamwork and degree of collaboration within the teams. And finally, one facilitator had difficulties in seeing a clear connection between students' project reports and the course.

Q5. If we were to organize another on-line competition in Sustainable Food Systems, what is one specific thing we should include? And how should we include this? Here various themes could be identified from facilitators' feedback related to assessment, interaction among teams and teamwork, supervision and topics for next competitions. As regards assessment, it was proposed to let students evaluate other teams. As regards teamwork and fostering interaction among teams, it was proposed to move further away from linear learning in the webinar format and towards trainings. As one facilitator put it: *«I think also what this competition showed is that the students share a common passion, in this case sustainability in the cereal chain, and*

it would be great to try and work more with this common passion" (Facilitator-ID 14231432). Furthermore, the role of external faculty advisors was brought up with the suggestion to involve them more in the planning, implementation and reflection. As one facilitator put it: *"It was not clear if and how much the supervisor contributed. Maybe the supervisors should sign "instructions for the supervisor". Maybe they could also be part of the facilitator team? And evaluate the other teams?"* (Facilitator-ID 22211431).

Q6. How was this competition different from other learning/teaching experiences you have had? The online learning arena was what 2 facilitators mentioned making FoodFactory-4-Us different from other learning/teaching experiences. And in this relation, one facilitator mentioned that cycle 2 had more teams and thus more students which made it *«exiting and challenging at the same time» (*Facilitator-ID 14231432). Also the fact that the competition is voluntary and an extracurricular activity was mentioned as a difference and a challenge to get students involved.

Q7. What was the best part of your participation in this competition? The answers to this question reflected facilitators' core role in the competition. Some facilitators are involved in the action-learning and action-research process, others in single online trainings and in the assessment of students' reports and in the Final Conference. The answers reflect this role division. While several facilitators mention the joy and appreciation of « reading and studying the project presentations and reports in the phase of preparation the final video conference" (Facilitator-ID 21212431), others highlighted the possibility of moderating a webinar and practicing the core competences with the students.

Q8. If you could change one thing to increase 'active learning' by students participating in the competition what would it be? To this question, several suggestions came up ranging from skills development, groupwork, the multi-stakeholder approach, practice-based examples and assessment. One facilitator emphasised to focus less on knowledge and more on skill development: «I think I would focus more on training and less on online learning/webinars. The students are at their final years of studies have gained already so much knowledge. Now what they should gain is skills. What the FF4-Us competition could give them is more skills training which they could gain by working together – as part of action-learning in online training – in our competition" (Facilitator-ID 14231432). In the same connection, it was suggested to focus more on group work. Furthermore, two facilitators suggested to work more on the multi-actor approach with more examples from industry in the online trainings and by *"Involving not only experts, but also business people (producers, sales, …) and other subjects (consumer science, social science,…) as facilitators"* (Facilitator-ID 22211431). And as regards assessment, one facilitator proposed by provide students written or oral feedback on their submitted project reports after the final conference.

Results teacher reflection documents cycle 3 (n=2):

Q1. Which skills did you improve by participating in the organization of this course? Here three codes were found: skills related to action-research; facilitation skills and collaboration skills with students and facilitators. For action-research, one facilitator mentioned that «Reflection on how to improve the course, and data-based reflection by looking at what students and facilitators in previous cycles had said about the course.» (Facilitator 13231332). Both facilitators improved their facilitation skills, both with students and also in the action-research process, e.g., facilitating the reflection workshop. And finally, collaboration among facilitators was improved by sharing responsibilities among them.

Q2. Did we successfully integrate the NextFOOD action learning model (that is participatory rather than passive learning) into the course? Both facilitators agreed that the move from linear towards participatory learning was taken a step further in cycle 3. As one facilitator put it: *«We have moved more and more to participatory sessions. We now have very few moments where students simply listen to us talk!"* (Facilitator 13231332) and *"One of the main take-away messages of the reflection workshop in cycle 2 was to foster interaction between teams which we did in almost all online trainings by placing students, independently of their teams, in breakout groups.»* (Facilitator 14231432).

Q3. Did we integrate the action learning model in a way that students could easily participate in an action learning and participatory course? How could we improve our instructions? Do you have other suggestions for improving our communication with the student teams? To this question, facilitators largely focussed on the training of the core competences. As Facilitator 13231332 put it *«Our instructions are very clear, we have improved a lot in that. We could do more by incorporating the competences of, particularly, reflection earlier in the course so that students get more practice at it»*. Also experiential learning and interactive learning were mentioned as indicators of having integrated action-learning. As regards the former, one facilitator wrote «*We integrated action learning but can do more. We can ask more about student past experiences and have student do an activity/have an experience during the course and then come back and learn based on that.»* (Facilitator 13231). As regards the latter, the other facilitator wrote: «*And we went further away from typical linear learning in webinars to more interactive learning in breakout groups with clear instructions to students beforehand. «* (Facilitator 14231432).

Q4. In what way did the student projects indicate that students were active participants in the action learning course? Team work and the composition of teams were mentioned as indicators that students were active participants. As one facilitator put it: *«Student projects showed that teams worked together. In the past we often had one student, the team leader, who did all or most of the work. Now students are clearly in it together as they give their final presentations as a team»* (Facilitator

13231332). Also, it was mentioned that in comparison to previous cycles, the project review meeting (meetings between individual teams and facilitators) were held earlier in cycle 3 focussing more on teams' written project report. As one facilitator wrote» *[students] had the opportunity to ask questions and we gave them feedback. We could see in the written reports that they had taken our feedback seriously and made adaptations accordingly.»* (Facilitator 14231432). And finally, communication and presentation skills of the students were highlighted as an indicator that students were active participants in the competition. One facilitator wrote *«Furthermore, we held the soft skills online training towards the end of the cycle, immediately before the final virtual conference, where students had the opportunity to practive the elevator pitch of their project, in a clear and concise way. It was my impression that their presentations at the final virtual conference were generally to the point, concise and clear. «* (Facilitator 14231432).

Q5. If we were to organize another on-line competition in Sustainable Food Systems, what is one specific thing we should include? And how should we include this? As regards the action-learning process, two points were raised: 1) «We could have students do more action learning in the sense that they are assigned or chose an activity and then incorporate that into their project. This could be something specifically related to industry, perhaps having an industrial partner or advisor on the team» (Facilitator 13231332) and 2) «I think also we should include student-led reflection in all online trainings. I think facilitation fosters the development of the other 5 core competences more easily» (Facilitator 14231432). As regards action-research, one facilitator proposed to ask students to write reflection documents reflecting on the whole cycle and not only single online trainings to better document the achievement of the core competences.

Q6. How was this competition different from other learning/teaching experiences you have had? While both facilitators agree that the role of the facilitator is different when practicing action-learning, one facilitator mentions the benefit of working together as a team of facilitators: «*Working with other facilitators. Most of my teaching experience has involved teaching alone. It is incredibly useful and enlightening to work with colleagues.»* (Facilitator 13231332) and the experience of having conducted 3 cycles**:** «*Each online training requires as facilitator a lot of preparation and so does the collection of data and of course analysis of the data. However, as we move further into action-learning and now approaching cycle 4, we are getting much more experienced facilitating action-learning and also in doing action-research.*" (Facilitator 14231432).

Q7. What was the best part of your participation in this competition? One facilitator mentioned interaction among teams and *«Seeing the students interact with new colleagues, that is not members of their team but members of other teams.»* (Facilitator 13231332 and the positive feedback from « *students during the online trainings and also in writing afterwards which makes it really positive*.» (Facilitator 14231432).

Q8. If you could change one thing to increase 'active learning' by students participating in the competition what would it be? Here one point was the option of organising more than 6 online trainings and a second was to incorporate more practical activities into the competition. As one facilitator put it: *«Have students do something during the competition, something in their own location, something related to the competition topic.»* (Facilitator 13231332).

3.4.3.2.1.2 Course reflection focus group/interviews

Reflection workshop cycle 2, 26 May 2020

Data from the reflection workshop held 26 May 2020 of cycle 2 was deductively coded in NVIVO. There were 8 participants in the reflection workshop, however, we received written reflection documents from only 5 participants. Thus the sample size of the qualitative data is 5 participants and of the quantitative data it is indicated in the graphs.

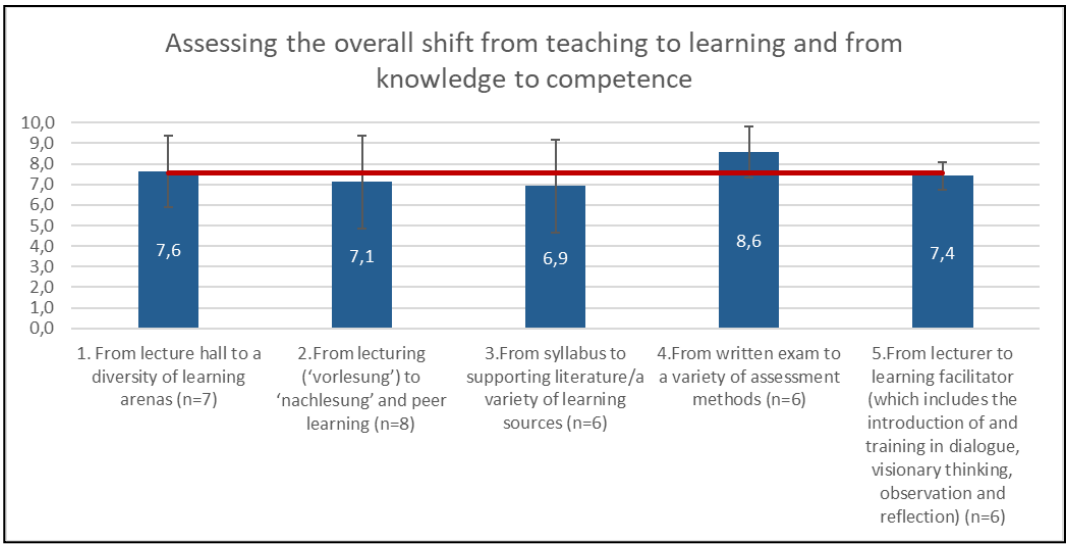

Figure 11: Facilitators' assessment of the shifts (cycle 2)

Figure 11 shows the average scores given by facilitators in the reflection workshop to the shifts on a continuum of 1-10. The overall average was 7.3. The shift from written exam to a variety of assessment methods received the highest score, 8.6, one full point above the next highest of lecture hall to a diversity of arenas.

Facilitators gave reasoning for the shifts they rated higher (**Q2 Reflection Workshop**). Here, the use of a variety of assessment methods including that students are evaluated not only on the grounds of their written reports but also on their oral presentation skills, and their participation in online trainings. Peer learning, diversity of learning arenas and learning facilitator were rated high because of teaching methods and tools as well as role of the facilitator, and for peer-learning, both among teams of students but also the inclusino of a faculty member connected to each team.

For the shifts rated lower, facilitators indicates how to improve them (**Q3 Reflection Workshop**). To move from syllabus to a variety of sources and from lecturing to peer learning, it was suggested to focus more on interaction among teams and to use learning methods that foster interaction and collaboration among students from different team,s for instance by more actively encouraging questions. As one facilitator said *"more interactive communication e.g. discussions between teams"* (Facilitator 21212431). One facilitator suggested student teams evaluate other teams' performance or assignments. Increased training of the core competences, especially dialogue and reflection, was also proposed.

Facilitators brainstormed 2 additional shifts (Q4 Reflection workshop). Several were related to communication and fostering interaction among students. One suggested: "Discussion platforms, "virtual coffee breaks" (lunch/team meetings) - meetings of students without teachers, not only for discussion on their work, but also to get to know each other, to exchange themselves, to meet -like what would happen during a conference in the breaks." (Facilitator 23212432). Also gamification, simulation exercises and practical activities were suggested.

Supporting forces (**Question 5 Reflection Workshop**): Facilitators noted at least 3 supporting forces for implementing the FoodFactory-4-Us competitions in line with the NextFOOD approach. Interaction with the students and their willingness and open-mindedness were motivational factors for facilitators. Involvement of external stakeholders from industry to provide practical examples of problems was mentioned as a supporting factor. And finally, financial means to support the use of online learning arenas for instance through the use of break-out rooms or interactive tools.

Hindering forces (**Question 5 Reflection workshop**): Facilitators noted at least 3 hindering forces. Here the workload placed on the advisory board was primary and efforts for communicating this were advised.

In **question 6**, facilitators ranked all supporting forces, with 1 for the most important. Here, the international and online character of the competition was stressed. As one facilitator wrote: "*Virtual and international community – makes our competition adaptable to changes, we are not bound by institutional, cultural barriers*" (Facilitator 14231432).

Q7: How should the supporting forces be built upon and how can the hindering forces be overcome? Among the supporting forces to build upon were financial support and the hindering forces to overcome were lack of social interaction among teams. Solutions included *"Financial support: engage industry, find grants (ERASMUS, CEEPUS, COST actions (Short term missions) or other networks to support exchange"*

(Facilitator 22211431) and "*meet at conferences, trips, holidays in between, make a summerschool on this topic (students may get funding, ..?)"* (Facilitator 22211431).

Q8: Note down three things you liked about this meeting, that you found useful, inspiring, interesting! Several facilitators mentioned the open-mindedness and honesty which contributed to a positive spirit of the workshop, together with the commitment and attention of all. Also, several pointed to the well-structured and planned workshop, keeping time limits and its solution-oriented character.

Q9: If I were to be responsible for the next workshop, what would I do differently? Here, the role of the advisory board was mentioned as a point to be included in further reflection workshops. One facilitator proposed to assign a rapporteur in the next reflection workshop because it is difficult to moderate and act as participant at the same time. And finally, as the reflection workshop was held online, several facilitators put forth their desire to have the next workshop physically to enjoy a cup of coffee together.

Reflection workshop cycle 3, 1 April 2021 (n=4)

Qualitative data from the reflection workshop held 1 April 2021 of cycle3 was coded in NVIVO deductively and quantitative data analysed in Excel. There were 4 participants in the reflection workshop.

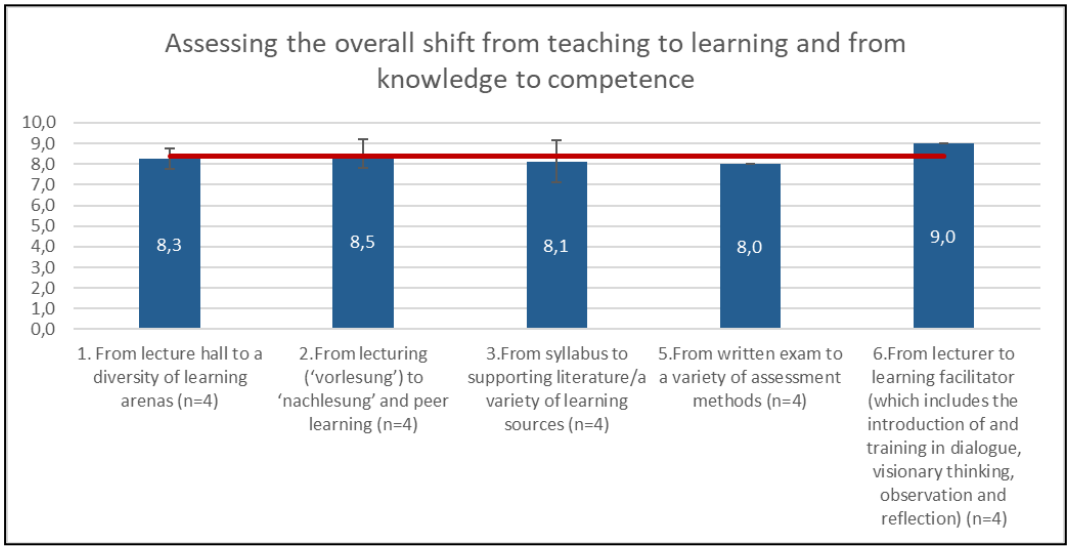

Figure 12: Facilitators' assessment of the shifts (cycle 3)

Figure 12 shows the average assessments given by facilitators in the reflection workshop to the shifts on a continuum of 1-10. While all shifts are above 8, the shift from lecturer to learning facilitator received the highest average score (9), 0.5 above the next highest shift of lecturing to peer learning.

Facilitators gaive reasons for the shifts rated higher (**Q2 Reflection Workshop**). Here, peer-learning was praised. As one facilitator put it: *"peer-learning was within teams in the last cycles but now it is between the teams. In plenary we had the impression they were happy to interact with other students from other teams. The peer groups changed in different sessions"*and *"we have moved to facilitating student interaction, expert participation using online resources (not inviting experts to lectures but to engage with students, organise participatory sessions)"* (Facilitator 13331332). Also the use of practical examples by bringing in industry and best-practice was mentioned as one of the reasons for giving high rates to the move from lecturer to facilitator. The move from lecture hall to a diversity of areans was supported by «*we moved from talking head webinars, using not only student presentations but also student group work"* (Facilitator 13331332) and the *"high variety of online sessions – every session was different"* (Facilitaor 32331431).

For the shifts rated lower, facilitators indicatee how toimprove them (**Q3 Reflection Workshop**), and here suggestions were made to shift towards supporting literature. One facilitator proposed «*We can ask students to provide/present an article. Or lead a literature session"* (Facilitator 13331332) and as another one wrote "*Ask to students to provide a short biblography at the end of their report*" (Facilitator 31320331). Furthermore, it was proposed to build closer relationships with civil society rather than focussing on theoretical literature. To widen assessment and combine it with peer-learning, one facilitator wrote: «*Include student assessment of peer's work. Perhaps have each team 'grade' the 1st student presentation*" (Facilitator 13331332).

Facilitators then brainstormed 2 additional shifts (**Q4 Reflection workshop**). Here they proposed to widen the topisc thinking in a larger and different context. As one facilitator put it:" *Sometimes a problematic is local....How to deal with a wider context...How to scale up...shift from one communication style to styles adapted to the audience. Shift from thinking about and improving 1 course to improving a curriculum or association. Shift from academia as an independent instituion to academia as a part of larger society"* (Facilitator 13331332). Another suggestion was to bring the competition closer to industry and real problems faced by industry. As one facilitator put it: "*Presentation of more applied projects and sometimes more targeted to the market. Close relationship with industry problematics*." (Facilitator 31320331).

Supporting forces (**Question 5 Reflection Workshop**): Facilitators noted at least 3 supporting forces for implementing the FoodFactory-4-Us competitions in line with the NextFOOD approach. Here educational and financial support from NextFood, technical support, engagement and experience of facilitators, and the size and international dimension characterizing the competition were mentioned as supporting forces.

In **question 6**, facilitators ranked all supporting forces, with rank 1 for the most important. Here especially the involvement of industry was mentioned. One facilitator suggested: "*A plus would consist in having an industrial partner in the team"* (Facilitator 31320331).

Q7: How should the supporting forces be built upon and how can the hindering forces be overcome?

Here three suggestions were made: financial means; widening the scope of advisory board members to include members of ISEKI-Food Association and student members; and include industry. To the latter point, one facilitator wrote: *"What can we do to attract industry? It is a good suggestion to have the teams select a industrial representative as a peer/advisor to include more the industrial perspective and embrace the overall aim of the competition. Giving them a role."* (Facilitator 14331432).

Q8: Note down three things you liked about this meeting, that you found useful, inspiring, interesting! Several facilitators mentioned the active and engaged participation fostering interaction and the use of the online tool for sharing ideas and solutions. Furthermore, facilitators mentioned that the meeting was solution-oriented and that the timekeeping was well done.

Q9: If I were to be responsible for the next workshop, what would I do differently? Here, it was proposed to include a break and to plan more than 2 hours for the reflection workshop.

3.4.3.2.2 Results

3.4.3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

Supporting forces could be grouped into 3 categories: i) students and the competition, ii) facilitators and external stakeholders, and iii) financial.

In the first category, interaction with students and their willingness to be active, the international and online character of the competition, the number of student teams involved were stressed in the reflection workshops. The fostering of interaction among students from different teams in breakout groups (another type of learning arena) was a deliberate move towards peer-learning as a means for students (peers) to support each other in the learning process acquiring the core competences and sharing knowledge.

In the second category, the active role of external stakeholders including their close contact with facilitators, the composition of the advisory board, and engagement and

experience of facilitators were points mentioned. This is in line with the shift from lecturer to learning facilitator where we in cycle replaced traditional linear online learning formats (webinars) with short introductory teasers given by not only teachers and facilitators but also by students themselves, triggering active participation in structured learning frames, namely through the use of break-out groups.

In the third category, educational means to improve facilitator understanding of action-learning, financial means to support use of diverse learning arenas, and technical support for online platforms are key supporting forces.

Hindering forces focused on the workload of the (volunteer) advisory board, the end of financial means, and lack of social interaction among teams.

3.4.3.2.2.2 What such a change requires from teachers, students and institutions

From teachers, more and continued training in being a facilitator is needed. Teacher interaction with the world out there should also be encouraged so that external stakeholders could more easily be brought into the learning arena. Teaching methods and tools of the facilitator should continuoulsly evolve. Especially the need to focus more on interaction and to use learning methods that foster interaction and collaboration among students.

From students, an understanding that they are in charge of their learning. This could come from involvement in (and assessment based on) discussion platforms, meetings without teachers, simulation and practical activities. Use of a variety of assessment methods such that students are evaluated not only on the grounds of written reports but also on presentation skills, and participation links this change to the NextFOOD shifts. Students can also be involved in the learning of their peers. Here, assessment of students by other students has been suggested. Finally, students can share their learning sources including finding sources in their communities.

From institutions, the willingness to widen the context of thinking. The univeristy is a part of the larger society and univesity initiative can bring better society involvement. Problems may be local and require vision to reach a wider audience. Scaling up may be the problem to address not only in food supply chains but also in action learning. The institution must be willing to see the data showing success of the NextFOOD approach and then apply the approach elsewhere. it was proposed to build closer relationships with civil society rather than focussing on theoretical literature.

3.4.3.2.2.3 Teachers´ perception of the greatest challenges to achieving such a change

From the data of teacher's reflection documents, challenges include working with larger groups of students and finding motivation for extracurricular activities – both for students and external stakeholders.

3.4.4 Concluding remarks on the case development since the previous reporting

3.4.4.1 *The most useful and inspiring experiences (supporting forces)*

Interaction with students and external stakeholders are powerful supporting factors. Additionally, the engagement and experience of facilitators, and the size and international dimension of the competition continue to motivate.

3.4.4.2 *Main obstacles/challenges encountered (hindering forces)*

Working with new members of the advisory board continues to be a challenge as we try to incorporate external stakeholder who are experts in the topic in each cycle. In the cycle 3 reflection workshop, one facilitator suggested having teams find their own industry partner (external stakeholder) and we are excited to try this.

3.4.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

A main lesson is to place more emphasis on the shifts from lecturing to peer-learning and from lecturer to facilitator. In this regard, we will continue our exploration of interactive online tools and platforms as well as updating our competition assessment to include not only the result but how the team gets there. In this way we will valorize peer learning and reflection in addition to innovative projects.

We will address the challenge of involving external stakeholders by looking for input from the students and their advisors.

With these main «take-home» messages, we started planning the next cycle of FoodFactory-4-Us focussing on moving further up the ladder of learning arenas, placing greater emphasis on peer-learning, and involving students in the choice and input from external stakeholders.

3.4.4.4 *Plans for how to move forward into the next cycle*

Challenges in cycle 3 were the difficulty of engaging industry in online trainings and stakeholders as part of the advisory board. We had less examples of "the world out there" as we did not organize the competition in collaboration with external experts rich in resources as in cycles 1 and 2 (with UNIBO and the International Cereals Association). On the other hand, this gave us freedom and allowed the online learning arenas go focus more on practicing core competences. It is our aim to continue with

this structure in cycle 4 but incorporating external stakeholders into the informative and exploratory sessions to a larger extent.

3.5 American Farm School (AFS)/International Hellenic University (IHU)

3.5.1 ID card

1.

Title: Farm Animal Reproduction

Level of the course: Undergraduate, 8th semester

Course language: Greek

Host institution: International Hellenic University

Course leader: Dr Aristotelis Lymberopoulos

Timeline of the activities covered in this report:

October 2020 – January 2021

Learner categories and number per category

Learner categories: Undergraduates, 2 groups

Learners: 20 total, 14 female, 6 male

Age: 18-22

2.

Title: Nutrition and Nutritional Value of Foods

Level of the course: Undergraduate

Course language: Greek

Host institution: International Hellenic University

Course leader: Dr Maria Papageorgiou

Timeline of the activities covered in this report:

October 2020 – January 2021

Learner categories and number per category

Learners: 80 total, 54 female, 26 male

Age: 18-22

The activities mentioned below are part of our case report but are not reported on in detail here. They may be mentioned in the our planning for next cycle

activities or in some of our reflections. Please visit case 5 in the NEXTFOOD Platform for more details.

1. **Title of activity:** Installation of Precision Technology Infrastructures

Host Institution: American Farm School, SPMO department / IHU (TEI)

Activity leader: Dr. Philippos Papadopoulos

a) Installation of **digital Insect traps** in a host of affiliated farms within the North of Macedonia region.

b) Installation of **weather stations** within the IHU farm and other locations in the region of North Macedonia, recording atmosphere and soil conditions.

2. **Title of Activity**:

Collaboration with WP1: Testing of the Inventory of Skills with students in the AFS

3. **Title of activity:**

Collaboration with WP4: Workshop with policy makers and members of the Agricultural Network of Northern Greece

4. **Title of Activity:**

Collaboration with WP5: Testing of the Framework of Impact in our case

5. **Title of activity:**

Collaboration between NEXTFOOD and INoFA: Facilitation of 4 Focus groups with members of Business clusters

6. **Title of Activity:**

Seminar on the implementation of precision technologies in IHU

3.5.2 Extended summary of Development of case since the previous reporting

3.5.2.1 *Actions Taken since the previous report*

3.5.2.1.1 Planning

Our last report closed with the end of the spring semester of IHU academic year and the courses of Plant Protection and Animal Reproduction. During the following months we held meetings between the AFS team and with the professors to reflect on our previous year experiences and plan for the challenged we had faced during the previous cycle. One of our main aims for the next cycle was to encourage and promote more independent facilitation of action-learning on the part of the professors involved and to further enhance the multi-actor approach with more extra-organizational activities and stakeholder involvement. We also spent time networking and finding external stakeholders that were willing to participate in the project and the next cycle activities. Unfortunately, there was considerable ambiguity as to the format that the present cycle courses/activities would have due to the emerging pandemic. Thus, our planning had to include an adaptation of the curricula to accommodate for on-line action-learning and also the training of our professors for this type of teaching while maintaining the action-learning principles and the multi-stakeholder approach. The outcome of our planning was that by the beginning of our two courses everyone was fully prepared for both the live-teaching and the on-line scenarios and there were multiple events planned with extra-organizational actors to participate in the sessions.

3.5.2.1.2 Implementation

The implementation had to be on-line for the entirety of the academic year, due to government restrictions. The sessions for both courses were organized in a way that included lecturing, student participation, peer-to-peer learning, a diversity of learning sources and reflection. Due to the nature of on-line learning, the above elements were more restricted than the past learning cycle and were done in a more “artificial” and formally organized manner. In order to enhance the multi-actor approach, there were two virtual visits organized for each module. Unfortunately, time restrictions were magnified in the on-line environment and we could not include all the visits we would like.

We anticipated that teachers might have limited interaction with the students and that students would react to reflection activities as something unnecessary, time consuming and boring. We tried to overcome these difficulties by being actively present throughout the activities and by offering our support and guidance whenever needed. In the beginning of the module, we had presentations on major reflection theories, on how to do effective reflection. Based on our past cycle experiences we also expected a considerable knowledge and skill gap in research methodology, We covered this gap by dedicating two sessions on how to perform literature searches, evaluate resources, write essays and do successful oral presentations.

The professors we were working with had already gone through the experience of action-based module implementation and responded well to our suggestion and implentation strategies.

On the whole the implementation of the modules went smoothly and without major practical challenges, except for the overall challenging factors that were out of our cotrol.

3.5.2.1.3 Reflection

Teacher reflections were done informally after almost each on-line session. Together with the professors we reflected on how they thought the session went, if we needed to do any adjustments and how we would proceed in the next session. The professors were asked to do one formal written reflection at the end of the module.

3.5.2.2 *Research results since the previous reporting*

3.5.2.2.1 Students', teachers' and other stakeholders's experiences and learning

The students that took part in the modules mostly reported positively on their experiences. Of course, their positive experience was relative to other "traditional" learning modules since they very often commented on how the on-line environment was very restricting and not suited for practical studies such as animal reproduction. However, the most prevalent features of the module that were reported on were the multi-actor approach with the virtual visits, the support with their research projects, the team-projects and student presentations and the photo-novella project.

The stakeholders' experiences were also regarded positive. They participated enthusiastically and mentioned that such collaborations should take place more often. They were very willing to discuss with students, answer questions and share important aspects of their work and vision. However, learning was linear with them taking the role of instructor in most cases.

Based on our observations and group reflections, facilitators experiences this learning cycle with mixed feelings but did show a very good level of adaptability and competence with regards to the pandemic circumstances. As with students, professors viewed on-line teaching as very limiting in all respects. However, they did show greater levels of independence regarding action-learning and they reported high levels of satisfaction about attempting the NEXTFOOD shifts both regarding their job as educators and with regards to their students' experience.

3.5.2.2.2 Outcome of the case development process, including effects of making the essential shifts

Despite the pandemic conditions, the Greek case developed its activities for the best possible outcomes. These conditions had a twofold effect on our case activities as a whole. First, new possibilities were offered for connections that would be very difficult before, due to time and distance restrictions. Since everyone became familiarized with on-line meetings we were able to conduct numerous workshops with different stakeholders from diverse backgrounds, which we would not have done otherwise. This had a positive effect both for our students and for our project processes as a whole. On the same note, all our actors and stakeholders had the opportunity to develop new competences and explore on-line possibilities, many of which will remain in their toolbox long after the pandemic has ended.

On the other side, students were deprived of very important opportunities for hands-on and socially and sensory rich experiences. This inevitably affected the shifts of the NextFOOD Project adversely because the medium through which we attempted them could never substitute live contact.

Having said that, the reported outcomes of actor experiences show evidence of a very positive effect in all activities but we must take into account that mostly students reported in numerous occasions that on-line learning is very limiting. With regard to professional actors that we worked with, we observed that, because communication became more easy and effortless in digital environments the NEXTFood Project shifts became more widely disseminated and connections and collaborations became easier.

3.5.2.2.3 Supporting and Hindering forces for implementing the NEXTFood model.

The hindering forces for change towards the NEXTFOOD approach that we continuously come across in our work is the lack of competence related culture within the universities, a general lack of a concrete conceptual framework for sustainability and the lack of experience with action-learning. These are issues that we have tackled directly with the professors and students that we have been working with.

In addition, we came across a few cases where students were not willing to work with us, saw our work as unnecessary and irrelevant and thought that traditional teaching was more suitable. These instances have shown us that even though it is widely accepted that action-learning has numerous academic benefits, the shifts to a sustainable future need to be reached in a flexible manner and that we need to accept that the goal of sustainable development may be more important than the means by which we try to achieve it.

Hindering forces on a higher level, as we have seen during numerous workshops and focus groups that we have carried out during this and previous working cycles are the general lack of connection between academia and other actors in society who would be able to inform and update curricula and offer opportunities for experiential learning.

On the other hand, there are numerous supporting forces as we have observed in the classes and as we have seen in our focus groups, reflection logs and based on our experience with student workshops. These are based on the very high motivational level of the actors we have worked with so far. There seems to be a great need from the part of students to participate in multi-actor, action-based activities and they are very receptive to ideas concerning sustainability. It seems that it is increasingly becoming a part of everyday social narratives and thus, younger generations may be more sensitive to and accepting of innovative ideas that support it. Professors on the other hand, are dealing with a great deal of professional stressors like time limitation, budget limitations, and organizational hazards. However, action-learning seems to improve their relationship with their students and this allows for greater job satisfaction. Finally, professional actors and organizations have shown to have a high level of interest in connecting with Universities in order to fill skill gaps in their fields and to interconnect with the other parts of the system (political as well as academic).

3.5.3 Data on the development of case since the previous reporting

3.5.3.1 *Students' responses, learning and competence development*

3.5.3.1.1 Methods of data collection and analysis

Following the structure suggested by D 2.1 (Action Research Protocol) the data collection procedures followed four stages (Stage 1, 2, 3).

Stage 1 took place during the **first week of the modules**. The students' understanding and expectations of the course were the main aim of the Stage 1. Following D 2.1 (Action Research Protocol) students were provided with a set of open-ended questions that were completed individually by all course participants on-line.

During the first day of the educational activity students also completed the **"Self-assessment of competences"** questionnaire aiming to assess their knowledge and abilities and to depict their competence profile in the following areas: observation, participation, visioning, reflection and dialogue.

Stage 2 took place during the **last week of the modules**. Following D 2.1 (Action Research Protocol) students were provided with the same set of open-ended questions **(Student Reflection Documents)** that were completed individually by all course participants on-line.

During the last day of educational activities the students also completed for the **"Self-assessment of competences"** questionnaire for a second time. The completion of the "Self-assessment of competences" aimed at identifying differences in the perceptions of the students by comparing the results of the questionnaire at the beginning and at the end of the course.

Stage 3 of the data collection took place after the completion of the modules. **8 Focus groups** with the students that attended the courses took place. Students formed 6 groups (4-6 participants per group) and participated in group interviews aiming to discuss the experience they gained form their participation in the course. The group interviews lasted from 1-1.5 hours. The researchers acted as facilitators of the discussion that evolved around the five competences.

A written consent for the participation of the students in all research activities was asked at the beginning of the course. All students read and signed the consent forms. The group interviews were audio recorded and transcribed into Greek. Selected quotations that used for supporting argumentation for the coding adopted were translated into English.

Data analysis

Thematic analysis, one of the most commonly used forms for the analysis of qualitative research, was used to identify codes, subcodes and family of codes and to analyse and interpret common patterns and themes within the qualitative data. (Boyatzis, 1998; Braun and Clarke, 2006).

Qualitative data analysis was assisted by the ATLAS.ti software as it was used to organise the text (interviews), facilitated the activities of searching and retrieving, selecting, organising and comparing segments of data. Quantitiative data analysis of the data of the "Self-assessment of competences" questionnaire was assisted by the Statistical Package for the Social Sciences (SPSS).

3.5.3.1.1.1.1 Student understanding, contributions and expectations.

During the first week of sessions, the NEXTFood Project, the educational model and its thematic relativity to their studies was introduced to the students. By doing this, we attempted to ensure that all students had a firm understanding of the educational model we would be working in, the competences we were aiming to enhance and why competence development was important to their education. Building on our previous experience, we also aimed to establish understanding of what is meant by "sustainability" and "sustainable development". We attempted this by way of instruction and open conversation in order to promote questions and dialogue.

After these introductions, students were sent the first reflection documents, in digital form, to report their understanding, expectations and how they anticipate contributing to the aims of the module. The questions were open ended and allowed for individual elaboration. The answers were collected and coded based on the competence tree provided by the research protocol using the Atlas qualitative analysis software.

3.5.3.1.1.1.2 Self-assessment of competences

During the first and the final week of the course students completed the self-assessment of the competences questionnaire to identify development of their core competences. Students were asked to rank their level of competence on several items using a scale from 1 (Novice) – 9 (Expert). Students who participated in both courses completed the questionnaire.

3.5.3.1.1.1.3 Students' final reflection document (Individual)

The students' final reflection documents as presented in the research protocol document were sent and collected in digital form in the final week of the course. To ensure that students would all fill in the reflection documents, they were given 20 minutes of the class session in order to complete them. The completion was compulsory.

3.5.3.1.2 Results

Tables 1 and 2 present a comparison of the means from the first and the final week of the courses. Comparisons of the means indicate differences in the competences identified by the self-assessment rubric.

A paired-samples t-test was conducted to compare between the two sets of the questionnaire. As shown in Tables 1 and 2 students ranked their competence development higher in both courses. In the "Farm Animal Reproduction" course students indicated higher mastery in the participation, visioning, reflection and dialogue competence. In the "Nutrition and Nutritional Value of Foods" course the largest increase was in participation and observation. In the "Farm Animal Reproduction" course the largest increase was in participation, reflection and visioning. The largest increase in the "Farm Animal Reproduction" course was identified in the participation and reflection competences, which may be due to students' involvement to the group project and presentation and to their engagement to the reflection activities.

On the other hand, students of the course "Nutrition and Nutritional Value of Foods" started ranking quite high all indicated competences. They seem to overestimate their competences. Such overestimation may be explained by the fact that they are first semester students who do not have the academic experience needed to appreciate the development of necessary skills and abilities.

Table 1: Average scores of self-reported competence development for the course "Nutrition and Nutritional Value of Foods". The scale used was 1 (Novice) – 9 (Expert). N=80.

	Average scores			Significance
Competences	Start	End	Diff	P value[1]
Observation	4,75	5,74	+0,99	<.0001***
Participation	5,37	6,34	+0,97	<.0001***
Visioning	5,47	6,02	+0,55	<.0001***
Reflection	5,40	6,19	+0,79	<.0001***
Dialogue	6,24	6,87	+0,63	<.0001***

*: p-value < .05, **: p-value < .01, ***: p-value < .001

Table 2: Average scores of self-reported competence development for the course "Farm Animal Reproduction". The scale used was 1 (Novice) – 9 (Expert). N=21.

	Average scores			Significance
Competences	Start	End	Diff	P value[1]
Observation	3,52	4,39	+0,87	<.0001***
Participation	4,09	6,19	+2,10	<.0001***
Visioning	4,22	5,61	+1,39	<.0001***
Reflection	4,53	6,41	+1,88	<.0001***
Dialogue	5,35	6,53	+1,18	<.0001***

*: p-value < .05, **: p-value < .01, ***: p-value < .001

With regards to the reflection documents, we observe a difference between the starting and end reflection documents. The first week reflections were considerably shorter and less elaborate than the final ones. They showed awkwardness in the process of reflection and a lack of reflective competence. Evidence of this is that answers were mostly very short and repeated the terminology that we used in the introductory class. In addition, when asked of the expectations students had of the course they mostly

repeated the knowledge content of the course and expressed that they be educated in these issues.

The end reflection documents reflect a development in the competence of reflection, although some awkwardness was still present. Students by large found it difficult to answer questions of process ("how" questions). However, we observe better understanding of what was expected form them and attempt to explain in more detail and depth their experience.

3.5.3.1.2.1 How do students experience such a learning process with respect to:

3.5.3.1.2.1.1 Learning goals?

At the beginning of each module we dedicated half a session in order to discuss with the students the learning outcomes of the module. During the discussions, we saw that students were generally not used to being part of such discussions and viewed their participation as a passive process of knowledge transference from the professor to the student. The learning outcomes that they expected were largely content based and even so, they had a very vague and general idea of what they were going to be taught. Their concerns evolved largely around practical questions about subject choices and how the module would be delivered and assessed and what this meant for their general studies. During this first session, we tried to engage students into a general conversation about the six core competences, sustainable development and what it meant for someone to be part of the agricultural chain as a student. The idea of competence development seemed entirely novel to them, although it was positively accepted. The general participation in the conversation was low but the students that chose to participate in the conversation showed curiosity and positivity. The low participation could also be due to the fact that the conversation was on-line and we have seen that many students felt intimidated to open their microphones and speak. We explained that part of the learning outcomes of the modules would be to develop these competences and we took time to explain each competence in detail.

As the sessions progressed, students engaged more in the learning process and felt more in control of their learning. The feeling that we got from our class observations and by student performance was that students owned the responsibility of their learning to greater extent. Having said that, we still observed low class participation during the lecture sessions and the facilitator had to insist on engagement in the discussions with questions that were addressed to specific students, because they seldom opened their microphones spontaneously. On average, only about 10% of students participated actively in each session. We observed higher participation in the Animal Reproduction module. The number of students in this module was lower and they were at a higher level in their studies than the Nutrition module.

With regards to the student perception of the learning process, students often refer to the factor of "will" in a number ways in their reflections. For example they refer to the

fact that certain aspects of the classes increased their will to participate or that “will” is an important factor in the way that projects turn out. From this we may start inferring the motivational strength of action-learning methodologies.

Reflecting on the experience they have gained through the class a student of the animal reproduction module says:

“Surely, we look at things in a more mature way. We recognise what is good and not in the field of reproduction of farm animals”

Student Reflection Documents (SRD) 63:9

Another observation was that a large number of students, especially in the animal reproduction module, mention that their learning was hindered significantly by the on-line learning environment, because it deprived them of the practical experience they needed from the face to face lab sessions. This is completely understandable, since it is a highly practical module that needs hands-on experience in order to reach the learning goals of the module.

Students stressed the value of participation and how the present situation has affected this competence:

“*The part of experiential and practical training remains incomplete”*

SRD 63:15

But they also mention that the module, while on-line helped them to remain connected to the subject in a meaningful way:

“It is very important to stay in contact with the subject since, due to the circumstances we have become distanced from our university and from the field of our future profession”

SRD 63:17

3.5.3.1.2.1.2 View on competences needed for sustainable development?

As mentioned before, students generally began the courses with a very vague idea, of what sustainable development means. From previous learning cycles and interviews in the course of the NEXTFOOD PROJECT we have seen that neither students nor professors have a firm grasp on ideas of sustainability or what is needed to follow sustainable development. Also, the idea of skills and competences itself is difficult to

incorporate in their view of their education. However, we saw that after the discussions we had, students began to think about this matter in a promising way.

From the student reflections we see that students tend to talk about attitudes in the same way as they talk about competences. Here, we come across a challenge of methodology and definition in our work which is quite predictable. We need to accept that sustainable development relies on changes in attitudes as well as the development of competences. That is, we need to view and investigate our educational activities as an amalgamation of transformative learning in both attitudinal and competence terms. As such, we accept and incorporate a number of comments on attitudes as well as competences that students perceive as important for sustainable development.

Students tended to remain constant in the importance they place on acquisition of hard skills and content knowledge. The majority of students answered this question by referring to specific knowledge they think is important in their field. They mostly referred to specific aspects of Farm Animal reproduction and Nutritional values of food groups. One student framed this as knowledge being the basis on which they could build their competences:

"From this module I gained more and more detailed knowledge on which I can base my competences in order to support sustainable development in the field of Nutrition"

SRD 63:86

However, showing a growing awareness of their field development students also reflect on skills, competences and personal traits that they find important:

- Research skills
- Respect toward the environment and its resources. They also often refer to the will to continue developing and educating oneself as highly important.

«Some basic skills are respect to the environment and to make the best possible use of the resources that it offers us"

SRD 63:19

and

"the will for continuous development on our field and continuous education"

SRD 63:10

- Knowledge on technological advancements. They mention the need for updated knowledge about technological advancements and continued education:

"I believe that it is vital to be informed not only in nutritional subjects but also in technology so that our skills and knowledge keep in pace with the advances of society"

SRD 63:64

- The need for increased willingness, participation, for critical thinking and for assuming personal responsibility.
- The need for ethical development in sustainability issues
- Logical thinking, creative thinking and intuitive thinking.
- Innovation
- Team work, a holistic view and understanding of the role of nutrition for a sustainable future.

E.g

"The skills that someone needs are, collectivity, the use of logical, intuitive and creative thinking. For these to develop there is a need to learn from our training as a whole and from our practical training"

SRD 63:100

" For a start I believe that everyone who is involved in the field of nutrition needs to have an holistic view of things. They need to be informed in all fields: physical, spiritual and psychological"

SRD 63:75

- Knowledge of the aims and objectives of sustainable development so that a person can develop innovative ideas.
- The need for a change in attitude toward sustainability rather than market value driven food quality; higher sense of responsibility by stakeholders.
- Knowledge on the environmental footprint of food products

In closing,

"*For supporting sustainable development in the field of Nutrition, it is most important to have a stance of solidarity, respect for human rights and trust and support to innovative ideas"*

SRD 63:88

Specific attitudes that were inferred by the student responses to this question were, proactivity, openness, willingness, love for the subject, patience, reconciliatory attitude and objectivity. Solidarity and respect were also mentioned as attitudes that may support sustainable development. The will to learn and develop seems to re occur very often in student comments.

3.5.3.1.2.1.3 Recognition of own competences and competence development?

Students were called to recognize their own competence development through the reflection on how they contributed to the learning experience of the activities. They were asked about the competences that they brought to the experience and they also reflected on how the activities helped them develop their competences. Based on their reflections' responses students found most important and developed

- Social skills through the group projects. Specifically they commented on developing patience, cooperation and organizational skills.
- Prominent in student comments are research skills, with numerous comments on how they learned to search for trustworthy sources, the ability to discriminate between relevant and good quality information (critical thinking) and the ability to put together documents that are scientifically valid.
- The ability to combine knowledge from different aspects of their fields and to transfer theoretical knowledge to real life situations
- Presentation skills
- Dialogue, communication skills, expression of ideas, listening and understanding others

"I was able to connect better with the members of my team and to share with them relevant knowledge, ideas and experiences in order to contribute to their learning experience"

SRD 63:121

and

"I could contribute to my team by forming conditions and questions that fostered dialogue and cooperation and also by appreciating the opinions of all my teammates. By doing this I could collect and evaluate them with the aim of creating a final stance that all the team could support"

SRD 63:112

- Reflection
- Observation
- Participation
- Critical thinking

- Facilitation

"The work of the professors and my work as a student and our good cooperation contributed to the very positive development of the class"

SRD 63:124

- manifold thinking

«(…)my ability to look at the subject from all the possible angles so that we could cover it all the possible implications that were related to it"

SRD 63:130

- Technological competences
- Visionary thinking/insight
- Leadership skills
- Goal setting and achievement of goals
- Attentiveness
- Creative thinking

Here we will also mention some of the attitudes that students perceived as important from their part in the learning experience and the attitudes that the activities helped them develop. For example they often mentioned

- Respectfulness
- Sociability/extraversion
- Optimism
- Self-confidence
- Stamina
- Willingness
- Commitment
- Self-confidence
- Diligence
- Openness to diverce information and mindsets (a crucial attitude for transformative learning)
- Patience

3.5.3.1.2.1.4 Transformation?

Students refer to how the activities and the learning experiences from the modules transformed them in many different ways and in many different occasions.

Transformation occurred in frames of mind, their view of the field standards, their personal emotional and mental development and their willingness to participate and take responsibility in their field. These reflections took place by large with reference to the issue of food loss/food waste, after the virtual visit by a non-profit food waste organization. Some good examples of transformative learning are:

"Personally, I reconsidered my actions on issues of sustainability and I understood that we need a different model of living that aims at the best possible environmental outcome. In this way the quality of life will improve for people and at the same time their ability to cover their future needs and expectations will be strengthened."

SRD 63:139

"I have understood a little bit more about reality; I reconsidered some things that I took for granted and from now on I will try to contribute as much as possible to the elimination or the reduction of several every-day problems in the field of nutrition"

SRD 63:141

" (…)I have questions now regarding the improvement of different issues. E.g. land that is not used for cultivation, over-consumption, wrong use of best-before-dates etc".

SRD 63:140

"I can understand now that many of the food products that we consume daily are not as they are presented to the public and that ignorance for what is within those products can lead to a lower quality in life and even to disease"

SRD 63:135

In the Animal Reproduction module many students reflected on the emotional impact of the group project. A good example was:

" I became able to say my opinion when it was needed. That is…even if I had an opposite opinion in some issues (something that I found difficult in the beginning); because I wanted the project to be good, without imperfections and because we all had responsibility for the project, I didn't want to be exposed with mistakes. I also took initiative and helped other when they needed it"

SRD 63:41

3.5.3.1.2.2 To what extend does the education enhance the students'

3.5.3.1.2.2.1 Competence of observation, reflection, visionary thinking, participation, dialogue?

As mentioned before, the educational activities have played a significant role in the development and enhancement of the six core competences. Most of our activities involved a mixture of competence development with some targeting competences in more direct ways than others.

For example we included the lectures on reflection. This activity was designed to introduce the competence of reflection in a more concrete way. By this activity we aimed to introduce a cognitive framework that would help students practice reflection more fluently and more precisely. Thus, this activity increased the cognitive capacity for the competence of reflection directly. We also aimed at engaging in oral, group reflection for a few minutes after each class. Additionally, we included an extra activity-reflection-log for the groups that were involved in the Photo Novella Projects apart from the initial and ending formal on-line reflections that were done by all students. During all these activities, all the other competences were enhanced in a theoretical and cognitive way.

This cycle's activities had certain specificities that may have hindered the optimal enhancement of observation, participation and dialogue. The on-line environment, added to the general uncertainty and novelty of the academic proceedings may have played a negative role in students' learning experience and may have hindered the competence development of less technologically or introverted individuals. However, with the activities we designed, we went at great lengths to ensure the best possible outcomes of a very negative scenario. Here, we would like to make a special reference to one of our activities, which was added to one of the modules, experimentally. It was the Photo Novella Project, taken by half of the students in the Nutrition Module and which targets all the core competences in a creative and participatory way. Students were divided into groups and were asked to choose between a variety of subjects on Nutrition and develop a photographic gallery of photographic representations on the subject, while linking it to sustainability. They were also asked to keep a reflection diary while on the project and to present their gallery to invoke conversation with their peers. The reflection documents from this activity produced a very rich variety of responses with regards to the core competences and more specifically on observation and participation:

On urban farming:

" The image of a bird sitting on a tree branch helped me understand that we could find anything we wanted, anywhere. (...) for a bird or animal it is not strange to find food in an urban environment. On the contrary, we humans find it very strange to see a crop in the city and this might be something that we need to change"

Photo Novella Diary Reflections (PNDR)19:2

and

"The photographs of my project are quite realistic and so my feelings are mostly admiration, satisfaction, fantasy and optimism when I think of how my city could look like if we used the available land for farming"

PNDR 26:1

On genetically modified foods:

"This image might be frightening but at the same time it makes us think and it creates a sort of curiosity regarding the genetic modification of foods"

PNDR 20:2

and

«Are scientists genuinely interested in the quality of foods that are offered to consumers or is profit the only aim?"

PNDR 20:3

The same student later considers a different perspective…

«With the cultivation of genetically modified food there is considerable limitation of pesticides and fertilizers in the crops. With this way, there is better waste processing and management, so the environment is better protected. Nature "breathes" better"

PNDR 20:4

And general reflections on the process:

"Taking pictures and doing research gave me a different point of view for the food we consume. My feelings about the images are mixed since, as you will see, they incline the viewer that they are negative but they hide positive sides as well."

PNDR 54:2

and

"Exchanging photographs with my group contributed to me learning about the nutritional habits of two families, which was very interesting"

PNDR 51:3

From the above and other such reflections, we concluded that this was a successful activity for enhancing all core competences.

Other than this activity, the responses that we received from the students, contribute to our understanding that the most impactful activities for competence development are the group projects, the involvement of professional field actors in the modules and the training in research methods.

3.5.3.1.2.2.2 Dealing with "the challenge of the whole" (systems thinking)

It seems that most of our activities have contributed significantly to students' awareness of the agricultural and food systems as a whole. They became more able to appreciate different perspectives, to appreciate the complexity of the systems involved and to see themselves as part of these systems with a sense of responsibility and agency.

Having said that, this cycle's activities, under the pandemic circumstances gave us no opportunity to observe students' ability to deal with this complexity and to become problem solvers within these systems in a practical and concrete manner. To a limited degree, students had the opportunity to discuss real life problems and difficulties with the professional actors and the facilitators. However, the circumstances did not allow for hands-on experience.

3.5.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the NEXTFood approach in education*

3.5.3.2.1 Methods of data collection and analysis

3.5.3.2.1.1 Teacher reflection documents

The facilitators of our modules, Dr. Aristotelis Lymberopoulos and Dr. Maria Papageorgiou prepared reflection documents providing feedback and a description of their involvement, the perceived development of students' competences, main themes and issues and a plan for further improvement of the courses "Farm Animal Reproduction" and "Nutritional Value of Foods". These documents were collected, coded in Atlas and analysed using thematic analysis.

3.5.3.2.1.2 Course reflection focus groups

8 Focus groups with the students that attended the courses took place. Students formed 6 groups (4-6 participants per group) and participated in group interviews aiming to discuss the experience they gained form their participation in the course. The group interviews lasted from 1-1.5 hours. The researchers acted as facilitators of the discussion that evolved around the five competences.

3.5.3.2.2 Results

The reflection documents of the facilitators and the student focus groups offer as considerable insight into the effect of the NEXTFood approach on the perceptions of

the actors involved in action-learning. As mentioned before, the facilitators have gained a variety of benefits regarding their satisfaction as educators and their perception of student satisfaction and competence. On the whole, facilitators reported motivation to continue with the action-learning model and that they experienced a shift in their educator mind-set. They also gained insight of the role of real economy actors in the formation of their module curricula and more experience in their communication with real economy actors. They perceive these experiences as valuable and an asset to their personal development.

On the other hand, it was pointed out that since the COVID-19 pandemic had affected the educational system, they had to move their educational activities online and this had a perceived negative impact on his and his students' learning experience.

Dr. Lymperopoulos commented that students benefited by their participation in the group projects and that the group working approach added to the students' learning experience as they have the opportunity to manage their time more effectively, to work with peers, to know each other better, to better understand their topics. Additionally, students who demonstrated proficiency in a skill can bring their expertise and experience to the group and the group can benefit from that.

Furthermore, students had the opportunity to participate in online live sessions with sector stakeholders who presented their farms and took part in fruitful discussions about farm management.

As it was pointed out by Dr Lymberopoulos:

"(…) we wanted to encourage active learning and provide an opportunity for the development of key skills such as communication, group working and problem solving".

Later in his reflection he comments that the main aim of redesigning the course was the acquisition of skills important in the farming industry:

"With this we tried to provide young students with the right attitude, an appreciation of the importance of the sector, farming knowledge, skills and science in the practice of farming industry".

Students on the other hand reported very positively on the experience of these modules, as is evident from the analysis in the previous sections. The focus groups,

perhaps more that the written reflection documents, reflect a development in the core competences and an awareness of the complexity of real life circumstances. Most students during the focus groups showed high willingness to participate, engage and contribute to the discussion in a productive and creative way.

There were also instances of indifference, lack of motivation and a general sense that the activities were an obligation to be delivered. This is understandable in the sense that many students were not in the course of choice in the first place and also there are considerable and expected differences in personality, attitudes and learning styles within any given educational environment.

3.5.3.2.2.1 Supporting and Hindering forces for change towards the NEXTFood approach with particular focus on essential shifts

The hindering forces for change towards the NEXTFOOD approach that we continuously come across in our work is the lack of competence related culture within the universities, a general lack of a concrete conceptual framework for sustainability and the lack of experience with action-learning. These are issues that we have tackled directly with the professors and students that we have been working with. However, we are very aware that we are working with a very small number of people within a very large educational system.

Hindering forces on a higher level, as we have seen during numerous workshops and focus groups that we have carried out during this and previous working cycles are the general lack of connection between academia and other actors in society who would be able to inform and update curricula and offer opportunities for experiential learning.

On the other hand, there are numerous supporting forces as we have observed in the classes and as we have seen in our focus groups, reflection logs and based on our experience with student workshops. These are based on the very high motivational level of the actors we have worked with so far. There seems to be a great need from the part of students to participate in multi-actor, action-based activities and they are very receptive to ideas concerning sustainability. It seems that it is increasingly becoming a part of everyday social narratives and thus, younger generations may be more sensitive to and accepting of innovative ideas that support it. Professors on the other hand, are dealing with a great deal of professional stressors like time limitation, budget limitations, and organizational hazards. However, action-learning seems to improve their relationship with their students and this allows for greater job satisfaction. Finally, professional actors and organizations have shown to have a high level of interest in connecting with Universities in order to fill skill gaps in their fields and to interconnect with the other parts of the system (political as well as academic).

3.5.3.2.2.1.1 From lecture hall to a diversity of learning arenas

The course "Farm Animal Reproduction" consisted of lectures, classroom activities and exercises. Due to COVID-19 pandemic and the government restrictions for higher education the course was delivered on-line. The module curriculum was delivered mainly through on-line lectures with the exception of a few lab sessions in the beginning of the module. Under these circumstances, the AFS together with the module facilitator, went to great lengths to re-design and accommodate the delivery methodology in line with international on-line action-based best-practices. The students were involved in synchronous and asynchronous action-based learning activities aiming at their active involvement and engagement in the educational processes. Our central concern was the connection of theoretical background with real-life farming practices and we used case-studies, exercises and discussions with the teacher and sector stakeholders. They also participated in 2 live-connection sessions with farmers. One, related to the lab practice of sperm collection and the other related to new technologies in milk production farming and estrus synchronization.

The course "Nutrition and Nutritional Value of Foods" module also consisted of lectures, classroom activities and exercises. This module was also delivered on-line due to COVID-19 pandemic restrictions. Students investigated the theoretical knowledge gained through lectures through two group action-based learning activities. Half of the =groups performed a literature review and made an oral online presentation. The other half of the groups were involved in a participatory research project based on the Photo novella methodology. They chose a subject and were called to create a personal photograph presentation to their classmates. Reflection was an integral part of the activities. We also included sector stakeholder live-connection visits that covered the topics of food loss and food waste and the connection of traditional cooking ingredients and practices with new knowledge, practices and ingredients.

Students did not initially anticipate the relevance and the help offered by such presentations. However, we were pleasantly surprised by how students embraced all activities. This was depicted in their reflection documents.

Our team, both from the AFS and IHU, learned valuable lessons on how to effectively communicate online and we also need to lean more on how to facilitate student engagement.

3.5.3.2.2.1.1.1 Supporting forces and how to build on them.

One of the greatest supporting forces of this year's cycle was the lessons learnt during this cycle was the fact the classroom can go anywhere using digital tools. Facilitators and students became very experienced in the use of technology which means that in the future they may use these competences to involve much more extra-institutional activity in their classrooms.

3.5.3.2.2.1.1.2 Hindering forces and how to deal with them.

The problems that remain regarding a diversification of learning arenas are those of individual motivation and participation.

Although these are not easily dealt with in a fixed manner, building an academic culture of participation and active involvement may serve as motivation for practices that involve alternative teaching arenas.

3.5.3.2.2.1.2 From lecturing to co- and peer learning

Both courses were designed around peer learning activities via engaging in group projects. In the "Farm Animal Reproduction" course the student groups engaged in literature searches and reviews on topics suggested by the facilitator. The activity ended with oral presentations of the group essays during the online class. In the course "Nutrition and Nutritional Value of Foods" module peer learning took place via group projects (literature review and Photo Novella projects). Here too, all student group projects concluded with on-line class presentations.

3.5.3.2.2.1.2.1 Supporting forces and how to build on them.

One of the main supporting factors is the fact that team projects and peer learning are a major time management tool in large classes. This serves as motivation for the facilitator.

Other than that, peer learning has proven to be a valuable tool for the introduction of a variety of resources that would remain untapped if only one person was responsible (facilitator). It also gives opportunities for creative and critical thinking. These are all valuable teaching tools that can be brought forward with just one activity. This is both time and resource efficient as a teaching methodology.

3.5.3.2.2.1.2.2 Hindering forces and how to deal with them.

The potential obstacles that we anticipated were the students' limited experience in using participatory knowledge construction techniques and also time limitations, since participatory techniques usually have a very high time demand. The online delivery of the course worsened the team management procedures. The students' reflections also demonstrated and identified the need for more effective team management skills.

These obstacles were overcome by careful planning and structured implementation of the activities. Clear instructions and support were provided to our students along the way by breaking the group project activities into smaller pieces and by providing guidance through related online lectures. Additionally, the students had to address issues relating to online group dynamics development and this was initially thought of as an obstacle to the successful completion of the activities. Evidence from the focus

group discussions suggested that students struggled with the online group interactions as they demanded organization skills and time management skills. Student motivation and commitment to the group tasks differed among group participants. However, students commented that group sensibilities and competences were developed further due to the interaction with the online group. Valuable lessons such as time-management, group structuring and support and student management. Focus group discussions and reflection documents suggest that students can re-use the experience gained through online group interactions and further develop their skills as their online learning experience continues to grow.

It became evident that as a research team we need to promote better student group learning and to provide training in the development of online group dynamics by suggesting related methods, mechanisms and strategies for handling online group interactions such as online group leadership, conflict resolution and facilitation of online group decision-making procedures.

3.5.3.2.2.1.3 From syllabus to supporting literature / diversity of learning sources

The diversity of learning sources was a central concern in designing both modules that participated in the case. In the both modules a variety of learning sources including both internal (cognitive) and external were used to enhance students' learning and to facilitate learning activities (training in the use of major scientific databases like PubMed, Scopus, google scholar, research techniques for information searching, presentation of criteria for web pages' evaluation. Our previous experience was that students had limited skills in this domain and we aimed to promote the student's use of various resources as well as their critical thinking and source evaluation skills. We included literature searches as action-based learning activities in both modules for the completion of group projects.

During this cycle we also decided to experiment with a different, more experiential, aesthetic and emotive learning source. That is, during the Photo Novella Project, students were called to include their personal imagination, their creative thinking, their emotional capacities and their environment as a source of learning. This turned out to be a very effective method, since it produced rich reflections and a very high occurrence of transformative learning experiences, observations and visionary thinking.

3.5.3.2.2.1.3.1 Supporting forces and how to build on them.

Both teachers and students responded positively to the incorporation of different learning resources into the syllabi, although it may be difficult to leave the security of the textbook. The positive response is a major supporting force.

Guidance into all aspects of a literature search made students more confident and helped them engage in such activities. It is highly important to our students' future development and the development of our case that we emphasize on this and continue to train our students to use alternative and diverse methods of learning.

3.5.3.2.2.1.3.2 Hindering forces and how to deal with them.

The lack of previous experience and skills on the part of students and professors is the major hindering force. So, in students the feelings of insecurity and uncertainty about the quality of their work and knowledge may be the most prevalent challenges of these activities. During the presentations, we observed many instances of this insecurity. Here again, training and the opportunity to test new sources with the relevant support may be the best way to deal with these challenges.

3.5.3.2.2.1.4 From textbook to a diversity of teaching aids

The students were introduced, trained and used a variety of action learning and teaching techniques aiming to mark the transition from textbook to a diversity of teaching techniques.

3.5.3.2.2.1.4.1 Supporting forces and how to build on them.

The on-line classroom environment offered a major opportunity for utilizing on-line teaching resources. For example, in the Nutrition module we made use of the Food and Agriculture Organization of the United Nations web page and applications for the curriculum purposes. Students were encouraged to use relevant applications for keeping a nutritional diary and to investigate production practices, food labeling and consumer behavior practices based on information from the FAO resources. The same occurred in the Animal Reproduction module, where it became standard practice to use on-line videos and professional farmer sites as teaching aid and case studies. Before the beginning of the modules, when we were preparing for the possibility of on-line teaching, we had extensive meetings with both facilitators in order to investigate on-line teaching resources, practices and methodologies. This preparation turned out to be valuable and opened possibilities for the facilitators that may become permanent teaching aids.

Reflection is an important teaching aid and it is much appreciated as a method of translating experience into learning because students have the opportunity to think about their experience, analyze it, evaluate it and eventually learn from it. Most activities were accompanied by self and group reflections. During the online sessions students were either provided with one question for a brief reflection or they took part in group discussion and reflection. To facilitate group reflection in the online environment students were split in breakout rooms.

Finally, most of the online course activities were accompanied by discussion, one of the most effective and interactive methods for strengthening learning. Students were encouraged by the facilitators to share their ideas on topics under discussion and present their views. However, since discussion is a useful teaching technique that is appreciated and used extensively, teachers need to receive additional training on facilitating online discussions.

Here again, the motivation and willingness of all parties involved, to learn and adapt to the circumstances was the most important factor of the success. Maintaining this momentum and this motivation is key to the shift.

3.5.3.2.2.1.4.2 Hindering forces and how to deal with them.

As before, lack of familiarity, lack of confidence and skill gaps, are the major challenges both for students and professors. Again, training, giving opportunities for alternative teaching aids and promoting examples of such practices are important ways to deal with these challenges.

3.5.3.2.2.1.5 From written exam to a diversity of assessment methods

Both courses incorporated both direct and indirect methods of assessment in measuring the student's learning outcomes. Direct methods mainly aimed to check students' learning against specific standards, while indirect methods aimed to engage students to reflect on their experiences, therefore, learning. A combination of direct and indirect assessment methods were used in both modules.

Written exams, group project literature review, group project presentation, reflection activities were the main assessment methods that were used to assess the students' learning outcomes. Indirect activities were linked with a grade. Students were given a percentage of the final mark (20%) for filling in reflections and for participating in the group activities and discussions. Additionally, activities included embedded assessments. For example, the group project mark assessed the group's performance for the production of the literature review but also assessed the students' ability to locate scientific information and journal articles and to evaluate web-based information. Additionally, feedback by the teacher/facilitator was given frequently to the students during lectures and mostly during practical sessions. The final grade of the course was shaped by the contribution of the following a written exam, the literature review essay (group essay), presentation of the literature review in the online classroom, participation in classroom activities, reflection documents.

3.5.3.2.2.1.5.1 Supporting forces and how to build on them.

Supporting this attempt was the professors' willingness to go a step further than the ease of the written exam assessment and the relative freedom they have to decide their assessment methods. In order for this to continue they will have to be further

supported by their organizations. We believe that it should become mandatory to assess student competences and knowledge through a diversity of methods, since students are diverse in their learning styles.

3.5.3.2.2.1.5.2 Hindering forces and how to deal with them.

The major hindering force here was the time and energy needed to assess students in percentages. It takes a good amount of organizational skills to do so.

It may need further research into technological aids for this and of course teacher training. It may also be worth considering to get help from student placements in order to assist professors in such organizational loads, since time restraints are evident in their daily routines.

3.5.3.2.2.1.6 From lecturer to learning facilitator

In action learning students are given the opportunity to be in charge of their own learning. However, the teacher is the one responsible to create a learning environment that allows action learning to flourish and then take the role of the facilitator.

The facilitator, apart from the final exams, must have the opportunity to check the students' learning and progress throughout the course and offer several checkpoints for students to understand where they are, what they have learnt and if they are doing something incorrectly. Then students must be given time to practice and further develop their skills. Additionally, the facilitator should challenge the students' skills by providing them with appropriate feedback and relevant resources. Furthermore, feedback should be given frequently to the students.

Both modules consisted of lectures, classroom activities in which the professor acted as facilitator.

3.5.3.2.2.1.6.1 Supporting forces and how to build on them.

Throughout these modules, the professors made great effort to accommodate the needs of the shift from lecture to action-based learning. This shift was marked by the effort of the professors to promote student competences as well as student knowledge. Based on our experience from the previous cycle activities, we decided to dedicate half a session at the beginning of the module to talking about the NEXTFOOD Project objectives, sustainable development and the core competences that promote sustainable development. As we noticed before, the Greek educational system and student learning expectations were based solely on content knowledge acquisition and the concept of skills and competences is alien to this learning culture. So, we framed the learning outcomes of the modules in a way that incorporated the core competences as well as a variety of other important learning skills such as information seeking skills,

essay writing skills, presentation skills, group working skills, critical thinking, systemic thinking and problem-solving skills.

3.5.3.2.2.1.6.2 Hindering forces and how to deal with them.

The acquisition of such skills and competences requires that the professor allows for time, resources and mental freedom for students to develop independently and it requires a facilitating role by him/her. However, in an on-line environment this is an extra challenge due to time-management and student management issues. From the reflection documents and the focus groups, we believe that the circumstances hindered this effort but at the same time, students in these modules mention a significant difference between these and other "mainstream" modules they attended in terms of richness in the learning environment, engagement, motivation and overall satisfaction.

So, dealing with this challenge would mean making good use of student feedback and promoting good examples.

3.5.3.2.2.2 What such change requires from teachers, students and institutions

From our experience and from the student and professor reports, we see that motivation, willingness and opportunities for alternative teaching methodologies are the most important factors on achieving the desirable shifts.

In the previous cycles professors often referred to financial shortages as a major challenge for action-based learning. However, as the pandemic has taught us during this cycle, action learning and multi-actor involvement is feasible without any time or financial burden made on the institution. Having said that, institutions have to give further incentive and training opportunities to professors to develop their teaching methodologies to deal with the challenges of the future. They need to incorporate teaching methodology in their educational culture and mindset and make it a mainstream theme of discussion and teacher assessment.

Students on their part would have to become more involved and engaged in their studies. Form their part they should demand for an education that properly prepares them for their future professions.

3.5.4 Concluding remarks on the case development since previous reporting

3.5.4.1 *Most useful and inspiring experiences (supporting forces)*

There are numerous supporting forces as we have observed in the classes and as we have seen in our focus groups, reflection logs and based on our experience with

student workshops. These are based on the very high motivational level of the actors we have worked with so far. There seems to be a great need from the part of students to participate in multi-actor, action-based activities and they are very receptive to ideas concerning sustainability. It seems that it is increasingly becoming a part of everyday social narratives and thus, younger generations may be more sensitive to and accepting of innovative ideas that support it. Professors on the other hand, are dealing with a great deal of professional stressors like time limitation, budget limitations, organizational hazards. However, action-learning seems to improve their relationship with their students and this allows for greater job satisfaction. Finally, professional actors and organizations have shown to have a high level of interest in connecting with Universities in order to fill skill gaps in their fields and to interconnect with the other parts of the system (political as well as academic).

3.5.4.2 *Main obstacles/challenges encountered (hindering forces)*

The hindering forces for change towards the NEXTFOOD approach that we continuously come across in our work is the lack of competence related culture within the universities, a general lack of a concrete conceptual framework for sustainability and the lack of experience with action-learning. These are issues that we have tackled directly with the professors and students that we have been working with. However, we are very aware that we are working with a very small number of people within a very large educational system.

Hindering forces on a higher level, as we have seen during numerous workshops and focus groups that we have carried out during this and previous working cycles, are the general lack of connection between academia and other actors in society who would be able to inform and update curricula and offer opportunities for experiential learning.

3.5.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

The lessons that we learned is that it takes time and persevearance in order to make a permanent change in culture. Although it is very common and easy to talk about action learning among professors and actors, it also takes concrete guidance and skill building on the part of the professors and the students to make it a reality.

We have also learned that this support can be given with relative ease now that we have established a good relationship with the institution. A the moment we can utilize a vast amount of tools and experiences in order to continue and disseminate our work to other professors and more students.

Building on the supporting forces would involve maintaining high motivation in the actors involved in the NEXTFOOD Project. This can be achieved in a variety of ways.

First, during the next cycle of activities we need to retain wide connections with IHU by means of student workshops and seminars, that will enhance their learning experiences and their connection to activities that take place beyond their curriculums and academic environment. We will aim to involve IHU professors as much as possible, thus also enhancing the connection, trust and communication between them and the students.

We also aim to build on our previous workshops with the agricultural Network of Northern Greece and invite them to an open discussion with IHU officials in order to follow up with their intentions to connect and contribute to the university curricula.

3.5.4.4 *Plans on how to move forward*

In order to best serve the objectives of the NEXTFOOD PROJECT, the next activity cycle will need be more concentrated on studying the core competences in relation to real-life working conditions and the dynamics of multi-actor relationships. Thus, we are planning on supporing professors in designing their teaching modules as needed and concentrating our efforts on improving and implementing the learning set methodology with a smaller number of students.

So, our aim for the next cycle is to manage to enhance the action-learning culture we have started with the small number of professors we have been working with and to expand the benefits we have been seing to the larger possible population. We plan on doing this by organizing a higher number of workshops and seminars that will enhance and create more permanent ties between students, professional organizations and the University.

We also plan to implement a GOAL SETTING TOOL, as an action-learning activity that may maintain and enhance the motivational levels that we have observed in student populations in IHU. This tool will be offered to the whole student population of IHU.

During the next cycle we also aim to give more support and promote the use of the precision Technology infrastructures that have been installed in IHU.

We are still dealing with the challenges of the pandemic so our plans remain flexible as to the method of implementation. However, the lessons we have learned from this cycle and also the technological readiness of students and professionals allow us to be optimistic as to the implementtion of the next cycle activities.

3.5.5 References

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3.6 SKOGFORSK

Case development report Y3 - Skogforsk

Authors: Lotta Woxblom and Tomas Johannesson

Case 6

3.6.1 ID card

Course title: Towards a profitable and sustainable forestry chain – increased quality and number of micro-habitats for enhanced biodiversity

Level: Vocational course for forestry professionals

Language: Swedish

Host institution: Skogforsk

Course leader: Tomas Johannesson

Timeline of the activities covered in this report

June 2020 – April 2021

Learner categories and number per category (demographics)

Forest company:

Logging machine operators	4
Forest management officers	2

Skogforsk:

Course leader	1
Expert on nature conservation	1
Training manager	1
Researcher	1

3.6.2 Extended summary of development of the case since the previous reporting

Skogforsk is running a case aiming at a higher understanding about logging techniques, strategies, and methods to increase quality and number of micro-habitats in production forests. Our case is conducted as a vocational course for forestry professionals, i.e., logging machine operators and forest management officers. The course runs during 1 year with a total of four physical meetings (4-5 hours each). Some of the planned physical meetings have been replaced by web-meetings due to the Covid-19 situation.

3.6.2.1 *Actions taken since the previous report*

3.6.2.1.1 Planning

The course is facilitated by a team of four persons, together forming the steering group of the Nextfood case at Skogforsk. Three facilitators are responsible for facilitating the students' learning processes, while one person is mainly responsible for driving the research activities connected to WP2 in Nextfood.

Skogforsk normally offers short courses for professionals and most of the time these are held at a forestry district office or in the forest. This means that, in the initial planning there was no need for us to make a shift from lecture hall to other learning arenas. However, the Covid-situation (starting early spring 2020) forced us to find new ways to meet our learners, i.e., to change the learning arena from forest site to Zoom.

A basic platform for the case meetings was created at the first meeting with our group of learners, a group of machine operators in northern Sweden. This platform, which included their suggestions of subjects, expectations from participants of the Skogforsk-team and subjects appearing during a meeting, was used as a basis when planning of the up-coming meeting(s).

3.6.2.1.2 Implementation

Each meeting had a predetermined theme (from the above-mentioned platform). All meetings were led by the project leader, who arranged an outdoor office with a computer brought to a forest area close to the harvesting site.

Because of the Covid19-situation case-meetings were organized as digital meetings (Zoom) on mobile phones and computers.

Participants participated from different places:

- The machine operators and the project leader from forest sites in northern Sweden.

- The expert on nature conservation from a harvesting site in the middle of Sweden.
- The researcher and training manager participated from their home offices in the middle of Sweden.
- One of the machine operators participated in the discussion during harvesting work with mobile camera mounted in the cabins front window allowing others to see the operations and surrounding condition.

Normally, our teaching aids are in the places where we meet – the forest, the logging operation site etc. This environment is the daily "office" of our professional learners. Because we could not meet, we used photos to describe different phenomena and examples that we wanted to discuss.

To keep the dialogue going between meetings we started a chat on our phones. For this purpose, we use an app (*Supertext*) where members of the Skogforsk team and forestry professionals, on equal terms, can create posts from everyday work or observations linked to the theme of previous case-meeting. Posts can be questions, fostering a (short) dialogue and further knowledge transfer or observations illustrated by photos, acting as proof of an increased understanding and knowledge of the subject. In connection to meetings, different topics, i.e., the core competences were also repeated and addressed by phone or Supertext.

3.6.2.1.3 Research results since the previous reporting

3.6.2.1.3.1 Students', teachers' and other stakeholders' experiences and learning

In the evaluation form fulfilled after each meeting, participants were asked to mark words from a list that could be used to describe the day.

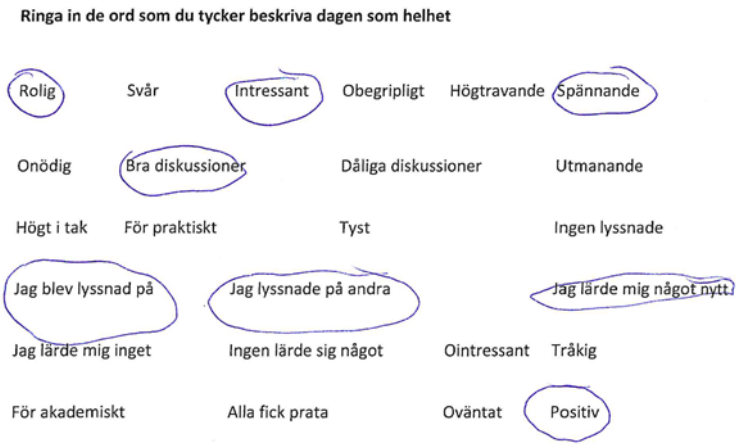


Figure 2. From the evaluation form - Mark the words you feel describe the day.

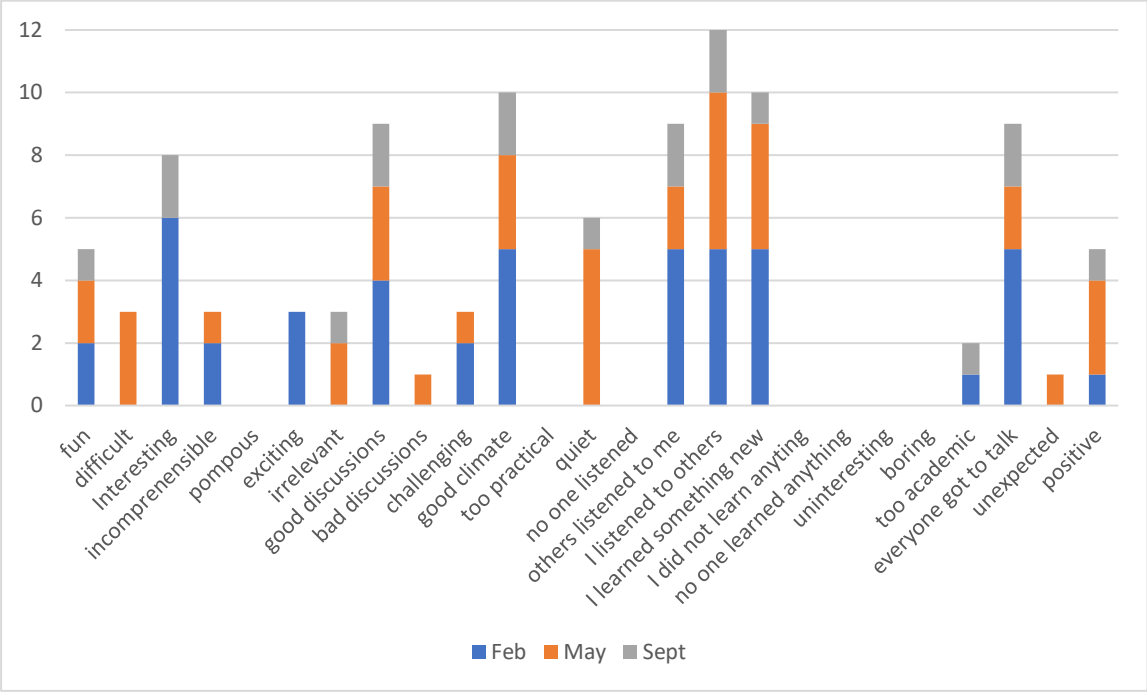


Figure 3. Words describing the course meetings – February, May, and September.

From the diagram we can draw the preliminary conclusion that the participants seem to be positive to the meeting days as a whole. Expressions /words like “I listened to others”, “I learned something new”, “others listened to me”, “good climate” and “good discussions” are chosen by a majority of the respondents.

3.6.2.1.3.2 Supporting and hindering forces for implementing the Nextfood model

The part of the Nextfood model that include a diversity of learning arenas, learning sources and teaching aids as well as “learning from each other” is well in line with how Skogforsk are used to work with education. We often meet our learners and other stakeholders at a forestry district office or in the forest where our main learning source is dialogue around actual problems, possibilities, or situations in the everyday work of the participants. The circular model used within Nextfood is expected to give an added value to the learning process for machine operators, as well as for the Skogforsk team. Our teaching aids are in the places where we meet – the forest, the logging operation site etc. This environment is the daily “office” of our professional learners. Everyone in the Skogforsk-team already have an open mind – wants to learn from the forest professionals and have a desire to teach expert knowledge.

The main obstacle to implementing the Nextfood model during the period reported was the Covid19-situation, from early spring 2020 and still not over. The fact that we were not allowed to meet made it very difficult to motivate our learners. Quite soon, we

noticed that it was difficult to have a good dialogue with everyone in the group at a digital meeting. How do you get to know someone behind a screen? Where does the small talk end up when you do not gather for a coffee? How do you get everyone to talk when you don´t have eye contact and can feel the atmosphere?

The learners in our case, i.e., the machine operators employed at a forest company are used to traditional learning situations, where they are the receivers of knowledge or instructions. Some of them are not very comfortable with or used to reflect and discuss, and there was an obvious need to build trust between those who had never met before, and this was not very easy when we did not actually meet. After two digital meetings, when we noticed that the machine operator's motivation quickly declined, we decided to end this cycle and the course leader made a last round of phone calls with the machine operators to sum up.

In addition, technical problems, e.g., quality of sound when out in the forest, swaying connections, did not make things easier. Several of the participants did not have headsets for outdoor use and windy conditions caused some disturbance. Also, the Zoom app turned out to be very power consuming, something that led to some phones got out of power.

Another fact that made it difficult to maintain the pace and achieve continuity in the course, was that the group diminished over time because of parental leave and holiday trips. We found that it would be very time consuming to get back on track and to keep a live dialogue going among all participants.

It is important to also have in mind that working with professionals is quite different from the situation of working with students. Professional machine operators do not have scheduled time to work with projects and written assignments, like full-time students have. Their working days are totally focused on achieving a sustainable and profitable harvesting operation. This requires that they can continuously observe their environment, use their knowledge, and reflect on the options available to be able to choose the best solution at that moment. Written documents e.g., student reflection and self-assessment documents are not applicable to our target group. Our experience is that it was very difficult to make the participants completing the self-assessment forms and submit them to us. Therefore, we have had to test and try out different ways and to adapt our work model to reality. For example, we have used self-assessment of case related topics and core competencies to try to catch their development.

3.6.3 Data on the development of the case since the last reporting

N.B.

Results of students and participants from the Skogforsk team are shown in the same figures.

Because of the difficulties to fulfil this course cycle, it is not possible to draw any definite conclusions from the material collected so far. However, to give a picture of how the participants assessed their own competences and an impression of how they experienced the meetings arranged (one physical and two digital) a few diagrams are shown here.

In the Cycle Report section there are further explanations of the difficulties we experienced so fare and how we plan to use these experiences when we plan a new cycle with forestry professionals.

Respondents

According to the original plan, total number of learners was supposed to be six, four machine operators and two forestry officials. For various reasons none of the officials turned up at the meetings and one of the operators did not participate at all. Only one of the machine operators fulfilled all three meetings, the other two were not able to attend the third and last meeting.

In addition, it proved to be very difficult to get the participants to fill in the questionnaires if not done in direct connection to the meeting where the case leader collected the forms immediately after finishing the meeting. As the case leader was not present at the site during the third meeting and only one machine operator participated (via mobile phone) no data was collected from this meeting.

That is, total number of learners, is too small for statistical analysis.

3.6.3.1 *Students' Participants´ responses, learning and competence development*

3.6.3.1.1 Methods of data collection and analysis

After each meeting, the course leader collected the forms for self-assessment and course evaluation from the participants. Between meetings, phone calls with learners were used to try to catch reflections and thoughts.

All meetings were documented in text by the researcher – agenda, subjects discussed and comments. In the first meeting when we met also observations were documented.

3.6.3.1.2 Results

3.6.3.1.2.1 To what extent does the education enhance the students' participants competences of:

In connection with each course meetings, participants were asked to complete a self-assessment form. Results from the meetings are presented in diagrams below.

Because the number of respondents is low (2-3 persons in each category), and training of have been sparse with this group competences has not been made material is very small, it is not possible to to draw any significant conclusions from the material collected.

3.6.3.1.2.1.1 observation?

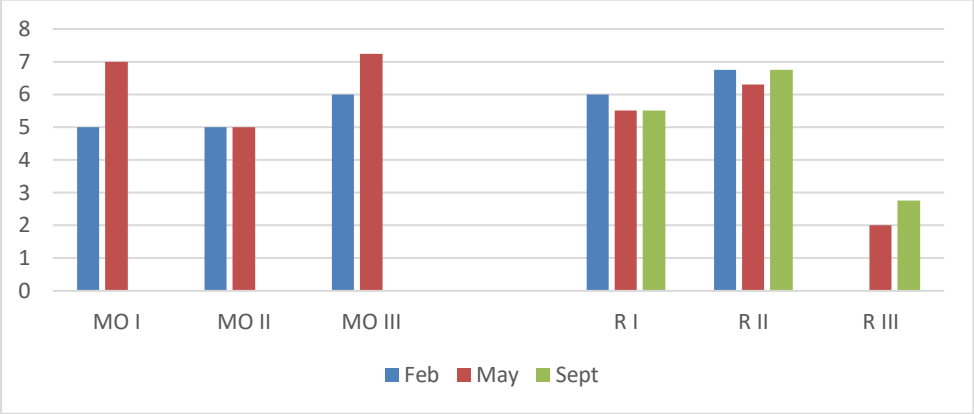


Figure 1. Self-assessment of core-competence OBSERVATION - mean value per participant in connection to each course meeting. (MO = Machine operator, R = Researcher)

3.6.3.1.2.1.2 reflection?

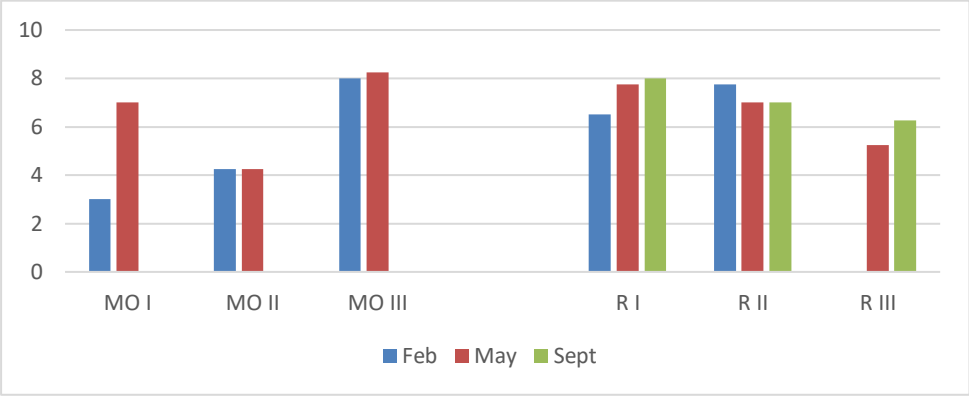


Figure 2. Self-assessment of core-competence REFLECTION - mean value per participant in connection to each course meeting. (MO = Machine operator, R = Researcher)

3.6.3.1.2.1.3 visionary thinking?

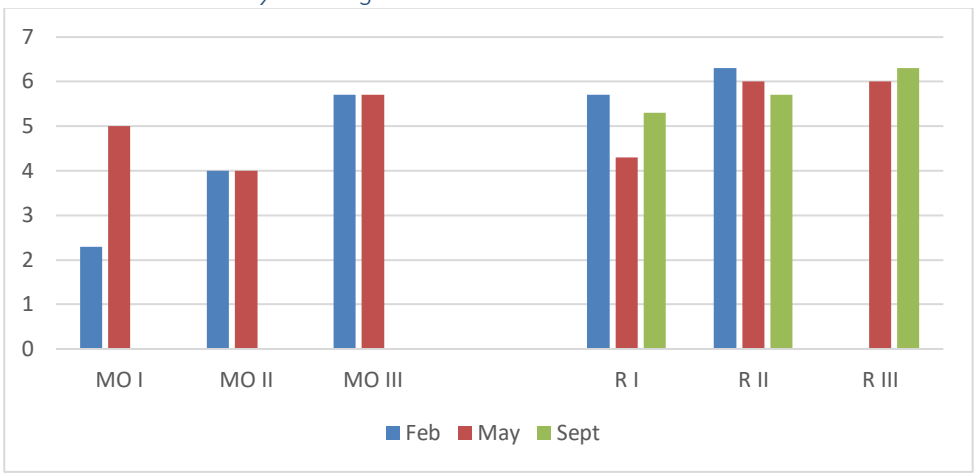


Figure 3. Self-assessment of core-competence VISIONING - mean value per participant in connection to each course meeting. (MO = Machine operator, R = Researcher)

3.6.3.1.2.1.4 dialogue?

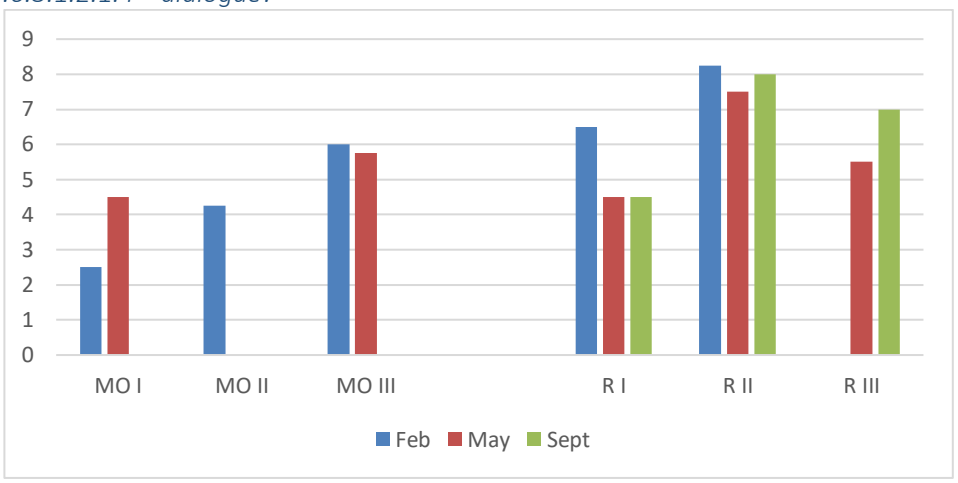


Figure 4. Self-assessment of core-competence DIALOGUE - mean value per participant in connection to each course meeting. (MO = Machine operator, R = Researcher)

3.6.3.1.3 Results

3.6.3.1.3.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.6.3.1.3.1.1 From lecture hall to a diversity of learning arenas

3.6.3.1.3.1.1.1 Supporting forces and how to build on them.

Skogforsk normally offers short courses for professionals and most of the time we meet our learners and other stakeholders at a forestry district office or in the forest where our main learning source is dialogue around actual problems, possibilities, or situations in the everyday work of the participants. This means that, in the initial planning there was no need for us to make a shift from lecture hall to other learning arenas.

3.6.3.1.3.1.1.2 Hindering forces and how to deal with them.

The Covid-situation (starting early spring 2020) forced us to find new ways to meet our learners, i.e., to change the learning arena from forest site to digital meeting place (Zoom).

The fact that we were not allowed to meet made it very difficult to motivate our learners. Quite soon, we noticed that it was difficult to have a good dialogue with everyone in the group at a digital meeting.

3.6.3.1.3.1.2 From lecturing to co- and peer learning

3.6.3.1.3.1.2.1 Supporting forces and how to build on them.

The circular model used within Nextfood is expected to give an added value to the learning process for machine operators, as well as for the Skogforsk team.

Everyone in the Skogforsk-team already have an open mind – wants to learn from the forest professionals and have a desire to teach expert knowledge.

3.6.3.1.3.1.2.2 Hindering forces and how to deal with them.

The learners in our case, i.e., the machine operators employed at a forest company are used to traditional learning situations, where they are the receivers of knowledge or instructions. Some of the participants were not very comfortable with or used to reflect and discuss, and there was an obvious need to build trust between those who had never met before, and this was not very easy when we did not actually meet.

3.6.3.1.3.1.3 From syllabus to supporting literature/a diversity of learning sources

3.6.3.1.3.1.3.1 Supporting forces and how to build on them.

Our main learning source is dialogue around actual problems, possibilities, or situations in the everyday work of the participants.

To keep the dialogue going between meetings we started a chat on our phones. For this purpose, we use an app (*Supertext*) where members of the Skogforsk team and forestry professionals, on equal terms, can create posts from everyday work or observations linked to the theme of previous case-meeting. Posts can be questions, fostering a (short) dialogue and further knowledge transfer or observations illustrated by photos, acting as proof of an increased understanding and knowledge of the subject. In connection to meetings, different topics, i.e., the core competences were also repeated and addressed by phone or Supertext.

Supporting literature often include information and results from R&D-projects conducted at Skogforsk and universities that we collaborate with. (Popular science in reports, the magazine Vision and on the web; www.skogforsk.se.

3.6.3.1.3.1.3.2 Hindering forces and how to deal with them.

3.6.3.1.3.1.4 From textbook to a diversity of teaching aids

3.6.3.1.3.1.4.1 Supporting forces and how to build on them.

Normally, our teaching aids are in the places where we meet – the forest, the logging operation site etc. This environment is the daily "office" of our professional learners.

3.6.3.1.3.1.4.2 Hindering forces and how to deal with them.

The Covid19-situation was the major hindering force also in this case. Because we could not meet, we tried to use photos to describe different phenomena and examples that we wanted to discuss. However, the experience is not at all the same as when we can gather at a site and for example point at certain phenomena that we wants to know more about or discuss.

3.6.3.1.3.1.5 From written exam to a diversity of assessment methods

3.6.3.1.3.1.5.1 Supporting forces and how to build on them.

3.6.3.1.3.1.5.2 Hindering forces and how to deal with them.

Written documents e.g., student reflection and self-assessment documents are not applicable to our target group. Our experience is that it was very difficult to make the participants completing the self-assessment forms and submit them to us. Therefore, we have had to test and try out different ways and to adapt our work model to reality. For example, we have used self-assessment of case related topics and core competencies to try to catch their development.

3.6.3.1.3.1.6 From lecturer to learning facilitator

3.6.3.1.3.1.6.1 Supporting forces and how to build on them.

Most of the experts and researchers at Skogforsk are used to act as facilitators in different situations. Our main target groups for vocational courses, i.e. professionals and stakeholders are in most cases based on dialogue with the participants rather than lecturing.

3.6.3.1.3.1.6.2 Hindering forces and how to deal with them.

3.6.3.1.3.2 What such a change requires from teachers, students and institutions

To fully be able to adapt the Nextfood model it must be customized to fit the target groups that we are working with, e.g., often small groups of forestry professionals with various educational background.

3.6.3.1.3.3 Teachers´ perception of the greatest challenges to achieving such a change

The part of the Nextfood model that include a diversity of learning arenas, learning sources and teaching aids as well as “learning from each other” is well in line with how Skogforsk are used to work with education.

The current / basic design of the model is to large extent customized for full-time students at a university education, often over a long period of time. The students have chosen to study and that is their main activity.

The conditions in our case – full-time professionals with busy working days – is the greatest challenge and is quite different from the situation of working with students at a university/school.

Professional machine operators do not have scheduled time to work with projects and written assignments, like full-time students have. Their working days are totally focused on achieving a sustainable and profitable harvesting operation.

An important challenge when trying to implement the Nextfood model during the period reported was the Covid19-situation, from early spring 2020 and still not over.

We believe that our group of learners would have been much more motivated if we could meet regularly and and to collaborate in our main classroom.

3.6.4 Concluding remarks on the case development since the previous reporting

The Covid19-situation made it very difficult to run the course as planned and to fulfil the goals. Keeping participants motivated required much more time and energy, especially for the course leader, than we had planned for. We noticed that it was very hard to create activity in between meetings, unless the facilitator or researchers took the initiative – posted photos or questions in the app.

3.6.4.1 *The most useful and inspiring experiences (supporting forces)*

Previous experience from arranging courses on forestry and biodiversity show that best results are reached when lecture hall is replaced, and all participants meet outdoors in the forest.

Our experience show that this was true also for this specific project. Meeting with the machine operators at their own job site, i.e., the current harvesting area, enable us to about what we all see at the same time and to exchange of knowledge is on an equal level.

3.6.4.2 *Main obstacles/challenges encountered (hindering forces)*

The arrangement is based on the fact that we discuss questions on predetermined themes, but in connection to the site where they are currently working using local conditions and various habitats to feed the dialog.

The first case-meeting took place in the forest, at a site where the logging team worked at time of the meeting. Then, because of the Covid19-situation, the conditions changed, and we had to rethink and find new ways to continue the project.

The second and third case-meetings were organized as digital meetings (Zoom) on mobile phones and computers. All participants met behind a screen, operators in their machines, the facilitator in a forest close to the machine team and the researchers at their home office or in a forest area close to their home.

Quite soon, we noticed that it was difficult to have a good dialogue with everyone in the group a digital meeting. How do you get to know someone behind a screen? Where does the small talk end up when you do not gather for a coffee? How do you get everyone to talk when you don´t have eye contact and can feel the atmosphere?

In addition, the fact that connection swayed, and computer and phone batteries ran out during the video meeting, did not make things easier.

After two digital meetings, when we noticed that the machine operator's motivation quickly declined, we decided to end this cycle and the course leader made a last round of phone calls with the machine operators to sum up.

Another fact that made it difficult to maintain the pace and achieve continuity in the course, was that the group diminished over time because of parental leave and holiday trips. We found that it would be very time consuming to get back on track and to keep a live dialogue going among all participants.

3.6.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

However, during this process, going from physical meetings with a lot of energy to digital meetings with declining motivation, we have learned a lot.

We are now ready to plan a new edition of the course. We are currently recruiting new participants and we hope to be able to start a course in the fall. We hope and believe that progress has been made and that a large proportion of the population is vaccinated against Covid-19 and that most restrictions are lifted, so that we are able to implement course meetings outdoors in small groups.

During the process of going from physical meetings with a lot of energy to digital meetings with declining motivation, we have learned a lot.

Prerequisites

- Our learners are professionals with focus on productivity, therefore it is important to create a common understanding of the benefits of participating in the case before each learning cycle starts.
- A contract signed by the employer, that determines time set aside for participants to take part in the course. Perhaps also a contract where the participants commit to follow the course from start to end.
- All meetings must be scheduled before the course starts.

Facilitation

- The course leader has an important role to keep in contact with the participants in between meetings. E.g., to call them on regular basis to capture relevant examples from their everyday work. These conversations should be documented and considered as raw data.
- Appoint a responsible person to keep the dialogue alive and encourages input between meetings (physical or digital).

Learning aids:

- A lot of basic material is already developed and is still useful.
- Professional machine operators do not have scheduled time to work with projects and written assignments, like full-time students have – we need to develop methods to evaluate progress in core competences e.g.,
    - digital forms for collecting self-assessment and evaluation.
    - Digital form with a few pre-defined questions for a short daily/weekly reflection – fulfilled before the participant leaves work.
    - Exercises on core competences – for example one per week to fulfill in a digital form.
- Supertext-app to communicate in between meetings.
    - Appoint a person responsible to keep the dialogue going in the app.

We need to have alternative plans and be flexible:

- Our learners are very busy and often must adapt to what happens in nature (e.g., storm or snow) and on the market for forest products. This means difficulties to keep the plan of our activities.
- Plan A – if conditions enable physical meetings.
- Plan B - if we need to go digital.
    - Digital meetings should be short and frequent.
    - To create commitment and trust in a digital group, it is important to include a time for small talk so that the participants have a chance to get to know each other.
    - Dialogue and reflections in break-out-rooms combined with meetings in whole group.
    - Digital meetings could be recorded.

Regardless of the situation, it is important to arrange a kick-off meeting (outdoors) before the summer holiday to get to know each other.

To find time for meetings, education, and vocational training.

3.6.4.4 *Plans for how to move forward into the next cycle*

We are now planning a new edition of the course and currently we are recruiting new participants and we hope to be able to start a course in the fall. We hope and believe that progress has been made and that a large proportion of the population is vaccinated against Covid19 and that most restrictions are lifted, so that we are able to implement course meetings outdoors in small groups.

3.7 University of South Bohemia (USB)

3.7.1 ID card

Course title:	Development of sustainable farming systems I+II
Level:	MSc.
Language:	Czech + English
Host institution(s):	University of South Bohemia in České Budějovice, Faculty of Agriculture
Leaders:	Jan Moudrý, Reinhard Neugschwandtner
Researchers:	Chisenga Emmanuel Mukosha, Nela Küffnerová

Timeline of the activities covered in this report

Course divided into two parts (semesters).

Beginning of the course 1.10.2020

Winter holiday 21.12.2020-3.1.2021

End of first semester 14.1.2021

Examination period 18.1.2021-12.2.2021

Start of the second semester 15.2.2021

End of second semester 22.4.2021

Examination period 26.4.2021-28.5.2021

Learner categories and number per category (demographics)

9 learners total, 2 male, 7 females

Age: 21-25: 9

Czech: 9

all 9 graduates of bachelor course Agroecology

3.7.2 Extended summary of development of the case since the previous reporting

3.7.2.1 *Actions taken since the previous report*

3.7.2.1.1 Planning

The second cycle was planned on base of previous experiences. We made changes in the structure of the student projects, areas for practical works were changed and all projects were situated on one farm. Former three separated student projects were merged into one complex project with three sub-topics included. Cooperation with new participants from farming practice was established and teacher team was extended. Planning was realised more in advance with involvement of the farmers and external experts. Content of the course was modified (slightly reduced), to provide more space

for student activities, presentations, discussions, etc. It was little bit difficult to organise planning meetings with farmers, as they had full season during our planning phase

3.7.2.1.2 Implementation

Although everything was well planned and prepared in advance, only the first meeting was realised in accordance with our plans. From second week of the course, all university activities were switched into on-line mode, due to COVID lockdown. Rest of the course was realised on-line via MS Teams. We tried to motivate students to the active approach, also individual visits of the target area of the student projects were suggested. External experts were invited in accordance with original plan to the lectures, but for farmers this format wasn´t suitable and their involvement was relatively low (against the plan). Due to different time demands of the fully on-line course, the structure of the projects was modified, and social part of the project was cancelled (resp. reduced to the lecture and discussion). The environmental part was also time demanding in the on-line form, it was necessary to reduce theoretical parts. For students was difficult to keep attention during longer on-line sessions, therefore the length of the regular meeting was reduced. During course, there was also minor technical problems, mainly due to unstable internet connection of the students. There was visible progress in student willingness and ability to communicate in on-line mode, but the discussion and most of the activities were affected by on-line environment and probably worse in comparison with normal personal meetings.

3.7.2.1.3 Reflection

On base of collected data and feedback from all involved actors, the updates of the course are prepared. The course was affected by COVID-19 situation, yet some of aspects (e.g. multi-actor approach) were evaluated as very positive. There are still improvements needed in structure of student projects and in conception of the course, where some of the topics (theoretical lectures from environmental part) will be moved on the beginning of the course.

3.7.2.2 *Research results since the previous reporting*

Since previous reporting, the course content was updated and the number of student projects was reduced on two main projects. New external experts (farmers) were involved into course, however due to COVID-19 situation, interaction with farmers was very limited and visits of farms weren´t possible.

3.7.2.2.1 Students', teachers' and other stakeholders' experiences and learning

Students very often mentioned positive effect of active approach, although for the teachers it was difficult to motivate students, especially in on-line environment. After few meetings with the students, the progress was clearly visible, especially in comparison with other student groups, not involved into innovative methods multi-actor action learning approach. Students appreciated discussions with other involved actors and overall atmosphere of the course. Most of the students is not prepared for active

role in educational activities, therefore they often mentioned need of higher share of theoretical lectures. For the teachers, it was difficult to keep motivation and activity of the students and also to involve some of the external experts, especially farmers. Stakeholders from environmental practice evaluated the course positively, student project, where they were involved, was realised during second part of the course, where the students were more familiar with new approach and much more active than on the beginning of the course. Stakeholders from farming practice were involved only partially, as the visits on farms weren´t possible and farmers activity during the on-line meetings was limited.

3.7.2.2.2 Outcome of the case development process, including effects of making the essential shifts

We were able to realise only part of the shifts, due to COVID-19 situation, e.g. change of learning arenas – we were during whole course on-line. Students (and actually all stakeholders), made progress in communication skills, leading of the dialogue and they also improved critical thinking and active approach.

3.7.2.2.3 Supporting and hindering forces for implementing the Nextfood model

There is still difficult to motivate students for the activity, what affects especially the discussions, individual work of the students, their input into the course (e.g. presentation of own learning sources). This is problem on the national level, where after long years of passive approach of the students, which are not motivated for activity, we trying to completely change their behaviour and approach. It will be necessary to repeat this process each year, as the new students (not familiar with NEXTFOOD methods) will join the course. Similarly, also by some of the external experts (especially farmers), the students are not perceived as partners and it takes some time to put them together and to create atmosphere suitable for dialogue. Another hindering force will be the budget for the involvement of the external experts, who usually don´t want to spent their time for free. For the practice part of the projects realised on farms, the logistic could be hindering force, especially when there will be more students in the groups. Supporting force could be positive feedback from the absolvents of the course, resp. from their employers.

3.7.3 Data on the development of the case since the last reporting

3.7.3.1 *Students' responses, learning and competence development*

3.7.3.1.1 Methods of data collection and analysis

At the beginning of the academic year, the students were asked to reflect on the four questions regarding their expectations, contributions, and understandings. The reflection documents were sent to the students as an assignment to the course. The students were later sent reflection documents on their competencies which were also part of the course assignment. Interviews were also conducted at the start of the academic year, during the course and at the end at the year. The collected data were in form of written student reflection documents and the audio interview recordings. The

text data was analysed qualitatively using descriptive coding in NVIVO qualitative data analysis software (QSR International).

3.7.3.1.1.1 First week (day) & last week (day) of the course

3.7.3.1.1.1.1 Student's understanding, contributions, and expectations

At the start of the academic year, the students were asked about their knowledge and skills needed to support sustainable development in the agri-food and forestry systems. Most of the students mentioned the need to enhance a more practical approach towards the learning process and improved ecological knowledge. Others highlighted the lack of agrotechnical measures. Others brought up the lack of product marketing amongst farmers and the need to educate marketing skills. A few students raised the need to increase interest in protecting nature without damaging the quality of the agricultural produce, emphasizing the lack of sustainability knowledge and soil protection. At the end of the semester Student´s understanding and expectations changed little bit, as the students see the improved model of education in practice. a few students repeated some of the needs, however most students elaborated the needs of improved communication and marketing skills among farmers and stakeholders.

Others suggested the need for in depth knowledge about sustainability and environmental protection in to order to support sustainability. Others mentioned the ability to identify the problems and be able to independently decide to solve the given problem. A few saw the need of improved information distribution about the sustainability and suggested social networking sites as a medium of educative information distribution. Collectively the students share the desire to try and improve the sustainability of agri-food and forestry systems.

Students were also asked about the experiences and competencies they bring. Most students highlighted their ability to participate actively and communicate with the facilitators during the course, both on-field and in-class environment. Some students highlighted their farming experience from working on the farm or interacting with farmers. A few students offered to share stakeholder or farmer's contacts to build a network and gain more practical trends worldwide. At the end of the semester the students were asked about the experiencing and competencies they brought during the course, most of the students highlighted on the joy they had in sharing their ideas and opinions the problems and situations during the course. A few students did mention the impact online form of studies affected their contributions to the course, as they felt in a classroom environment they would have engaged and contributed even more

When asked about the questions they would like this Course to address the students raised several interesting questions such which were more specific, and the interesting part was most questions were related to sustainability. Students posed questions such as “how agricultural policies affect the day-to-day activities?” how would sustainable agricultural production be in CR and EU with reduction in subsides? At the end of the

semester the students were asked a progressive question about the course the course help the answer. Most students admitted to having their questions answered through course. Several students pointed out that the course hugely helped them with the master thesis as they had topic closely related to the course. A few students mentioned about the improved knowledge about setting up crop rotation.

On the competencies, the students would like to improve a vast majority of the need to enhance their ability to work with information database systems used in the industry. Others raised the need for more knowledge about the CR and the EU subsides. Most of the students emphasized the not only to gain know about sustainability but the need to apply the knowledge in practice. Others aimed at skill development such as improving communication skills, decision making during critical situations and ability to solve expert problem independently. A few mentioned the need to improve their understanding of agroecology trends and practices internationally. When asked about the competencies they significantly improve a vast majority of the students emphasized that they significantly improved their orientating with the LPIS data base system, and it will be valued in their future. A few students improved their communication and decision-making skills.

Last but not the least, when asked about the questions they were asking themselves at the end of the course. The students posed several questions “why aren’t their more measures about soil erosion when it’s not even time consuming of financially expensive” “how will this course help in future practice” “does livestock production have much great impact on natural ecosystems than crop production”. Only did the students have question but also had opinions such as “conventional production with an emphasis on animal production is absolutely unsustainable for future life on this planet”.

3.7.3.1.1.1.2 Self-assessment of competences

To track the progress of the students a self-assessment was conducted at the beginning and at the end of the course by filling in a questionnaire about their competence on a scale from 1 (Novice) – 9 (Expert). For statistical significance of the differences between the self-assessment figures at the start and end, a student t test was done. The p-values indicate an increase in the competences.

Table 1: Average scores of student self-assessment – competences at the start and end of the course. The scale used was 1 (Novice) – 9 (Expert).

Competences	Average scores			Significance
				P value
	Start	End	Diff	
Observation	4,75	5,22	+0,47	<.0001***
Participation	4,67	5,47	+0,8	<.0001***

Visioning	3,69	4,48	+0,79	<.0001***
Reflection	4,28	5,16	+0,88	<.0001***
Dialogue	3,53	5,47	+1,94	<.0001***

At the start of the course a vast majority of the students evaluate themselves as advanced beginners or as competent performers, in a few cases as beginners and proficient performer. There was a significant improve in the dialogue competence as at the start of the course it was the lowest average compared to the end being the joint highest with the participation competence. Observation showed the least amount of change which could also be attributed to the online form of learning. Reflection did have the second highest difference in average. None of the student showed a decrease in the competence score. Overall, there was slight improvement in all five competences as shown in figure 1 above.

3.7.3.1.1.1.3 Students' final reflection document (individual)

At the end of the semester the students were asked to evaluate the course after its completion. The reflection documents contain insights on the student's experiences during the learning process. To analyse these reflection documents qualitative analysis was done using NVivo software.

Most of the comments were very positive and supportive, the students generally shared a positive experience of the course. The students also mentioned their increasing abilities and skills. Most students were amazed by the learning approach as I took them out of their comfort zone and the curriculum of the course as it involved a lot of practical work such as solving actual problems faced by sustainability, though in two cases of students that joined the course in the second semester preferred a more theoretical approach opposed to the practical approach taken. Others were impressed by the engagement of facilitators from other faculties and universities, and it allowed them to gain external information and the diversity of the topics.

Most of the students were impressed about how they learnt to work with the LPIS database which was one the key expectations they had when enrolling for the course. Other students were happy they had the chance to be able to express their ideas about the practical problems that were posed to them.

Students had some interesting thoughts about the online form of learning, most of the students were saddened by the current online situation as they had no chance to collectively go on the field. A few students thought they lost concentration and sometimes the motivation to be more involved during the course. They suggested switching on the cameras as it allows them to pay more attention which will lead to

more participation as they had experienced it during the student exchange programs Erasmus.

3.7.3.1.2 Results

3.7.3.1.2.1 How do students experience such a learning process with respect to:

3.7.3.1.2.1.1 learning goals?

Students had different expectations and goals at the beginning of the course that they wanted to achieve. Most of the students gave a positive feedback about their goals and expectation and highlighted how the course was in line with their expectation. A few mentioned that the course helped in their thesis research.

3.7.3.1.2.1.2 view on competences needed for sustainable development.

At the being of the course most students highlighted the need for a practical approach which was addressed in the course was we developed a more practical approach against the traditional theory.

3.7.3.1.2.1.3 recognition of own competences and competence development?

Students did notice an improvement in their competence at the end of the course. Students found this course very beneficial and different from most courses they tool. It gave a different approach which improved their skills as shown in table 1 above.

3.7.3.1.2.1.4 transformation?

Students changed their approach during the course, most of them became more active and they started to use critical thinking, they started to ask, bring our opinion and to use arguments.

To what extent does the education enhance the students' competences of:

3.7.3.1.2.1.5 observation?

When it comes to observation it was a slight challenge in the beginning as the form of study was new, some students had their cameras off and eventually during the sessions but when asked questions they would actively respond and this showed they were paying attention and observative to the proceedings of the lessons, though some of the students expressed the difficulty to concentration and actively observe due to distraction in the home environment

3.7.3.1.2.1.6 reflection?

Students ability to reflection was partially changed, due to improvements in other aspects. As we tried to motivate students to use critical thinking and to have active approach oriented on problem solutions, they improved also their reflection. This was influenced also by the improvement of communication skills.

3.7.3.1.2.1.7 visionary thinking?

With the more practical approach the students admitted to giving them I different view on how to see and solve actual problems in practice, most of the highlight that the course helped them get ready to think and act independently in practice when faced with challenges.

3.7.3.1.2.1.8 participation (engagement)?

The students did actively participate during the course and where not afraid to share their own views, ideas, or experiences though most students stress that the online form of study slightly hindered their participation as they were not used to it. Student liked the learning approach and most of them which it would have been a classroom environment as they would contribute and participate more

3.7.3.1.2.1.9 dialogue?

In comparison to the beginning of the course there was significant improvement in dialogue during the course, though in a few instances there was a language barrier as some sessions and presentation where in English which brought a slight challenge.

3.7.3.1.2.1.10 dealing with "the challenge of the whole" (systems thinking)?

Most student expressed the readiness to face challenges in practice as most of the and little or no knowledge about the information databases which were covered during the course.

3.7.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.7.3.2.1 Methods of data collection and analysis

3.7.3.2.1.1 Teacher reflection document

The course was strongly affected by the COVID situation, which leads to the fully on-line form of education, without possibility of meetings of students and other participants, visits on the farms, etc. If during the first cycle was difficult to gain students trust and motivate them to the active approach, in on-line mode this was even bigger challenge and continuous support from facilitators was necessary.

During first cycle students switched into active and responsible approach after first three or four meetings and all of them were active. On-line environment (where the students don´t use web cameras, from different reasons) was more difficult and activity of some of the students was lower. Also, it wasn´t possible to use some of the tools suggested by Nextfood methodology, which were successfully used during first cycle

(diversity of learning arenas). Bring students to the more active mode and keep their attention was one of the biggest challenges for this cycle.

Nevertheless, during the course the student's activity increased and their progress was visible in comparison with other groups of students, who absolved only traditional lectures. Students' ability to present own opinion, work individually with the data, search for information, connect them and present them to other participants increased during the course. However, the full-time form would probably bring significantly better results.

On-line mode was challenge also for the external experts and for some of them (especially farmers), this form of cooperation wasn´t suitable and their involvement was lower. Cooperation with expert on environmental topics was very successful even in on-line mode, students often mentioned usefulness of gained information and skills (especially work with system for farmers, landscapers, environmentalists, and other relevant professions - LPIS), which could be very useful also for their future practical work.

We will need further develop our communication skills and collect more methods as e.g., rich picture, which are very useful for increasing of the student activity Even if some of students didn´t feel comfortable to paint the pictures and present them to the other participants, this method worked very well.

From the point of view of content, the course is now balanced and we will do only minor changes for next cycle. These changes should lead to the more intensive involvement of students and to the better connection between theoretical and practical parts of the course.

For some of the teachers, there still could e difficult to change their role from the teacher to the facilitator, for students there is difficult to apply critical thinking and to present it, especially in discussion with teachers or experts from practice. This is probably problem of the system of education, which is forming the student approaches for long years on all levels of education and until this will last, we will have to overcome the problems associated with this approach at the beginning of each course cycle and our results will be limited by this factor.

Positive is, that the change and innovative approach is welcomed by most of the students, and they highly praised our approach.

3.7.3.2.1.2 Course reflection focus group/interviews

From discussion with group of relevant respondents it is clear, that most of the problems are the same, as last time. Very often is mentioned focus on scientific results, instead of education - quality of education is evaluated like less important (almost unimportant) factor – most important are scientific results, important is number of students on institution, but not the quality of their education. This leads to the situation, where universities and their absolvents are often perceived by practice like insufficient – absolvents gain practical skills during employment, not during educational process.

Even if the cooperation with practice is often mentioned like important factor, the support is very limited, and evaluation of institutions is based mainly on scientific results. Farmers usually don´t see reason for cooperation with universities, or at least cooperation with students.

Obstacle is also personality of some teachers – for some of them is impossible to change role to the facilitator and perceive students as colleagues, not as subordinates

3.7.3.2.2 Results

3.7.3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.7.3.2.2.1.1 From lecture hall to a diversity of learning arenas

3.7.3.2.2.1.1.1 Supporting forces and how to build on them.

Originally there was planned to have ca. 1/2 of the meetings with students at lecture rooms and in university campus and second half on the farm. After first meeting with students, where the content and program of the course was introduced, all educational activities on university went into fully distant mode, due to COVID situation. All interactions with students and other actors were realized on-line via MS Teams, students received detailed instructions about target areas (farm/particular fields) and suggestion to visit these places individually (most of them already did). The farm, fields related to the student's project and surrounding landscape was also partially "visited" on-line with use of tools as Google street-view or LPIS maps and videos and pictures from previous cooperation with farm were used.

3.7.3.2.2.1.1.2 Hindering forces and how to deal with them.

Due to on-line form of education, it is difficult to estimate the effect of the "From lecture hall to a diversity of learning arenas" step, but one of the indicators could be communication activity of the students, which was much lower in on-line environment (although the students tried to be active). There was big difference between students, who already have some experiences in on-line forms of educations, and those, who do not have.

On-line form of education also brings some obstacles, due to unstable internet connection of some of the students, some of them didn´t used the web-cameras and tis behaviour was soon followed by others, so most of the meetings was realised with

cameras off. Some of the students were connected via their smart phones, some used tablets, notebooks, desktop PC, etc. This variability sometimes brings another obstacle as absence of microphone, in one case, or difficulties during works with some of IT Tools and programmes and during presentations of student works.

Due to COVID it was also impossible to visit courses in other countries (to see and experience the good practice examples), so we still need to see some examples of realization on other institutions (logistic, course organization…) and to have more examples of indicators for evaluation of desired effect. Also, the knowledge of more methods suitable for work in on-line environment could be very useful.

3.7.3.2.2.1.2 From lecturing to co- and peer learning

3.7.3.2.2.1.2.1 Supporting forces and how to build on them.

There was progress in communication skills with further lectures, and ability to use arguments and to present own opinions was increased. This was clearly visible during lecture within another course, realized in March 2021, where group of students from NEXTFOOD case was mixed with other students, who weren´t involved into innovative model of education. Especially communication with invited expert and with teachers, but also ability to participate on short exercises and presentation of own outputs was much better on side of students involved into NEXTFOOD case. Also, here could be useful to visit some good practice example (and not to only see it from presentation).

3.7.3.2.2.1.2.2 Hindering forces and how to deal with them.

The shift from lecturing is another challenge, in our conditions. Model from first cycle, where the idea was not to give the scripts and presentations, to the students, but to present the topic of current lecture/meeting to them in shortcut on the end of the each previous lecture and then asking them to be prepared for active participation during next meeting and to cooperate with other involved actors (other students, teachers, experts from practice), was partially changed, as the on-line form of education was limiting for some forms of interactions. Especially on side of the farmers, there was only small interest for on-line interactions.

Discussions between involved participants were strongly influenced by the on-line environment and we (facilitators) were only very few times able to “warm up” all involved persons to start and lead real full discussion. This passivity was one of obstacles, together with (similar to the previous cycle) the approach of some of external experts, who were not able to perceive students as partners for communication. This was changed in the case, when the external expert visited more of the meetings with students, and they find “common language”. Also, the students were more active during communication with someone they already know

3.7.3.2.2.1.3 From syllabus to supporting literature/a diversity of learning sources

3.7.3.2.2.1.3.1 Supporting forces and how to build on them.

Students were asked to use actively internet sources and to find own materials, which they can present to others. On the end of each meeting, they were informed about topic for the next meeting and asked to provide materials for sharing with others. Here the on-line environment was advantage, after few lectures, and it was easier and more comfortable to share and present materials via MS Teams. Also, some methods, as e.g., rich picture, were simply transferred to the on-line environment and served as good diversification and refreshment.

As the indicator, the number and variability of sources could serve, other indicators, which could be based on quality and quantity of gained knowledge/skills is difficult to evaluate during the course. More relevant could be evaluation of the further application in practice.

3.7.3.2.2.1.3.2 Hindering forces and how to deal with them.

Obstacles are in form of technical problems (stability of internet connection, different devices used by students), on the beginning of the course also lack the experiences with on-line work and sometimes communications of the students (activity). There is still language barrier (some of students have only very elementary knowledge of English language and only some materials are translated into Czech language), which was hindering force also during presentations leaded by English speaking colleagues. Similar to the first cycle, for the lecturer it is challenge to keep the information materials collection and presentation in the right direction. It is more time demanding, than to work with own materials prepared by teachers and sometime, even if the information brought by student are partially relevant, they can distract us from the main topic of the meting/course. This could be avoided by more detailed instructions/demands on the information, which should be presented by the students, but when the instructions were too strict and detailed, the creativity of students and variability of materials provided by them, was low.

It would be good to know more about time management – some of valuable sources are in form of the long texts/books and usually we don´t have enough time to read it. The short and “easy-to-follow” materials often don´t have necessary quality, resp. contains only basic and common information, instead of detailed information

3.7.3.2.2.1.4 From textbook to a diversity of teaching aids

3.7.3.2.2.1.4.1 Supporting forces and how to build on them.

The course is based on three pillars, which are in accordance with the pillars of the agroecology (agriculture-environment-social sphere). In agricultural an environmental part there were practical student works realized with assistance of relevant external experts. This learning-by-doing part is probably most valuable. During the theoretical parts of the meetings, we were focused on interactive approaches, discussions,

presentations, etc. Most of the content was presented by “doing and discussing”, but from the student feedback is clear, that this method is difficult to adopt for most of the students and their reactions are mixed.

Usually, they highly appreciate focus on the practice and possibility of practical realization, on other hand they are often asking for more traditional lectures and theoretical materials. We will need to find the way to balance these two components and how to teach students to derive theoretical knowledge also from the practical realization and exercises.

As the indicator, the number and variability of teaching aids could serve, also the ability to work with multiple sources could be evaluated

3.7.3.2.2.1.4.2 Hindering forces and how to deal with them.

Individual searching for the materials was time demanding, some materials have lower quality, but to find out, we need to read / watch / listen these resources. Also, the students usually choose the text sources, and only in very few cases something else (video, application…). It would be good to have inspiration from other courses, to extend scale of teaching aids

3.7.3.2.2.1.5 From written exam to a diversity of assessment methods

3.7.3.2.2.1.5.1 Supporting forces and how to build on them.

The activity of the students (communication and own initiative) was observed, the students presented their projects to other involved persons (other students, teachers, and relevant experts from practice). In frame of this presentation, the students explained their steps, outputs in moderated discussion.

Evaluation of the students was changed, formally we must follow the rules, where the evaluation by the grade is necessary. The grade is based on the knowledge, presented during the written test and oral exam. This can´t be canceled (at least ´till the re-accreditation of the study program), but in addition to the evaluation on base of the test and exam, we also added evaluation of the students based on the description of their work/skills and progress during the course. This evaluation was perceived by the students as much more effective, as the description of their strengths/weaknesses is included, and the feedback is for the students much more understandable against simple evaluation by the grade

3.7.3.2.2.1.5.2 Hindering forces and how to deal with them.

This is much more time demanding for the teacher and it is necessary to suppress personal sympathy / antipathy. It would be difficult to use this method for larger groups of students. We would like to know more about the possibilities and methods of

continuous evaluation, especially how to prepare evaluation of bigger groups of students. It would be good to see some practical examples of which indicators could be used, what are the optimal methods for bigger groups of students from the point of view of the time demand, etc.

3.7.3.2.2.1.6 From lecturer to learning facilitator

3.7.3.2.2.1.6.1 Supporting forces and how to build on them.

In our conditions this is difficult part, where we need to radically change the approach of teachers and at the same time to motivate students to change their approach and behaviour. The traditional form of education is very formal and based on dominance of the teacher (what actually increase the passivity of the students), it´s difficult for the students to be more active. The situation is even more difficult in current on-line environment, where we can´t use some of non-verbal aspects of communication and where the students can simply "hide" and be passive. We tried to use positive motivation, to support students to communicate, but still the level of interactions is not high (but the progress is visible, as was mentioned in previous points). Very useful was focus on small exercises and presentations of student findings/outputs. Also repeating of rich picture method and its application on different sub-topic have positive effects.

Increasing communication activity could be used as the indicator. During the course, the more meetings we absolved, the more students were able to talk about the project, lead conversation with other participants, ask questions, etc. Second cycle was strongly affected by on-line mode of education, which demands even more time to gain students trust and understanding, which leads to the active approach from their side.

3.7.3.2.2.1.6.2 Hindering forces and how to deal with them.

The obstacle is, that we will start again and again with each cycle, if the methods of education will not be changed on previous levels of education. Our students before case course absolved ca. 17 years of traditional frontal education and our first task is to teach them soft skills, as communication, use of arguments, critical thinking, etc. This is time demanding, strongly influenced by personality of students and we have limited time, which should be dedicated more to the agri-food sustainability topics. Similarly, to previous cycle, some of the involved external experts were surprised by the rule of facilitator and it is difficult for them, to perceive students as partners, but this time all of them were able to handle the situation and cooperate with students and teachers as partners/colleagues. Currently we have no questions for this point, but the further inspiration from other cases is very welcome.

3.7.3.2.2.2 What such a change requires from teachers, students and institutions

3.7.3.2.2.3 Teachers´ perception of the greatest challenges to achieving such a change

3.7.4 Concluding remarks on the case development since the previous reporting

3.7.4.1 *The most useful and inspiring experiences (supporting forces)*

There were two most inspiring moments, which bring motivation for further development of the case – feedback from the absolvent employer and interaction of "NEXTFOOD" students group with "non-NEXTFOOD" students in frame of another course. In first case we gained very positive feedback and offer for further cooperation from two different employers of absolvents of previous course. Second moment was during the together work of two groups of students in frame of course, which is not part of the NEXTFOOD case and where we (teachers from NEXTFOOD case) have only one-day involvement. Students visiting the NEXTFOOD case course were much more active and during the parts focused on dialogue, active approach and individual work, they significantly surpassed other students. Other inspiring experiences are based on interaction with external experts, where the farmers have positive approach during the planning phase (unfortunately, later, probably also due to on-line mode of teaching, their involvement wasn´t strong).

3.7.4.2 *Main obstacles/challenges encountered (hindering forces)*

One of the main obstacles we faced was the online form of study. Due to COVID it was also impossible to visit courses in other countries (to see and experience the good practice examples), so we still need to see some examples of realization on other institutions (logistic, course organization…) and to have more examples of indicators for evaluation of desired effect Other obstacles are in form of technical problems (stability of internet connection, different devices used by students), on the beginning of the course also lack the experiences with on-line work and sometimes communications of the students (activity). There is still language barrier (some of students have only very elementary knowledge of English language and only some materials are translated into Czech language),

3.7.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

We will continue with project oriented approach, the agricultural projects will be further improved in accordance with needs of the agricultural practice. Also we will continue with strengthening of the communication skills. We will need to prepare more methods and exercises focused on student activity and presentations, to cross the communication barrier as soon from the beginning of the course, as possible.

3.7.4.4 *Plans for how to move forward into the next cycle*

For the next cycle there will be minor changes in planning, we will focus on strengthening of the on-line forms of education (as back-up for the case, the lockdown situation will repeat). With progress in the course, students started to be positive and more active. They appreciated innovative approach, which was often mentioned as much more interesting and attractive even for on-line form of education. Some of their

ideas and suggestions will be used during the planning phase. The feedback collection was also affected by the on-line mode of education, especially on the beginning of the course, where was unclear, how the situation would develop. Also, the student project structure will be slightly modified, and order of particular parts will be changed. Practical works on environmental part of the project will be started earlier and connection with agricultural part will be explained wider (and hopefully better).

3.8 University of Gastronomic Sciences (UNISG)

MOG

3.8.1 ID card

Course title:	Agroecology & Sustainable Agriculture
Level:	1 week course in a (1 year) Master programme of "Gastronomy: Food Cultures and Mobility"
Language:	English
Host institution(s):	University of Gastronomic Sciences Pollenzo
Course leader(s):	Paola Migliorini and Geir Lieblien

Timeline of the activities covered in this report

May 2020

Learner categories and number per category (demographics)

25 females, 2 males;

2 students with Master degree, 25 students with Bachelor degree

3.8.2 Extended summary of development of the case since the previous reporting

3.8.2.1 *Actions taken since the previous report*

3.8.2.1.1 Planning

We needed to plan the Online version of the course. The most challenging aspects were the following:

- to find Online cases to replace farm visits

- to find common time slot for students that were at home from west coast of USA to Phlippine!

- to find appropriate tools for the students to develop joint Rick Picture online

- to develop groups discussion and breakout rooms

3.8.2.1.2 Implementation

We planned to shift to online all the course including Experiential learning, discussion and reflections online and so to find appropriate space and time (considering different time zone).

3.8.2.1.3 Reflection

To even more implement Experiencial learning in COVID restrictions, physical action learning (not online) or combination of physical and online action learning could be

organised in student's home countries for didactic process, depending on the students' location.

The University electronic platform could be used after COVID-restrictions for peer-feedback / reflection activities regardless mode of farm visits (in presence and online).

3.8.2.2 *Research results since the previous reporting*

The 3rd cycle of the short course of "Agroecology and sustainable agriculture" was completely different due to the COVID-19 restrictions. All didactic activities were organised online. However, main results were similar to the previous cycles of the course and include following:

- Improved the students' core competences,
- So-called "Transition" or changes between the students initial and final questions,
- Challenges in writing reflection document (in this cycle there were more challenges, probable due to online courses).

3.8.2.2.1 Students', teachers' and other stakeholders' experiences and learning

3.8.2.2.2 Outcome of the case development process, including effects of making the essential shifts

3.8.2.2.3 Supporting and hindering forces for implementing the Nextfood model

3.8.3 Data on the development of the case since the last reporting

3.8.3.1 *Students' responses, learning and competence development*

3.8.3.1.1 Methods of data collection and analysis

3.8.3.1.1.1 First week (day) & last week (day) of the course

3.8.3.1.1.1.1 Student's understanding, contributions and expectations

3.8.3.1.1.1.2 Self-assessment of competences

The students' self-assessment tests, received after the first and last days of the course, were elaborated on IBM SPSS Statistics 26, a pared two-tailed t-test was performed.

3.8.3.1.1.1.3 Students' final reflection document (individual)

3.8.3.1.2 Results

Table A. Students' competence self-assessments at the beginning and the end of the course in sustainable agriculture (n=27)

Competencies	First day	Last day	Change	P-value

Observation	4,57	5,65	1,08	*
Participation	4,83	6,00	1,17	***
Visioning	4,33	5,73	1,40	*
Reflection	5,00	6,18	1,18	***
Dialogue	4,72	6,39	1,67	***

Levels: 1–2 = novice; 3–4 = advanced beginner; 5–6 = competent performer; 7–8 = proficient performer; 9 = expert;

*p<0.05, ***p<0.001

3.8.3.1.2.1 How do students experience such a learning process with respect to:

3.8.3.1.2.1.1 learning goals

Many students mentioned improving knowledge as main learning goal for the course of Agroecology and Sustainable agriculture. This knowledge includes theoretical and practical issues of Agroecology.

Besides, improving competences (observation, participation, dialogue, critical thinking, organisational skills, development of their creativity) and another way of thinking were mentioned by the students a one the learning goals.

3.8.3.1.2.1.2 view on competences needed for sustainable development

The students listed different competences, knowledge and factors needed for sustainable development. All of them are provided in Table B.

Table B. Students view on skills, knowledge and factors needed for sustainable development

Knowledge	Skills	Factors
- seasonality, - crops, - water management, - use of pesticides and fertilizers, - sustainable farming practices	- holistic approach, - networking, - problem solving, - adaptability, - ability to handle complex situations,	- indigenous wisdom and intergenerational exchange, - education, - black feminism, - change of paradigms

- differenced between countries,
- concept of sustainable development,
- supply chains,
- soil and it's components,
- institutional factors affecting agriculture,
- social and environmental issues,
- national and international contexts,
- agricultural industry
- food waste
- recycling,
- sustainable consumption
- knowledge about whole eco-system,
- marketing strategies,
- current agricultural policies
- communication,
- facilitation,
- humility,
- willingness to participate,
- empathy all along the system

3.8.3.1.2.1.3 recognition of own competences and competence development

As their competences, the students described their pre-knowledge in several areas such as agroecology, sustainability, permaculture, marketing and consumer research. Besides, they recognised following competences:

- holistic view,
- problem solving,
- communications,
- active listening,
- making linkages between agriculture and society,

- comprehensive thinking,
- open mind,
- critical thinking,
- technical and interpersonal skills,
- creativity

3.8.3.1.2.1.4 transformation

Table 3. Comparison of initial and final questions of the students

Initial questions	Final questions
- Many “What” questions - Brief questions - Questions on agroecology and sustainability definition and concepts - Questions on the general concepts (realism of sustainable agriculture) - Demonstrated interest to agriculture in general - Questions like “Where food does come from?” from the students without agricultural background - Questions related to COVID-19 disruptions and consequences for agriculture	- Many “How” questions - “Long” questions concerning details - Descriptions of situation and deep questions - Questions related to the students’ role in the whole system, their possible contribution to different areas of agriculture and responsibility (“How can I…”) - Interest to future and sustainable development of agriculture - Global questions related to policy-making and financial issues - Specific questions: questions related to standards and small-scale farmers - Specified context: questions related to the certain problems in certain countries

3.8.3.1.2.2 To what extent does the education enhance the students' competences of:

3.8.3.1.2.2.1 observation?

Observation competence has the lowest growth (1,08). This could be explained by online didactic activities provided to the students. Thus, web-case (instead of experiential part of action learning) allowed to the students to observe each farm online. For some of them it was an interesting experience, while other students (without agricultural background) had difficulties to receive a comprehensive understanding of a farm without their physical presence there. This could be interpreted as one of limitations of online action learning.

As for Observation, there were two lessons that I internalized when creating the Rich Picture. Overall, the whole process of creating a Rich Picture taught me to be a better observer.

3.8.3.1.2.2.2 reflection?

Stakeholder document and final assignment (Individual reflection) enhanced the students' reflection competence. For most students this kind of activities was very new and interesting, but at the same time some students found difficult online reflection. That is why this competence doesn't have very high growth (1,18).

3.8.3.1.2.2.3 visionary thinking?

Visioning competence has pretty high growth (1,40), it was improved in the preparing Rich picture and Stakeholder Document.

3.8.3.1.2.2.4 participation (engagement)?

Both Rich Picture and Stakeholder document have enhanced the student' participation competence. According to the students' self-assessment, participation competence doesn't have the highest growth (1,17), that means an increased level of the students' participation (from Advanced Beginner to Competent performer). The higher growth could be provided by the physical students' participation, not online.

3.8.3.1.2.2.5 dialogue?

Many students mentioned in their feedback, that they improved a dialogue competence during their group activities. This improvement is expressed in the final self-assessment test, where the dialogue competence has the biggest growth (1,67). The growth in the dialogue competence also demonstrates shift between the levels: from Advanced Beginner to Competent performer.

The students gave their positive feedback on rich picture. This didactic activity was also new and exciting for many students and enhanced their dialogue competence and their ability to work in groups. Aforementioned online way of action learning, and

particularly online space for communication, nudged students to enhance their dialogue competence in order to complete the group rich picture. The students were based in different countries and in different time zone, they were split into the groups considering their geographical location, and their time zones. At the same time, due to different relations within the groups, some students struggled in their group work, because for them was not easy to have a dialogue with their peers and to put together opposite opinions. Thus, group work forced the student to overcome their personal issues and to adapt themselves to the group activities, particularly to organise a dialogue.

I have said very often to my friends that I like discussion. The word discussion however has a very negative connotation. It usually means that people have a different opinion and that neither wants to listen to the other and so they argue. I have very often had discussions after which I would say to my "opponent": "Wasn't his fun?!" What is meant to say is I like dialogue. I like hearing other people voice their opinion and show me a different perspective, but also raising questions to statements people make. The way dialogue is used in the Agroecology sector, is that you work together and come to a joint solution through dialogue.

3.8.3.1.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

During the course the students had several didactic activities such as rich picture, web-case and preparing stakeholder documents.

Rich picture encouraged the students to use non-judgemental approach, to develop visual thinking and creative thinking, to represent many perspectives and to see interconnections.

Rich picture is to draw a current situation and display a clear scenario from a mess, and to identify the problems from the interaction, process, and perspectives from the situation which helps you to come up with an improvement. This method gives me a sliver line in this pandemic whirl, especially when everything is very contingent to change.

I found the rich picture readings and exercise to be incredibly helpful in providing a way to capture an in-depth look at any complex situation, and I will likely use this in the future in my personal and professional life.

Web case was used on the course instead of field experience. The students could observe a farm as an example of agricultural activity.

The web case, though I wish they were an in-person farm visit instead, was still very helpful in helping me to dive right into the topic of agroecology and to think critically about assessing a complex situation and thinking up ways to improve the situation.

Stakeholder document enhanced the students' capacities to work in the groups, to interpret the stakeholders' activity in a clear way and to connect a personal background with received information concerning stakeholders.

I appreciated being able to complete this document as a group. We were able to work off each other's strengths and learn from each other. I certainly felt that I learned a lot from my peers. I enjoyed this assignment much more because of this. My groupmates and I all come from different backgrounds in agriculture with different undergrad majors. We used this to our advantage where we could.

3.8.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.8.3.2.1 Methods of data collection and analysis

3.8.3.2.1.1 Teacher reflection document

3.8.3.2.1.2 Course reflection focus group/interviews

3.8.3.2.2 Results

3.8.3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.8.3.2.2.1.1 From lecture hall to a diversity of learning arenas

3.8.3.2.2.1.1.1 Supporting forces and how to build on them.

As was mentioned before, the challenge related to Covid-19 restrictions forced to use and to learn different digital tools. This has several benefits for a learning process:

- a high increase of digital literacy, that works both for the students and for teachers,

- better organisation of learning activities due to used function of time management provided by learning platforms,

- more provided learning sources for the students including registered classes, web-cases and discussions

3.8.3.2.2.1.1.2 Hindering forces and how to deal with them.

Hindering forces – the COVID 19 restrictions (online way, pros and cons)

The Covid-19 restrictions was main challenge of 2020 and partially of 2021. Unexpected forced use of online learning for all didactic activities was the strongest hindering force both for teachers and for students. However, online learning has its advantages and disadvantages.

Undoubtedly, the main disadvantage is lack of real field experience and social relations between the students. Moreover, our online platform tools (BlackBoard) didn't have the possibilities to have multiple widows to allow us to see everybody face to face.

This limited a lot participation of the students in the field and practical activities. The students without agricultural background had many difficulties, as for them just observation of farm activities did not provide a sufficient learning gains.

On the other hand, online learning encouraged the use of different digital tools: learning platforms, connection tools, tools for creative group work, shared documents and spaces.

These allowed the students to continue learning process notwithstanding their different geographical locations and time zones. Thus, a combination of different digital tools and students' willingness to participate in online learning activities could be considered as a huge supporting force.

3.8.3.2.2.1.2 From lecturing to co- and peer learning

3.8.3.2.2.1.2.1 Supporting forces and how to build on them.

In the 1-week online course the students experience Web Case studies (detailed report about a farm) instead of field experience and had few frontal lectures and several other activities: pre-course assignment, group work, individual exercises, plenary session, co-sharing responsibilities, feedback sessions and peer review group presentations.

At the end of the course, the students prepared a online version of Rich pictures and presented them to other students. Thus, all students in a group could learn from their peers and could see experiences of other groups. In this case, creation and presentation of Rich picture as a tool of co- and peer-learning, required the students' creativity, well-organised dialogue, ability to work in the group, and strict time management (as the students were squeezed in time). Positive students' feedback on the Rich picture could be considered as good sign for this Shift.

3.8.3.2.2.1.2.2 Hindering forces and how to deal with them.

3.8.3.2.2.1.3 From syllabus to supporting literature/a diversity of learning sources

3.8.3.2.2.1.3.1 Supporting forces and how to build on them.

The Covid-19 restrictions forced universities to use different digital tools, including recorded classes. This provided opportunity to alleviate language issues to the international students, that was extremely useful for the students.

3.8.3.2.2.1.3.2 Hindering forces and how to deal with them.

3.8.3.2.2.1.4 From textbook to a diversity of teaching aids

3.8.3.2.2.1.4.1 Supporting forces and how to build on them.

Instead of textbooks the students were exposed to scientific papers, video, farmers interviews. Before the course the students were required to read provided papers and materials as teaching aids. This pre-reading required language skills from the students, as all teaching aids were provided in English, that is not a native language for several students.

According to the student's feedback, provided reading materials were interesting both for the students with agricultural background and for the students without it.

3.8.3.2.2.1.4.2 Hindering forces and how to deal with them.

3.8.3.2.2.1.5 From written exam to a diversity of assessment methods

3.8.3.2.2.1.5.1 Supporting forces and how to build on them.

The students didn't have a written test, but they were assessed by a group paper for stakeholders and an individual reflection document.

3.8.3.2.2.1.5.2 Hindering forces and how to deal with them.

3.8.3.2.2.1.6 From lecturer to learning facilitator

3.8.3.2.2.1.6.1 Supporting forces and how to build on them.

2 teachers and one facilitator were involved into full time designing the online course cycle and action learning activities. In their feedbacks the students positively characterised the co-presence of the two professors, opportunity to have two different approaches in teaching and facilitation of class.

3.8.3.2.2.1.6.2 Hindering forces and how to deal with them.

3.8.3.2.2.2 What such a change requires from teachers, students and institutions

3.8.3.2.2.3 Teachers´ perception of the greatest challenges to achieving such a change

3.8.4 Concluding remarks on the case development since the previous reporting

3.8.4.1 *The most useful and inspiring experiences (supporting forces)*

inspiring: use of web-cases ready to use, ability to adapt to covid restrictions (prepare full online course),

received experience could be used for action learning approach

thinking (organization) on the whole process

right information for the students

exiting: very nice rich pictures (creativity, used tools), putting all the elements together

advantage of web-case: already clustered information that could be easily transform to rich pictures (different starting point for the rich picture)

Technical issues: Exploring BB (options/ features/ functions of electronic platform) >

3.8.4.2 *Main obstacles/challenges encountered (hindering forces)*

[Core competences were not often mentioned in the reflection documents.

Online - lack of direct contact, extremely different time zones ,

Challenge:

- completely new process (online), uncertainty in the result, dependence on the students' participation;

- density and intensity of the course activities (full week + evening activities)

3.8.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

lesson learned: BB is explored, BB provided more opportunities (to see peoples' faces)

good organisation and clear communication improve the students' motivation and willingness to participate in the course activities

commitment by 3 people (co-presence) → personal example of participation

communication and dialogue between the people

the structure of the course: 2 professors, 1 facilitator, a lot of communication, good and inviting relations between teachers and students

3.8.4.4 *Plans for how to move forward into the next cycle*

probably physical action learning (not online) or combination of physical and online action learning depending on the students' location

using BB for peer-feedback / reflection activities regardless mode of farm visits (in presence and online)

MAFS

3.8.5 ID card

Course title and level: Master in Agroecology and Food Sovereignty (1 year Programme of 90 ECTs)

Host institution(s) and course leader(s): University of Gastronomic Sciences

Timeline of the activities covered in this report

September 2020 – March 2021 (half of the Master Program)

Learner categories and number per category (demographics)

11 females, 5 males;

1 student with Master degree, 15 students with Bachelor degree

3.8.6 Extended summary of development of the case since the previous reporting

3.8.6.1 *Actions taken since the previous report*

3.8.6.1.1 Planning

3.8.6.1.2 Implementation

3.8.6.1.3 Reflection

3.8.6.2 *Research results since the previous reporting*

3.8.6.2.1 Students', teachers' and other stakeholders' experiences and learning

3.8.6.2.2 Outcome of the case development process, including effects of making the essential shifts

3.8.6.2.3 Supporting and hindering forces for implementing the Nextfood model

3.8.7 Data on the development of the case since the last reporting

3.8.7.1 *Students' responses, learning and competence development*

3.8.7.1.1 Methods of data collection and analysis

3.8.7.1.1.1 First week (day) & last week (day) of the course

3.8.7.1.1.1.1 Student's understanding, contributions and expectations

3.8.7.1.1.1.2 Self-assessment of competences

3.8.7.1.1.1.3 Students' final reflection document (individual)

3.8.7.1.2 Results

3.8.7.1.2.1 How do students experience such a learning process with respect to:

3.8.7.1.2.1.1 learning goals?

Due to the different students' background and different professional experience, they had different learning goals at the beginning of the course. Thus, the main learning goals included:

- Learning about promoting and practical application of agroecological practices;
- Learning about encouraging people to contribute to sustainable agricultural practices and knowledge exchange
- To find answers on certain questions and to learn specific subjects (plant protection, production processes, climate change, gender issues)
- To handle complex situations,
- To learn new methodologies,
- To understand a personal role in the complexity of the food system

As the midterm learning goal, many students specified the use of received theoretical knowledge on practice and to improve field skills. This is an expected learning goal after several month of online classes. Besides, improving of all core competences was mentioned as one of mid-term learning goals.

3.8.7.1.2.1.2 view on competences needed for sustainable development?

- 5 core competences (visioning, reflection, dialogue, participation, observation);
- Empathy;
- Combination of skills, theoretical knowledge and practice;
- Communication skills;
- Motivation;
- Open-mind;
- Leadership

3.8.7.1.2.1.3 recognition of own competences and competence development?

- Communication;
- Team work;
- Understanding proper vulnerability;
- Great curiosity and willingness to learn;
- Positive participation;
- Dialogue;
- Observation;
- Reflections;

- Adaptability;
- Collaboration;
- Open mind;
- Specific professional skills such as graphic design (that later was demonstrated in a very detailed rich picture), technology skills and fermentation experience;
- Experiential learning;
- Teaching and dissemination of knowledge;
- Skills In poetry and writing;
- Leadership;
- Dealing with complex situations;
- empathy

3.8.7.1.2.1.4 transformation?

Initial questions	**Midterm questions**
- Many brief “How” questions	- Many long “How” questions with detailed explanations
- Willingness to understand basic concepts (agroecology, food sovereignty)	- Willingness to change (situation in already existing communities, existing economic systems, policies)
- Willingness to learn general concepts	- Willingness to connect theory and practice
- Many questions about general concepts	- Many community-related questions
- Expressed interest to role of education for agroecology and sustainable agriculture	- Expressed interest to participatory research
- General questions concerning “my role as an agroecologist”	- Specific questions related to activities of agroecologists for changing the situation

3.8.7.1.2.2 To what extent does the education enhance the students' competences of:

3.8.7.1.2.2.1 observation?

I think that the technical learnings about plants, animals, agroecological practices, and food systems enabled a new level of observation for me.

3.8.7.1.2.2.2 reflection?

Activities of Portfolio, particularly regularly preparing of Reflection journal improved reflection competence of the students.

I feel that I have developed my ability to reflect. Partly due to being online so much and not spending time together, I have had a lot of time to think about what I am learning and write about it.

3.8.7.1.2.2.3 visionary thinking?

[Text] Numerous assignments and exercises targeted at providing future perspectives have improved the students' visionary competence.

I have significantly improved the competence of visioning; using the skills from the rich pictures, I believe that I can employ the competence of visioning to create a desired future.

3.8.7.1.2.2.4 participation (engagement)?

Participation competence has the lowest growth (0,72). This could be explained by used online approach instead of real-life action learning. Participation competence was improved during plenary discussions and group presentations*:*

Participation, I think I am improving i.e. speaking up more and sharing my ideas when I may have been quiet previously.

3.8.7.1.2.2.5 dialogue?

3.8.7.1.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

Preparing portfolio (as a part of action research) included description of different aspects related to the community where the students will have experiential part of action learning.

How do the different categories of learning activities impact on enhancement of the core competences?

Weekly individual reflection as a part of action research enhanced students' capacity to reflect. The students were asked to fill the individual reflection journal every week. This didactic activity encourages the students to remind all previous activities and to connect them with their inner world.

Plenary discussions and peer feedback activities facilitate the dialogue and participation competences of the students. The students

3.8.7.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.8.7.2.1 Methods of data collection and analysis

3.8.7.2.1.1 Teacher reflection document

3.8.7.2.1.2 Course reflection focus group/interviews

3.8.7.2.2 Results

Table A1. Students' competence self-assessments at the beginning and the middle of the Master Program (n=16)

Competencies	First day	Midterm results	Change	P-value
Observation	3,90	5,57	1,66	*
Participation	4,98	5,70	0,72	*
Visioning	3,57	5,07	1,50	*
Reflection	4,27	5,40	1,24	**
Dialogue	4,16	5,40	1,24	**

Levels: 1–2 = novice; 3–4 = advanced beginner; 5–6 = competent performer; 7–8 = proficient performer; 9 = expert; *p<0.05, **p<0.01, ***p<0.001

3.8.7.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.8.7.2.2.1.1 From lecture hall to a diversity of learning arenas

3.8.7.2.2.1.1.1 Supporting forces and how to build on them.

Classroom, online platform, University garden, nearby farms, agricultural communities and open spaces were considered as learning areas for this Master.

Depending on the current Covid-19 restrictions, different areas were used as learning arenas: class rooms, the University garden, online platform, the University open spaces. As far as online education was used most time, virtual rooms played role of main learning arenas.

Online education provided several benefits such as connection between professors and the students based in different countries, and recorded classes that could be used by students several times or according to their time zone. However, the action learning approach that attracted the students suffered from lack of hands on activities limited due to red zone and lock down period

3.8.7.2.2.1.1.2 Hindering forces and how to deal with them.

3.8.7.2.2.1.2 From lecturing to co- and peer learning

3.8.7.2.2.2 Supporting forces and how to build on them.

Numerous plenary discussions, group presentations and peer-feedback sessions were included into online didactic activities. The students learned from experience of their colleagues.

Group work and group papers (group assignments and group presentation) were planned as one of basic principles of the Master. The students had a few group activities and peer learning sessions in class, as most of them were online, however group work had a positive feedback from the students.

3.8.7.2.2.2.1.1 Hindering forces and how to deal with them

3.8.7.2.2.2.2 From syllabus to supporting literature/a diversity of learning sources

3.8.7.2.2.2.2.1 Supporting forces and how to build on them

The students were exposed to numerous learning sources: books, films, papers, scientific articles and international electronic databases, that were used as learning

sources. Pre-course assignment (study of the materials before the course) was one of the features of Master Program.

Each professor provided learning sources. Selection of the learning sources for pre-course assignment, balance between their quantity and quality and their compatibility with learning objectives of each course are the most challenging points for identifying appropriate learning sources.

Good feedback from the students could be considered as an indicator of right learning sources. Right learning sources help to the students to understand better the course concept, to participate in further discussions and to answer the students' questions.

3.8.7.2.2.2.2.2 Hindering forces and how to deal with them

[Text] Selection of the learning sources for pre-course assignment, balance between their quantity and quality and their compatibility with learning objectives of each course are the most challenging points for identifying appropriate learning sources.

3.8.7.2.2.2.3 From textbook to a diversity of teaching aids

3.8.7.2.2.2.3.1 Supporting forces and how to build on them

3.8.7.2.2.2.3.2 Hindering forces and how to deal with them

3.8.7.2.2.2.4 From written exam to a diversity of assessment methods

3.8.7.2.2.2.4.1 Supporting forces and how to build on them

Different types of assignment were used as assessment methods: group slides and presentations, individual assignments (papers), stakeholder documents, tests and written group assignments, Portfolio (reflection journal and community portfolio).

This diversity of assessment methods allows to the students to demonstrate their creativity and gives more freedom to express their ideas. Furthermore, group assignments encouraged the students to learn from their peers, to share responsibility and improve dialogue competences.

3.8.7.2.2.2.4.2 Hindering forces and how to deal with them

3.8.7.2.2.2.5 From lecturer to learning facilitator

3.8.7.2.2.2.5.1 Supporting forces and how to build on them

3.8.7.2.2.5.2 Hindering forces and how to deal with them

- lack of time for better organisation and reflection
- lack of personal presence (formal and informal relations with the students)
- institutional hindering forces (lack of sufficient institutional support to proper facilitation)
- needed weekly space for sharing personal issues
- needed written document with described holistic approach
- reconsideration of weekly structure of the didactic activities

3.8.7.2.2.3 What such a change requires from teachers, students and institutions

From teachers such shifts (readiness to online teaching and facilitation) require a high level of flexibility and familiarity with digital tools (options of electronic platforms).

From the students such shifts require several issues:

- patience, as lack of social life is one of the students' complains,
- familiarity with use of digital tools,
- high level of engagement (participation in online group work and plenary activities)

3.8.7.2.2.4 Teachers´ perception of the greatest challenges to achieving such a change

3.8.8 Concluding remarks on the case development since the previous reporting

3.8.8.1 *The most useful and inspiring experiences (supporting forces)*

daily team work of our UNISG team (good internal collaboration)

shared thoughts by the students (opportunity to see the results and students' points of view)

opening session (the start of the Master → social/personal activities)

visible results of planned activities (how the students used developed action learning approach)

close contact with the guest professors (co-designing the weekly modules)

3.8.8.2 *Main obstacles/challenges encountered (hindering forces)*

- Challenges related to the novelty of the Master, and not sufficient number of team members

- uncertainties related to the Covid restrictions (not predictable rules)
- challenges in collaboration with some stakeholders involved in co-design process
- institutional challenges related to the 1st edition of this innovative master Programme. New things/aspects that nobody knows how to solve or who is responsible for.
- issues with the process organisation in terms of community matching (selection places for further experiential part)
- find a right balance between the students' work/free time
- ERS was overwhelming and needs a better organisation), this requires better balance between the students' work time and free time (weak self organization)

3.8.8.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

- more clear organisational issues
- necessity to express clear needs (institutional needs, needed information)
- to develop less complexity in the selection process of places for experiential part of the Master
- to develop more clear collaboration between the stakeholders
- opportunities to provide an added value for all involved stakeholder

3.8.8.4 *Plans for how to move forward into the next cycle*

- to reconsider Masters' organisation (didactic approach)
- to reconsider collaboration with the stakeholders involved into education process
- ERS (Experience, Reflection, Sharing – group and individual activities of action learning organised before and after classes) should be better developed
- great hope to have all activities in presence not online

3.9 University of Calcutta (UoC)

3.9.1 ID card

Course title: Three months' Online Certificate course in Agroecology

Level: For farmer trainers - bachelor degree holders are prefered.

Language: English.

Host institution(s) and course leader(s): University of Calcutta (Host), Anshuman Das (Welthungerhilfe – Leader) and Parthiba Basu (UoC – Leader)

Timeline of the activities covered in this report

September 2020- December 2020

Learner categories and number per category (demographics)

A. Number of students starting the educational activity (male and female) – Female – 13, Male - 27
B. Number of students passing the educational activity- 40
C. Educational background of students (high school, bachelor, master, PhD) - Bachelor
D. Number of students with more than three years of experience in the field/business - 40

3.9.2 Extended summary of development of the case since the previous reporting

3.9.2.1 *Actions taken since the previous report*

3.9.2.1.1 Planning

The major planning we had to do was to make this course online due to the ongoing pandemic. So we had to make changes keeping in mind last years' recommendations as well as how to implement it online. We invited applictions from different organisations and we specified that the applications should come in groups from every organisation. It was specified because we wanted to have group works in the field. As there were travel restrictions in the country so that they could work in their own fields. There were major challenges in field works, like we want to put the student in the field for a period of time and see how they work as an extension worker. But due to the pandemic it was not possible. The biggest obstacle of last course overcame since this was an online course and due to the pandemic situation we could manage to have many students from developmental sectors who work there full time and they were eager to learn for three months. We learned that the structured course curriculum are

needed to invite more number of students we also need to have a Course break up and a more structured course.

3.9.2.1.2 Implementation

There was a teacher's training workshop to familiarise them more with the nextfood approach and make them more of facilitator than a teacher. Since the students were from different organisations, it was easy for them to find the fields. Students were experienced in the farms and they were eager to learn and implement in their future. The difficulty we faced were conducting online. It is very difficult to have students regularly present in the sessions and monitor them. The networks are very poor and many of them are not to familiar with technical reporting.

3.9.2.2 *Research results since the previous reporting*

3.9.2.2.1 Students', teachers' and other stakeholders' experiences and learning

Several students indicated that the during the course, the process of bridging the academic study of farming and food systems with their own life experience makes them ready as a change agent with the following skill and competencies.

- Ability to link real-life situations and theory,
- Skill and comfort in using appropriate tools/methods,
- Confidence in handling complexity and change,
- Competent communication and facilitation skills,
- Potential for autonomous and life-long learning.

Analysis based on reflection documents submitted by students by comparing on how the students describe the educational approach and their understanding and acquisition of the core competencies.

- Students' reflection documents indicate that key competencies are being obtained.
- The students' attitude towards the experiential, phenomenon-based approach tends to undergo a transformation from frustration to appreciation.

3.9.2.2.2 Outcome of the case development process, including effects of making the essential shifts

The learning methods were not successful for all; the transition from a lecture-based and hierarchical educational system to one of participation is a major challenge for some including the teachers.

But in most of the cases, the shift worked well – particularly for the students who are practitioners. The cyclical method was better in terms of knowledge building through continuous reflection.

It was also worked well for the coordinator/case leader who could do mid-course correction, which is essential for a dynamic course.

3.9.2.2.3 Supporting and hindering forces for implementing the Nextfood model

Supporting forces

- As it was online, we could bring in teachers from various geographical location
- Good number of students
- Less interference from the authority in running the course
- Students from multiple discipline and background made a heterogeneous class

3.9.2.2.4 Hindering fources

- Conflict between techniques in farm and understanding of systems as whole
- Farmers in the case farms, sometimes, not open to suggestions made by the students in the vision document.
- Some of the facilitators from the mainstream were not keen on going beyond powerpoint presentation and lectures.

3.9.3 Data on the development of the case since the last reporting

3.9.3.1 *Students' responses, learning and competence development*

Students self-evaluated themselves on five different points – Observation, Participation, visioning, reflection and dialogue. Every point has several sub points. Students Self evaluated themselves on the first day of the course as well as on the last day of the course. The evaluated on each sub point on the scale of 10. Most of the students evaluated themselves higher on the last day of the course on every point. Observation- carefully observe a situation in field, create a comprehensive overview of the complex situation, allow for examination of the whole situation before drawing conclusions. There was significant increase ($t= 0.0002$, $p<0.001$) in all the competences among the students. Participation – Recognise values and goal conflicts of different stakeholders in society, Participate in the "work out in the field" with commitment and dedication, Empathize with the goals and feelings of stakeholders in the field. The self-evaluation by the students show that there is a significant increase in all the competences ($t=0.0002$, $p<0.001$) among them. Visioning- Have basic knowledge of factors that stimulate and block creativity in individuals and groups, Understand the processes that enhance a group's ability to identify today's critical challenges and envision a desired future state, Able to inspire change by helping a group develop and align around a shared vision. The competence of able to inspire

change by helping a group develop and align around a shared vision showed significant increase (t=0.0011, p<0.01) but other competences do not show any significant change. Reflection - Awareness of the role of reflection in personal learning and development , Connect situations in the field to theory related to farming and food systems as well as to personal growth, Connect experiences and theory to own personal development, Ability to embrace self-guided learning. Students were able to significantly connect situations in the field to theory related to farming and food systems as well as to personal growth (t=0.0002, p<0.001) and connect experiences and theory to own personal development (t=0.0004, p<0.001) after completing this course. Dialogue - Understand the difference between debate, discussion and dialogue, Can introduce a group to the purpose and guidelines for dialogue, Can identify and formulate questions which stimulate a dialogic approach, Can appreciate and explore a variety of perspectives and be able to identify and challenge the assumptions behind your own and a group's thinking. All these competences showed significant differences (t=0.0002, p<0.001) among the students after finishing of the course.

3.9.3.1.1 Results

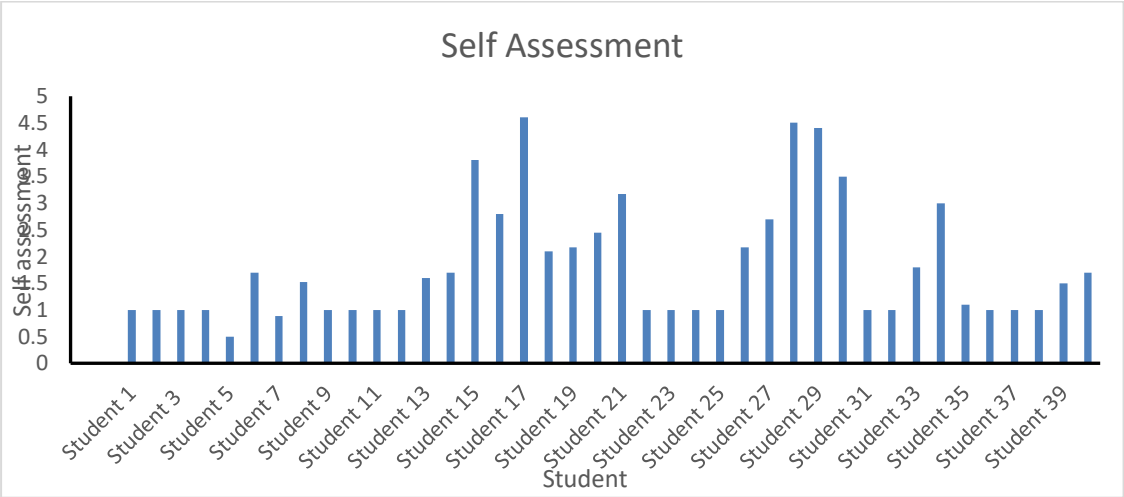


Fig.1. self-assessment values on observation by students after completing the course based on the given competences

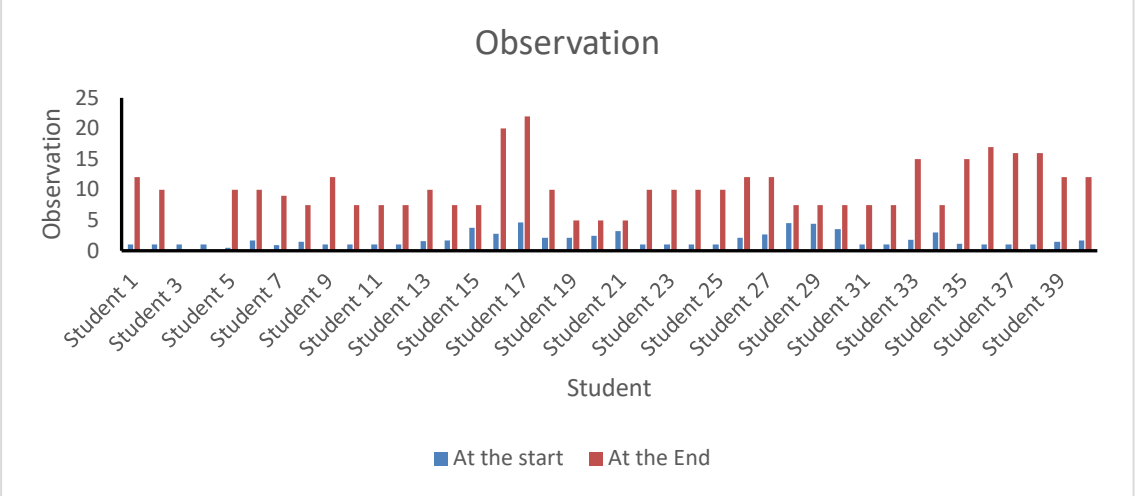


Fig. 2. Comparison of self-assessment values on observation by students on first day of the course with the last day of the course

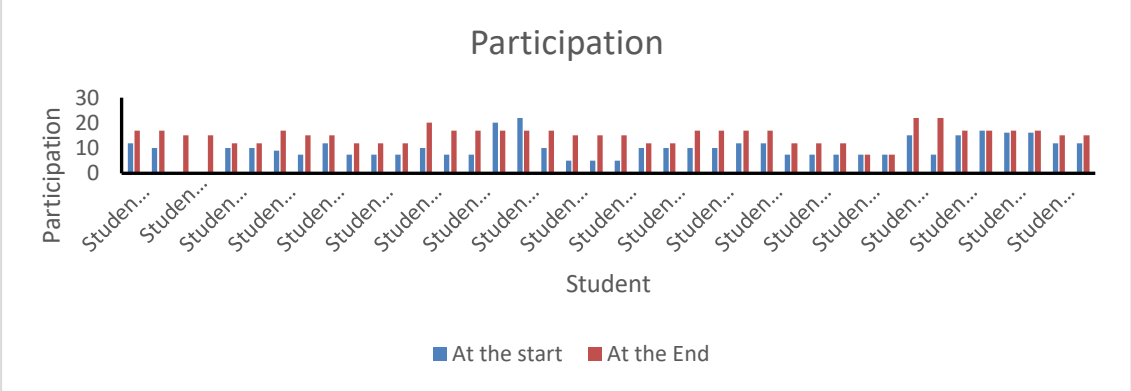


Fig. 3 Comparison of self-assessment values on Participation by students on first day of the course with the last day of the course

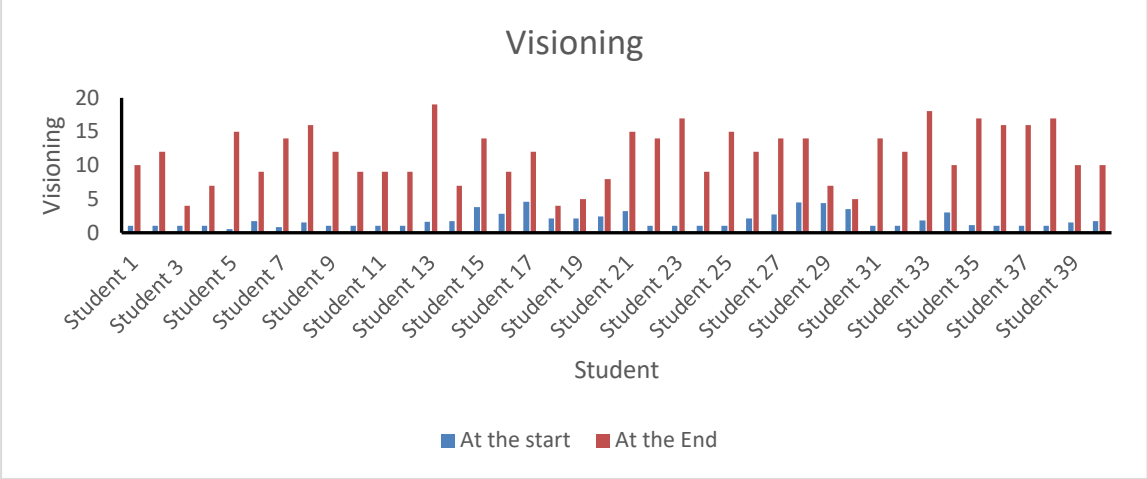


Fig. 4 Comparison of self-assessment values on Visioning by students on first day of the course with the last day of the course

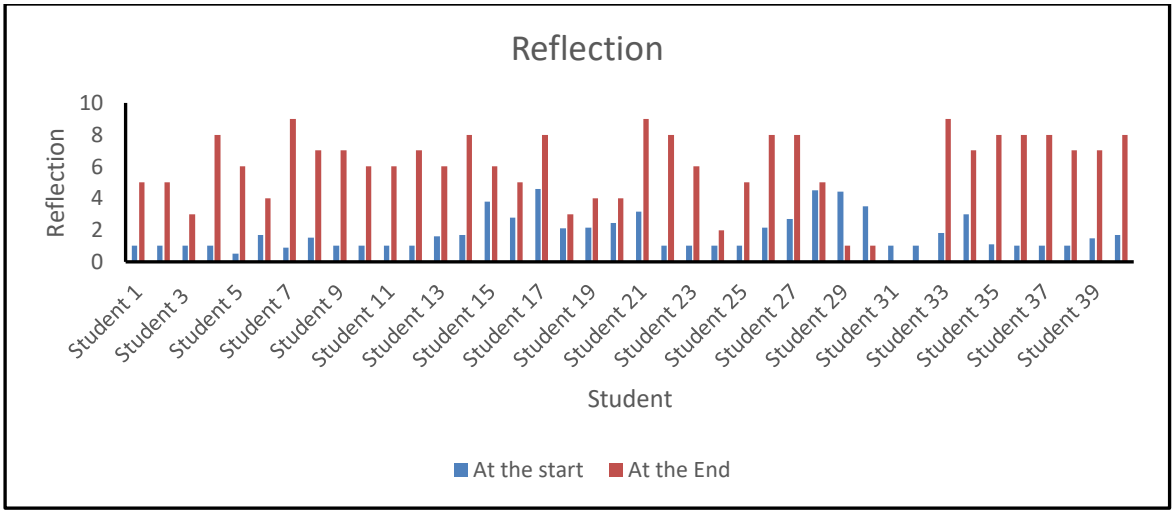


Fig. 5 Comparison of self-assessment values on Reflection by students on first day of the course with the last day of the course

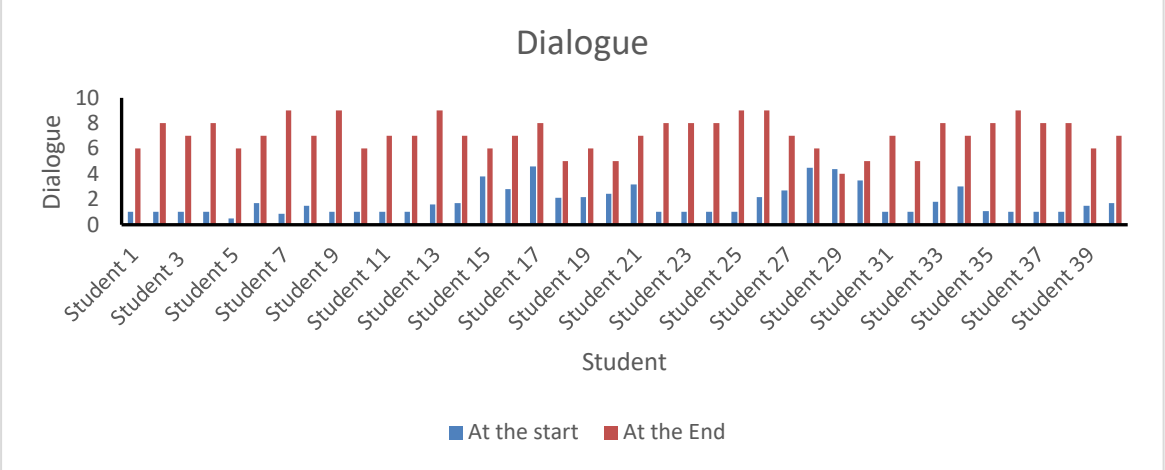


Fig. 6 Comparison of self-assessment values on Reflection by students on first day of the course with the last day of the course

The students were evaluated on the basis of few points (Table.1) and they were finally evaluated with a viva voce.

	Self Assessment	Learner Document	Case Work	Class Participation & Dialogue	Final Presentation	End of Course oral interaction	Total	Grade
Full Marks	10	25	25	20	10	10	100	
Highest Score	4.6	22	22	19	9	9	73.8	
S 01	1	12	17	10	5	6	51	A
S 02	1	10	17	12	5	8	53	A
S 03	1	0	15	4	3	7	30	B
S 04	1	0	15	7	8	8	39	B
S 05	0.5	10	12	15	6	6	49.5	A

S 06	1.7	10	12	9	4	7	43.7	B
S 07	0.88	9	17	14	9	9	58.88	A
S 08	1.52	7.5	15	16	7	7	54.02	A
S 09	1	12	15	12	7	9	56	A
S 10	1	7.5	12	9	6	6	41.5	B
S 11	1	7.5	12	9	6	7	42.5	B
S 12	1	7.5	12	9	7	7	43.5	B
S 13	1.6	10	20	19	6	9	65.6	A+
S 14	1.7	7.5	17	7	8	7	48.2	A
S 15	3.8	7.5	17	14	6	6	54.3	A
S 16	2.8	20	17	9	5	7	60.8	A+
S 17	4.6	22	17	12	8	8	71.6	O
S 18	2.1	10	17	4	3	5	41.1	B

S 19	2.17	5	15	5	4	6	37.17	B
S 20	2.45	5	15	8	4	5	39.45	B
S 21	3.17	5	15	15	9	7	54.17	A
S 22	1	10	12	14	8	8	53	A
S 23	1	10	12	17	6	8	54	A
S 24	1	10	17	9	2	8	47	A
S 25	1	10	17	15	5	9	57	A
S 26	2.17	12	17	12	8	9	60.17	A+
S 27	2.7	12	17	14	8	7	60.7	A+
S 28	4.5	7.5	12	14	5	6	49	A
S 29	4.4	7.5	12	7	1	4	35.9	B
S 30	3.5	7.5	12	5	1	5	34	B
S 31	1	7.5	7.5	14	0	7	37	B
S 32	1	7.5	7.5	12	0	5	33	B

S 33	1.8	15	22	18	9	8	73.8	O
S 34	3	7.5	22	10	7	7	56.5	A
S 35	1.1	15	17	17	8	8	66.1	A+
S 36	1	17	17	16	8	9	68	A+
S 37	1	16	17	16	8	8	66	A+
S 38	1	16	17	17	7	8	66	A+
S 39	1.5	12	15	10	7	6	51.5	A
S 40	1.7	12	15	10	8	7	53.7	A

30%-44.99% - Grade B (satisfactory)
45% - 59.99% Grade A (Good)
60%-70%- A+ grade (Very Good)
70% and above - O (Outstanding)

Table 1. Final evaluation result of the students

3.9.3.1.1.1 How do students experience such a learning process with respect to:

3.9.3.1.1.1.1 learning goals?

Adult learning methodology, participatory learning approach – it is easier to learn, particularly when the students have already completed their formal education. The students said that they did not have to study much though, it was all in the process. The process helped them in adaptation to the new subject. Learning was fun for them. It was a Two-way communication – students could chip in as and when required. Field work was good – which helped in realistic learning and linking learning to realities.

Students were able to connect the reality – various people. Personal aspiration was coupled with group's understanding. Students enjoyed equal level interaction, participatory. Assessing each other's capacity. It built their perspective. They could understand the role of science, loopholes in systems. After this course most of the students said they have clear vision now, to visualise the skill to others.

3.9.3.1.1.1.2 view on competences needed for sustainable development?

Who produce food? Role of women in food production. How can we be patient, feel empathy, create trust – build relation, give importance to all the stakeholder? How can we learn different ways of learning? Solutions are different depending on the perspective, flexibility, system understanding. How to solve complex problems without depending on externals? Observation, looking minutely, coming out of comfort zone, learning process – how to teach others? Thinking out of the box, open to learning – from everyone-everything

3.9.3.1.1.1.3 recognition of own competences and competence development?

The students said to transformed from a sedentary state to an engaged state of mind. They learned to help each other, as they were from different background. They learned to build connections – example nutrition, gender, agroecology

3.9.3.1.1.1.4 transformation?

We learned – but how do we practice in future? We now know there is still to learn. How to build trust?

3.9.3.1.1.2 To what extent does the education enhance the students' competences of:

3.9.3.1.1.2.1 observation?

Students are encouraged to observe a situation or a problem, and they express themselves in term of rich picture before analysing.

3.9.3.1.1.2.2 reflection?

The observation is followed by reflection on the structure and function of farming and food systems. Which helps in developing competencies of system thinking by discussing complexity and how the parts are related to the whole.

3.9.3.1.1.2.3 visionary thinking?

Students draw a future vision followed by reflection on a situation, in an uninhibited way - revealing the capacity to go beyond existing thought patterns.

3.9.3.1.1.2.4 participation (engagement)?

Students work together in group and with other stakeholders – and recognize conflict of values and goals and empathically engaged with each other.

3.9.3.1.1.2.5 dialogue?

Students apply and share the vision with various stakeholders - demonstrating the ability to listen, to express interest in other perspectives, a willingness to change or to reconsider personal point of view and learn from others.

3.9.3.1.1.2.6 dealing with "the challenge of the whole" (systems thinking)?

This course design has tried to create a systems model for the concept of agroecology among the farmers. It is very difficult with a reductionist approach to resolve the various challenges of food and farm systems which are systemic problems. This course tried to explore various key conceptual successions to explain the root of agroecology. It further clarified the few conceptual areas of various spectrum of agri food system and highlighted the limitations of conventional agricultural arming and food system. The students were exposed to various accumulated and then synthesized aspects of agroecology. Then the systems thinking were applied to develop a more comprehensive model of farm systems to promote the understanding and application of agroecology.

3.9.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.9.3.2.1 Methods of data collection and analysis

3.9.3.2.1.1 Teacher reflection document

3.9.3.2.1.2 Course reflection focus group/interviews

All the teachers were interviewed and they were sent questionnaire where they were asked about their perception about the course. They were asked to mention what were the positives and negatives of the course, what were the challenges they faced and what inspired them most.

3.9.3.2.2 Results

3.9.3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.9.3.2.2.1.1 From lecture hall to a diversity of learning arenas

3.9.3.2.2.1.1.1 Supporting forces and how to build on them

The three months online certificate course in agroecology are an opportunity for farmer leaders, agri-business entrepreneurs, developmental workers, right activists from any agri- food related background to participate in the certificate course to develop and

design their unique solution to an actual challenge in the agri-food system. The 3 months online course in Agroecology is to carry out Pedagogical action research on knowledge transmission through Observation – Reflection – Conceptualization – Active participation learning cycle. In the process students are attached to a farm where they observe the farming process – analyze it and then develop a vision for the farm in discussion with the farm. Essentially this is a student led research on the farming system and learning through it. Students also do their own research on the food system and the food value chain, thereby learning about it.

Students who joined this course-

i) Learned and understand system dynamics

ii) action-oriented learning to train stakeholder

iii) Understand and solving real life situations in agri-food sectors.

This course is working towards developing human resources for promoting Agroecological actions in India for rejuvenation and restoration of Agriculture, food security and rural local economy.

3.9.3.2.2.1.1.2 Hindering forces and how to deal with them

As the course mode was online due to the global pandemic, it was very difficult for us to design the course as the main focus of the course is on field attachment. It was difficult to attach a group of students to a farm of our choice. The students chose farms depending upon where they are located or where their organization works, since they could not travel due to the pandemic.

Often the number of students in a group discussion were reduced due to irregular presence in the sessions. Many online sessions were hampered due to network problems. Since many students were from rural part of the country, network issues always persisted. Getting the farmer's reflection was impossible since we were not attached to the farmers. The online sessions had a fixed time. It used to start at 11.00 in the morning till 13.00 and then after a break of an hour it resumed at 14.00 till 15.00. The second session consistently had very poor attendances despite several requests and reminders.

3.9.3.2.2.1.2 From lecturing to co- and peer learning

3.9.3.2.2.1.2.1 Supporting forces and how to build on them

The students were encouraged to think independently and then work in group's i.e breakout rooms in the online sessions. The online lectures always had an interactive lecture sessions followed by an assignment which was related to the lecture session. Students were divided and grouped for different tasks in the breakout room. The groups were not always fixed, it kept changing.

- Joint study, survey, analysis were used very often
- Peer teaching were used as a tool.

- Movie, Book review and presentation and then discussing together.
- Peer review of the vision document.

Students reflected that they enjoyed working in groups which they have rarely done before in their conventional education. The feedback include

- The process helped us in adaptation to the new subject. Learning was fun.
- Two-way communication – we could chip in as and when required.
- Personal aspiration was coupled with group's understanding.

3.9.3.2.2.1.2.2 Hindering forces and how to deal with them

Most of the students who participated in this course were either from developmental sector or they were farmers themselves. Many of them were very experienced and had a fair bit of idea about this curriculum. Due to the online mode of facilitation, the working groups formed sometimes were very big or too many in numbers. The working groups had their own problems, like network issues, reflecting within the short time period, few them were attending the classes from their mobiles so it was difficult for them to complete the classworks. During the sessions few students who were having network issues continuously left and joined the session. Network problems were a major issue in forming groups and working together.

Unless we start physical classes again, these problems are going to remain.

3.9.3.2.2.1.3 From syllabus to supporting literature/a diversity of learning sources

3.9.3.2.2.1.3.1 Supporting forces and how to build on them

Diversification of learning resources were a major area we tried to work on. The learning resources varied from movies, documentaries, case works, case studies, legendary books on ecology/farming etc. We have also used materials developed by previous batch as a courseware often. We created an organised online library for e-books, movies and all the resources that the facilitators used and provided.

The students have given feedback that – it is easier to learn when we use different learning sources, particularly when they have already completed formal education – and out of the rigorous processes involved in the conventional education system since long.

3.9.3.2.2.1.3.2 Hindering forces and how to deal with them

We didn't face any such obstacles in implementing these. Few students had problems in accessing the online library due to their lack of technical knowledge but in due course they overcame.

3.9.3.2.2.1.4 From textbook to a diversity of teaching aids

3.9.3.2.2.1.4.1 Supporting forces and how to build on them

Variety of teaching aids were used –

- Rich picture
- Mind map
- System analysis
- Dialogue
- Debate
- Movie making
- Survey and analysis
- Games
- Group discussions

Different new ideas came up from the students whenever they were analysing a situation/case and students participated in each of them heartily. They used many tools in their vision, reflection documents.

3.9.3.2.2.1.4.2 Hindering forces and how to deal with them

The major obstacle we faced were to make all the teachers/facilitators understand the tools beyond conventional textbook and presentation which are to be used during online facilitation. Hence the discussion on the methodology of teaching with the teachers/facilitators in an online platform beforehand are required.

3.9.3.2.2.1.5 From written exam to a diversity of assessment methods

3.9.3.2.2.1.5.1 Supporting forces and how to build on them

The students were assesed on the basis of a final viva-voce and continuous assessment. The final assesments were based on -

- Self Assessment
- Learner Document
- Case Doc

- Class Participation and Dialogue
- Final presentation
- End of the course oral interaction

Since this assessment method was continuous and many of facilitator's refletion on students were taken into consideration we find it very useful. Students were also 'relieved' is absense of a formal method. We could avoid rote learning. We didn't face any obstacles in doing these since students loved the process..

3.9.3.2.2.1.5.2 Hindering forces and how to deal with them

The major perception from the whole process we had was that If the assesment is continuous and there is no such formal written examination, students feel free and become more keen on learning

3.9.3.2.2.1.6 From lecturer to learning facilitator

3.9.3.2.2.1.6.1 Supporting forces and how to build on them

Resource persons were briefed before the sessions about the student's background, teaching methodologies and what is required from them. The feedback from the students were positive in most of the cases. Connections between various topics could have been dealt in a better way. There was a teacher's workshop prior to the course. The role of the coordinator were very important in linking up various topics, facilitators and modules. The students gave positive responses on that.

3.9.3.2.2.1.6.2 Hindering forces and how to deal with them

The reflections from the students suggest that few of the resource person could not deliver what was expected from them. Some sessions were too lengthy and no chances of interactions made the students inattentive.

3.9.3.2.2.2 What such a change requires from teachers, students and institutions

- More understanding of nextfood pedagogy by the teachers so that they plan accordingly
- Habit of getting into reflection mode by the students and teachers both, rather than expecting knowledge transfer
- Switch to self-learning mode by the students

3.9.3.2.2.3 Teachers´ perception of the greatest challenges to achieving such a change

- Mindset of students and the authority
- Lack of teaching learning content and tools for Nextfood pedagogy
- Integration of non-academic stakeholder in formal courses

3.9.4 Concluding remarks on the case development since the previous reporting

3.9.4.1 *The most useful and inspiring experiences (supporting forces)*

Most of the students had different backgrounds and they are the product of conventional chalk and talk education system. So they had to take some times to adopt to these action learning method. They were not used to observation-participation-reflection kind of education system. But as soon as they managed to familiarize with the new system they were loving it. They really quite enjoyed the process as they could participate in everything with the facilitator. System analysis were big part of the course and it was useful for the students as most of them would work in the agri food sector in the future. The case work and visioning for a farm were useful for them also. Several students indicate that the knowledge acquired through bridging the academic study of farming and food systems with their own life experience makes them ready as a change agent with the following skill and competencies

- Ability to link real-life situations and theory,
- Skill and comfort in using appropriate tools/methods,
- Confidence in handling complexity and change,
- Competent communication and facilitation skills,
- Potential for autonomous and life-long learning.

3.9.4.2 *Main obstacles/challenges encountered (hindering forces)*

Due to the global pandemic, the whole course took a setback. The course structure, curriculum, facilitation methodology had to be improvised to fit into the online system. The mobile network is often a challenge in India to conduct online classes for rural area's students, which does not allow fluidity in the classroom. A strict barrier between subject domains as agroecology is an interdisciplinary subject.Self-learning, group learning and peer learning is rarely practiced.

3.9.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

- Creation of scope for networking between the students beyond course
- Cross learning scope and using students as facilitator – as they are practitioners

3.9.4.4 *Plans for how to move forward into the next cycle*

- Create scope for both online and physical activities
- Organise methodical mid-course reflection
- Teacher's workshop at the beginning

3.10 SEKEM

3.10.1 ID card

Sub case 1: Biodynamic Agriculture Course

Level: Undergraduate level

Language: English

Institutions: SEKEM Vocational Training Centre

Course leaders: Prof. Hassan Abu Bakr*, Dr. Reham Fathy*, Ms. Angela Hofmann**, Mr. Peter Kunz***, Mr. Reto Ingold***, Dr. Shaimaa Hatab*, Dr. Eman Nour*, Dr. Hamed Hosny*, Dr. Hamen Ameen*

Learners:

Students of Faculty of Organic Agriculture, Heliopolis University: 36 students

First year students: 9 males and 8 females, Total: 17

Second year students: 7 males and 9 females, Total: 16

Extension Engineer(s): Egyptian Biodynamic Association (EBDA): 2 persons

Timeline:

Fall semester: 28.11.2020 to 10.12.2020

Spring semester: 02.04.2021 to 11.04.2021

*Faculty of Organic Agriculture, Heliopolis university for Sustainable Development

** Sekem Manager

*** Goetheanum School of spiritual sciences

Sub case 2: Bootcamp Entrepreneurship Course

Level: General

Language: English/Arabic

Institutions: SEKEM Entrepreneurship and Social Innovation Centre

Course leaders: Prof. Omr Ramzy, Mr. Mohamed Anwar, Ms. Menna Mohamed, Mr. Mo'men Ahmed

Learners:

20 Young Entrepreneurs

Timeline:

In progress – expected start summer 2021

3.10.2 Extended summary of development of the case since the previous reporting

3.10.2.1 *Actions taken since the previous report*

3.10.2.1.1 Planning

Introductory Biodynamic Course: The program covered the first steps, focusing on soil-plant-farm unity as a fundamental unit for sustainable farming operations worldwide. The main goal of the course was to bring theoretical knowledge of different directions such as botany, zoology, and microbiology in one holistic approach into a relationship with agricultural practice. The students were introduced to “Goethanistic” observation of soil, plant, and farm phenomena. Also, shifting the teaching system from the traditional semester style to the module style, which is still under preparation. The students spent two consecutive weeks at SEKEM farm.

3.10.2.1.2 Implementation

During the course, the students have been subjected to different exercises, assignments, and activities. The activities have been divided into individual and group activities. The group activities have been given to groups to not more than 4 to 5 students per group. Each group chose a topic and they should use their creativity to show/explain their topic by using the resources on the farm. The activities have been focusing on competencies such as observation which students were asked to observe animals, plants, and the whole surrounding and reflected on drawing. Through group work competencies such as participation and dialoguing have been emphasized during the activities (Fig1).

The lessons start with the explanation of a definite topic, and after that, the students are subjected to an activity that has to use the information given in the lesson. The students reflect on the topic given by the teacher (facilitator). Afterward, the students are collecting, observing, and discussing the information and finally presenting it to other colleagues. With such a method, the teacher is not exclusively the only source of information, but also students can share their knowledge and their views with the teacher(s) and colleagues.

Figure 1: *(left)* Students were working on one of the group exercises; they discuss how to improv a farm biodiversity and design a farm cover such components. The exercise trains the students competencies in participation, dialoguing and visioning. *(right)* the students were preparing a biodynamic preparation. They are not only having a practical experience but participation and group work is one of essential concepts of biodynamic farming.

In this cycle, a pre-determined syllabus has been set with consulting with the teachers of faculty of organic agriculture and Gotheanum. The previous cycles were not depending on a well definite syllabus and teaching was based on spontaneous teaching based on observation and reflecting. The students, mostly the first-year students, have little or no agriculture background. The teachers from HU are not familiar with Goethanistic methods. From this point, it has been seen that it is important to determine the course outline, syllabus, and materials.

The aim of the course is to let the students have a real-life oriented learning experience. It is emphasized that the students should spend the whole period. The method enhances the ability of students to observe the farm nature, the planted crops, livestock, soil, and even the sky not as an individual element but as one holistic

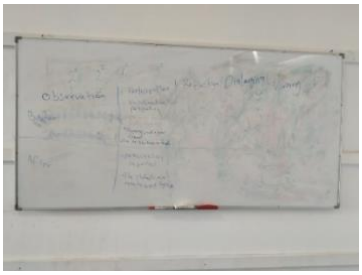
organism. The lessons are in most cases are taken in the field and illustration using colours and drawings instead of PowerPoint presentations.

The course is not yet added to the faculty of organic agriculture bylaw. Therefore, there are no exams needed for the final assessment. Furthermore, the course is designed not to assess students by the traditional way of exams, but by assessing their capabilities on participation and their output through exercises and individual/group assignments. The final assessment grades of the biodynamic course are added to one agriculture course taken by students in the semester.

3.10.2.1.3 Reflection

During the training, teachers have taken notes on each student's performance based on the five NF competencies. The assessment was carried on a student group performance and possibly on an individual student after completing the training. Due to Covid 19 measures and the lack of time of the swiss teacher, we could not have the opportunity to their feedback orally exactly after the training in a workshop and they sent written their feedback. After easing the Covid 19 restrictions, the teachers from the Egyptian side have discussed the performance of the student in groups (Figure: 2).

Figure 2: Teachers discussion regarding the performance of the Organic Agriculture



students at Heliopolis University and recording the feedback.

3.10.2.2 *Research results since the previous reporting*

3.10.2.2.1 Students', teachers' and other stakeholders' experiences and learning

In the previous pilot cycle of 2019, the number of students was 44 students from level 1 and level 2 students. Level 2 students had more experience with some agricultural practices and farm life. The number of staff was 7 teacher assistants and 6 professors. The teaching methods were relatively new to HU staff; however, they were enthusiastic to explore different teaching method.

3.10.2.2.2 Outcome of the case development process, including effects of making the essential shifts

In the previous cycles, the university staff and one agricultural extensionist had had training of the trainers (ToT) that aims to allow the staff to get the knowledge and build

their capacity and teach to the future students. The teaching methods in this cycle have allowed the students to engage more with farm animals, soil, and plants through observation and to do by hand. Students have been subjected to on-ground case studies based on SEKEM farm experience and present it to the lecturers.

3.10.2.2.3 Supporting and hindering forces for implementing the Nextfood model.

Supporting forces are for instance the opportunity of spending two weeks on Sekem farm. Consequently, the students as well as the teacher have a real-life case study and challenges.

Challenges are mostly pivoted on the organization and logistics. For instance, the preparation of the accommodation was not enough before arriving at the farm. Additionally, the teaching materials and topics were not presented beforehand and the topics were not clear to HU staff.

Lectures for HU professors had been postponed for two weeks since the professors had needed to be on the farm for the whole two weeks. In this case, the lectures had to be compensated after the training period, which represents a burden on the professors' schedules.

Since the training is not yet in the bylaw of the Faculty of Organic Agriculture, the studying hours, lectures, and grades of the students had to be compensated in their courses. This has resulted in excessive administrative work to compensate for the training grades to other courses and compensate what the students missed in the other courses

3.10.3 Data analysis & results

3.10.3.1 *Students' responses, learning and competence development*

3.10.3.1.1 Methods of data collection and analysis

The Sekem case for the NextFood project is based on the practical education of biodynamic course. The training course is aimed for undergraduate students of the faculty of agriculture. The students spend two weeks every fall and spring semester. In this year, the covid 19 situation has an impact on carrying out some activities such as face-to-face reflection as planned due to the measurements which set by the government and Heliopolis university to reduce the number of infections with Covid 19. It was planned to carry out two reflection session group reflection and the end of the course and face to face individual reflection later before the end of the fall semester. Yet with the Covid 19 measurements, we couldn't carry out face-to-face reflection as planned. In this report, we analyse the outcome from the student feedback on their reflection during the two weeks training, before and after question, and students' self-assessment on the competencies.

3.10.3.1.2 First and last questions of the training

At the beginning of the training, the students from first and second level students have been asked to answer the before four questions and the after 5 questions from the research protocol of NextFood at the end of the training. The students were overwhelmed during answering the first four questions since they were not sure what to answer each question. Yet, the students have tried to answer the questions according to their understanding and knowledge. When the students answered the question on knowledge and skills that they need to support sustainable development in agrifood systems, their answer varied between the training should improve agriculture knowledge, Networking, Cultivating plants, and Growing Animals. The question related to what experiences and competencies that they could bring to the training were to be positive, be hardworking, make effort in research, and be cooperative. the questions that they would like to find an answer during the training were what is biodynamic farming, how to grow animals, how to plant different plants, and how to fertilize plants. The fourth question was the competences the competencies that they would like to train, the students' answers were the knowledge on agriculture such as organic and Biodynamic, knowledge on growing plants and animals, and presentation skills.

The final five questions that were answered by the students at the end of the training have shown in-depth their understanding of skills and competencies needed to be compared to the beginning of the training. The first question was about the knowledge and skills that need to be supported by sustainable development. The students' answers were thinking in a holistic approach, communication with other people (networking), improve English (for communication), and presentation skills. The second question was about the experiences and competencies the students brought to the training, their answers were cooperation with colleagues and teacher, participation in the group assignments, and love and cooperation with the community. The third question was about what questions this training has helped the students to find an answer, their answers were learned more about biodynamic in Sekem, how to plant organic plants and produce a healthy crop, and learned about animal anatomy and how their bodies adapt to their environment and We saw the cow organs. The answers to the fourth question were they learned that we must be kind to animals because its important part of our life, Nitrogen and Carbon are very important minerals in the soil, know how to spray the crops or soil by compost, How we can make CPP and spray it into manure and animals, and how to communicate with different people. The fifth was question was slightly difficult to answer this probably due to the little knowledge of the agricultural sector. Yet, their answers were what are the biodynamic preparations, can be biodynamic the mainstream agriculture, and how can we spread the biodynamic approach.

3.10.3.1.3 Self-assessment of competences

The self-assessment was conducted at the beginning and the end of the course. The self-assessment form used was formed from NextFood research protocol. The following showing Table 1 showing the result of the students' self-assessment.

Table 1: Average results of first- and second-year students (N = 36)

Competency	Average		Difference	P value
	Before	After		
Observation	4.87	5.39	+0.52	< 0.05
Participation	4.48	5.59	+1.11	< 0.05
Visioning	4.27	5.05	+0.78	< 0.05
Reflection	4.64	6.58	+1.94	< 0.05
Dialoguing	4.61	5.43	+0.82	< 0.05

The students found difficulty to understand the statements when they were filling in the form at the beginning of the training. There was relatively low at the beginning of the course, with the end of the training we see a significant improvement in the five competencies.

3.10.3.1.4 Students' final reflection

At the end of the training, the students have carried out a self-reflection on the whole learning process. They have chosen a representative (one male and one female) to describe the learning process. The student representatives have emphasized observation as an important competency during the training period. Additionally, participation is another, which is developed as many assignments, and activities are mainly based on group work. As part of the group work, the students have mentioned dialoguing and discussion has been used intensively during the group assignments. On the other hand, the students didn't get to mention visioning, critical thinking. Reflection has been carried out during the training, yet the students didn't mention it as a competency they have improved that is probably due to the core of biodynamic philosophy is more focused on observation as a core competency for a biodynamic farmer.

3.10.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.10.3.2.1 Methods of data collection and analysis

3.10.3.2.1.1 Teacher reflection document

The teachers have mentioned there is an improvement in student's technical knowledge and skills. Prof Hassan Abu Bakr, Faculty of Organic Agriculture acting dean, has mentioned there is a significant development in students' knowledge and competencies. Not only at the beginning and the end of this training cycle but also there is a development from each cycle of the previous years.

3.10.3.2.1.1.1 Observation

At the beginning of the course, the group didn't know how to observe plants and landscape. They already observed soil, some plants but they needed to make much more observations to develop this competency and also to understand why it's important for farmers.

At the end of the training, the group made a good progression in their observation through drawing plants and landscape. “We made regularly group presentations from the observations. It helped to develop the observation skills” Quote: (Jean-Michael Florian, 2021).

One of the instructors mentioned in his assessment that as before starting the training, the students were passing by the field and farm without much focus on the key components of their surrounding, while in the end of the traning their observation skills appeared to be developed through their group presentation, showing much consideration into details of plants and farms components.

3.10.3.2.1.1.2 Participation and Dialoguing

At the beginning of the course, the students were shy and afraid to participate and present their work. In fact, there were two groups: the female and some males participated good but some males didn't participate a lot. At the end, with the exception of some males, the participation increased and the students enjoyed to participate. We made almost every day a presentation of the observation so that the students encouraged to participate. Another teacher observation stated that after a period of time during the course, some students became more confidant and able to present their work and discuss. One of the instructors assume that day after day students got more comfortable and confident in speaking and presenting their group class work, even though some are not that perfect in English.

3.10.3.2.1.1.3 Reflection

At the beginning, a lot of students had difficulty to make connections between different facts, for example, between soil, plants and animals. During the training, the topics were very general and not connected with the practical wise and scientific aspects. By observing regularly and explaining the connections in reality on the farm, the students develop their reflection and began to develop their reflection competency at the end of the training.

3.10.3.2.1.1.4 Visioning

At the beginning of the training the teachers have made an exercise to design a farm but the results were poor and the students don't have skills of visualization.

3.10.3.2.2 Results

3.10.3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.10.3.2.2.1.1 From lecture hall to a diversity of learning arenas

Introductory Biodynamic Course: The program covered the first steps, focusing on soil-plant-farm unity as a fundamental unit for sustainable farming operations worldwide. The main goal of the course was to bring theoretical knowledge of different directions such as botany, zoology, and microbiology in one holistic approach into a relationship with agricultural practice. The students were introduced to “Goethanistic” observation of soil, plant, and farm phenomena. Also, shifting the teaching system from the traditional semester style to the module style which is still under preparation. The students spent two consecutive weeks at SEKEM farm.

Lectures were divided into (i) traditional lecture halls with brief theoretical background to (ii) lectures in the open field and practical instruction based on observation and doing.

The students liked the idea of the Gothic teaching methods since the change of teaching method/place has let them experience other feelings and information compared to class-based education. Yet, the students were overwhelmed since a) the different nature of teaching since the method is not a direct information delivery b) the topic is not yet well organized and the syllabus is not clear c) repetition of some topics since this training is repeated with first- and second-year students.

3.10.3.2.2.1.2 From lecturing to co- and peer learning

During the course, the students have been subjected to different exercises, assignments, and activities. The activities have been divided into individual and group activities. The group activities have been given to groups to not more than 4 to 5 students per group. Each group chose a topic and they should use their creativity to show/explain their topic by using the resources on the farm. The activities have been focusing on competencies such as observation which students were asked to observe animals, plants, and the whole surrounding and reflected on drawing. Through group work competencies such as participation and dialoguing have been emphasized during the activities.

3.10.3.2.2.1.3 From syllabus to supporting literature/a diversity of learning sources

In this cycle, a pre-determined syllabus has been set with consulting with the teachers of faculty of organic agriculture and Gotheanum. The previous cycles were not depending on a well definite syllabus and teaching was based on spontaneous teaching based on observation and reflecting. The students, mostly the first-year students, have little or no agriculture background. The teachers from HU are not

familiar with Goethanistic methods. From this point, it has been seen that it is important to determine the course outline, syllabus, and materials.

3.10.3.2.2.1.4 From textbook to a diversity of teaching aids

The course aims to let the students have a real-life oriented learning experience. It is emphasized that the students should spend the whole period. The method enhances the ability of students to observe the farm nature, the planted crops, livestock, soil, and even the sky not as an individual element but as one holistic organism. The lessons are in most cases are taken in the field and illustration using colours and drawings instead of PowerPoint presentations.

3.10.3.2.2.1.5 From written exam to a diversity of assessment methods

The course is not yet added to the faculty of organic agriculture bylaw. Therefore, there are no exams needed for the final assessment. Furthermore, the course is designed not to assess students by the traditional way of exams, but by assessing their capabilities on participation and their output through exercises and individual/group assignments. The final assessment grades of the biodynamic course are added to one agriculture course taken by students in the semester.

3.10.3.2.2.1.6 From lecturer to learning facilitator

The lessons start with the explanation of a definite topic, and after that, the students are subjected to an activity that has to use the information given in the lesson. The students reflect on the topic given by the teacher (facilitator). Afterward, the students are collecting, observing, and discussing the information and finally presenting it to other colleagues. With such a method, the teacher is not exclusively the only source of information, but also students can share their knowledge and their views with the teacher(s) and colleagues.

3.10.3.2.2.2 What such a change requires from teachers, students and institutions?

As we know there are always resistance to change, teaching and learning methods have changed significantly in the past decade. We should make efforts to improve our performance and our teaching methodology or delivery of knowledge, whether we are teachers, instructors or officials of institutions.

The changes include:

1- Increased instructional technology and educational platforms to support learning.

2- Greater responsibility in education.

3- Improve the professionalism of teachers and instructors.

4- Decrease the resistance to change.

5- Increased the diversity of the studying topics, courses and scientific projects.

6- More interaction among the national students, international students and teachers.

3.10.3.2.2.3 Teachers´ perception of the greatest challenges to achieving such a change

The teachers and the instructors should always to keep up of contemporary changes and modern developments of the changes that taking place around us, whether in increasing of science and knowledge, how to communicate with students and rapid technology.

The greatest of the challenges faced by a teacher:

1- Understand the different learning abilities and skills of the students, and how to improve this through effective active learning and teaching methods.

2- Keep motivating and encouraging them during their courses or training.

3- Keep the teacher's eye on his/her students performance especially when it is underperform.

4- Establish an active communication channel between the teachers/instructors and students.

3.10.4 Concluding remarks on the case development since the previous reporting

3.10.4.1 *The most useful and inspiring experiences (supporting forces)*

The Biodynamic course pilot cycle of 2018 was the first time to implement the module teaching system. In the cycle of 2020, the number of students joined was 36 students from first- and second-year students and 2 agricultural extensionists from the Egyptian biodynamic association. Two general topics were covered during the training period and they were plant and animal topics. The planning is to provide two more extra topics in social and economic analysis and food quality and nutrition.

Supporting forces were the pre- preparation of the course, the teaching materials were shared between the teachers from Switzerland and Egypt. Additionally, the logistical organization were improved as Sekem farm could accommodate around 36 students (males and females) on the farm for consequent 9 days.

3.10.4.2 *Main obstacles/challenges encountered (hindering forces)*

The teachers from Switzerland and Egypt are still in understanding processing of NextFood model. Therefore, some of the tasks that required by NextFood research cannot fully implemented such as assessment of students on only five competencies.

Due to Covid 19 measurements, we were not able to carry out some activities regarding data collection and consequently data analysis. In some of the activities, the

students were not able to understand the tasks, and this due to the untraditional method used in the learning process and language barrier as English used in teaching and paperwork.

3.10.4.3 *Plans for how to move forward into the next cycle*

The next training is planned for the fall semester 2021, and first, second and third-year students will join the training. The first-year students will be focused on plant topics, second-year students will be focused on social and economic analysis and third-year students will be focused on food quality and nutrition. The teachers have stated that the competency of visioning should be developed in the next courses by providing more exercise to development this competency.

For the entrepreneur case, the training is designed in two components; the first component is designed to train participant's technical "agricultural" skills, and the second component is based on business skills. The technical topics are compost, vermicompost, biofertilizers and biopesticides, hydroponics and aquaponics systems, certification, and animal husbandry. The second components topic are finance for non-financials, introduction to strategic management, business model canvas, introduction to marketing, access to finance, sales for start-ups, business development, growth hacking, investment roadmap and pitching, and legalities of start-ups.

The first and second components will be covered during the three cycles, in which cycle 1 the participants will be subjected to fundamental courses in the fields of business administration and entrepreneurship. They will also be able to choose one main technical area of focus to carry out as a future business. In cycle 2, the participants will receive advanced in-depth courses in the fields of entrepreneurship aiming to validate their ideas and grasping their market potential. They will also be advancing in the technical courses to receive more technical "how-to" skills. In the end, cycle 3 aims to capitalize on and reap the fruits of the preceding two cycles and supporting the creation of high-growth businesses.

3.11 CIHEAM

3.11.1 ID card

Course title:	Mediterranean Organic Agriculture
Course level:	Master of Science
Course language:	English
Host institution:	CIHEAM
Course leader:	Lamberto Lamberti;
Coaching team:	Lamberto Lamberti, Suzana Madzaric, Virginia Belsanti, Patrizia Pugliese, Ivana Cavoski and Ramez Mohamad

Timeline of the activities covered in this report

The present report covers the period from December 01, 2020, until May 26, 2021. Case study activities were not finalized at the time of final reporting.

Learner categories and number per category (demographics)

The action learning activities included a total of 9 learners, all belonging to the post-graduate students' category.

Countries of origin: Egypt, Lebanon, Morocco, Serbia, Tunisia and Turkey.

Gender: Female – 8; Male – 1.

Age categories: 20-25: 6 students; 25-30: 3 students.

Considering the background, 8 students are having an agricultural studies background and 1 food technology.

3.11.2 Extended summary of development of the case since the previous reporting

3.11.2.1 *Actions taken since the previous report*

3.11.2.1.1 Planning

Planning of the action learning activities for the third year was even more requiring than the implementation, as we could observe as the course was progressing. We needed to face this 'blended' implementation model, with initial 3 months of the online course, which was new for us compared to two previous years. However, we decided to keep in mind some of last year findings, where one of the main conclusions was that we need to increase the number of topic-related seminars. Thus, we decided to concentrate them mainly in this initial online stage.

Still, due to the experience, we had in previous years, we were aware of how important is contact with sector stakeholders, and that by end of the course this results as the most appreciated by the students. To overcome this challenge we agreed that during the implementations students should individually (in their countries) approach some

reality of social capital in the agri-food sector, while to increase interaction with coaches to have a platform with a forum for constant dialogue. As the course started we understood that with additional efforts and group work and planning at the institutional level it is much easier to find solutions in this challenging period of the pandemic.

3.11.2.1.2 Implementation

As already reported above, initial months of our activities were conducted online. We used this period to provide students with solid theoretical background on the topic, but as well to introduce them with the methodology of action learning and core competences promoted by the project. Our idea to make students work with stakeholders in their countries demonstrated several challenges during the implementation. Students were not adequately prepared for interviewing stakeholders, despite inputs coming from the case study team and detailed instruction on how to conduct an interview. Further, availability of stakeholders and time to devote for students was limited, which partially could be attributed to the fact that students could not communicate in clear manner the objective of their activities. Further, it is thus expected that the objective will not be clear for the stakeholders, or they were not convinced to participate in something which does not bring concrete benefits for their organisations. All this resulted in very divers outcomes reported by the students, while some of them did it in more structured way, the other had significant lack of information and were not able to approach again selected stakeholders, due to the lack of interest.

To compensate this gap, we decided that upon their arrival to Italy we should provide them opportunity to meet in presence different realities of social capital in agriculture, which at that time was restricted by the COVID related regulations. Only at the second part of May, we finally had opportunity to take students outside of the campus and to let them meet different actors. We devoted one full week for on-site visits, which was very much appreciated by the students. This last part of the activities contributed significantly to the desired shifts among our learners, since finally they got opportunity to explore different arenas, to have hand-on experience approach, to practice their dialogue skills, etc.

3.11.2.1.3 Reflection

The course was still ongoing at the time of reporting, thus reflection on the third cycle will be provided in the coming period, or as part of the reporting for final year of the project. Still, we would like already to reflect on one important aspects, which is online method of education. Our experience of this year indicated for us that action learning as online activity poses a lot of challenges, and requires additional efforts from involved staff. Despite the best intention, we understood that learning outcomes are of much higher quality when activities are done in direct interaction with students.

3.11.2.2 *Research results since the previous reporting*

Case study overview - CIHEAM Bari is in its third case study cycle and, as in the previous cycles, involves MSc students in the Mediterranean Organic Agriculture course. Students were divided into 3 groups (3 students each), each coached by 2 learning facilitators. Within the MSc programme, Action learning activities are devoted to the design and implementation of the student's final project, which contributes to 15% of their final grade, and delivers a total of 10 credits (ECTS). As for the first and second cycle, the group report is complemented with an individual essay, providing the space for each student to have a personal reflection.

Action learning activities were organized in the form of *Teaching Unit* (TU), distributed all along their MSc course studies, while the thematic area selected was *Social Capital Development in Agriculture*. Below you will find a description of the action learning teaching unit, its aims and expected learning outcomes.

TITLE OF THE TU: *Action learning on social capital development in agri-food sector*

DESCRIPTION: Social capital is considered nowadays as one of the key assets for sustainable livelihoods, territorial development, and for the organic sector development as well, thus being of high interest for our action learning activities. Different forms of relationships, organizations, collective actions, etc. can provide a wide array of services to stakeholders involved, such as enhancing access to and management of natural resources, accessing input and output markets, lowering certification costs, improving access to information and knowledge, support solutions to problems of environmental and economic sustainability of the agri-food sector, etc.

AIM OF THE TU: The aim of the TU is to facilitate the development of a set of skills that will enable students to:

- Acquire knowledge on social capital and its role in mediating challenges of contemporary and organic agriculture and competences;
- Engage stakeholders and identify pathways and strategies for social capital development.

The TU intends to lead the students towards a critical understanding of the role of social capital and its development and give them the tools to approach real life sector issues and therefore be ready for future professional challenges.

LEARNING OUTCOMES:

As a result of the action learning TU (project) students were intended to achieve the following learning outcomes:

- Become knowledgeable about main concepts, forms and dimensions of the social capital in the agri-food sector, and understand the importance of tailor-made approaches to stakeholders;

- Be able to perform community-level analysis and to propose problem-solving and development strategies (pathways);

- Improve their understanding of the interplay of social capital with other elements of the agri-food system, such as institutional arrangements, the governance of markets, consumer awareness, etc.

- Develop and improve competences needed for stakeholders engagement and management of social capital, including six core competences promoted by the project.

ACTIVITIES PERFORMED WITH THE STUDENTS: Interviews with the sector stakeholders in their countries of origin and in Italy, series of topic-related seminars and lectures, group work and presentations, coaching and discussion with learning facilitators, exercises on the core competences, exercises on social capital assessment methodologies, etc.

3.11.2.2.1 Students', teachers' and other stakeholders' experiences and learning

To be performed at the end of the course.

3.11.3 Data on the development of the case since the last reporting

3.11.3.1 *Students' responses, learning and competence development*

3.11.3.1.1 Methods of data collection and analysis

Following the project research protocol (D2.1), we collected the data, anonymized and stored it according to the instructions for the first week of the course, while final evaluation will be done at the end of the course. This year we did not perform mid-term evaluation, since in general due to the pandemic, the course started one month later, and we needed to make this adjustment to be able to respect project deadlines. The responses we received for initial data collection were 9. Collected answers were subjected to the analysis by Nvivo 12 software (QSR International – 2020). All data were collected in the written form. As reported earlier we will distribute an additional questionnaire at the end of the course, concerning action learning and its interplay with our MSc course.

3.11.3.1.1.1 First week (day) & last week (day) of the course

3.11.3.1.1.1.1 Student's understanding, contributions and expectations

Students provided their answers to five questions from the research protocol, considering their opinion on the knowledge and skills needed for sustainable development, core competences fostered by the project, their expectations, etc. All answers were anonymized and subjected to coding, following data analysis

instructions shared by the WP leaders. Besides 10 codes provided within the manual (Competences: Dialogue, Facilitation – by students and by the teacher, Observation, Participation, Reflection, Visionary thinking; and Transformative learning) we introduced one more code, named: *Technical knowledge and/or competences*, following our experience of the last year and to have the possibility of comparing the data, in the light of scientific publishing possibilities.

Compared to the last year we introduced action learning more precisely defined concerning the topic/thematic area of investigation/interest (social capital development in agri-food sector), while last two years we had a more "open/general" approach (rural/territorial development). This change was now reflected in the findings of the first data collection, where students focused more on the topic of interest while highlighting less technical skills (i.e. farming practices, techniques, etc.).

This is confirmed with the word frequency in the Word Cloud presented below (Figure 1), where the most frequent words were *development*, *activity*, *sustainable*, *agro-food systems* and most interestingly word *competences* (which was not the case for the last year. Further, we can see that the words *social* and *capital* had medium frequency, as well as *help*, *support*, *improve*, *knowledge*, etc. We associated this to the more precise description of the topic, and thus the immediate effect on students focus, despite having most of them with the agronomic background. This is for us very useful experience, and after three years of case study implementation we found a good balance, where we had an open approach in terms of methodology, but better framed in terms of topic, giving a chance to students to progress faster in the learning process.

Figure 1: Word frequency from the first data collection

Qualitative analysis of the text from the first evaluation is presented in the form of a hierarchical map (Figure 2), where text coding resulted in the dominant presence of competences over *transformative learning* (TL), and *technical skills*. In the case of TL, this was expected for the first data collection (knowing the complexity of TL, and having last year experience with data analysis), however, we would expect a higher frequency for *technical skills*. As we wrote above, we see it related to the more clear definition of the topic.

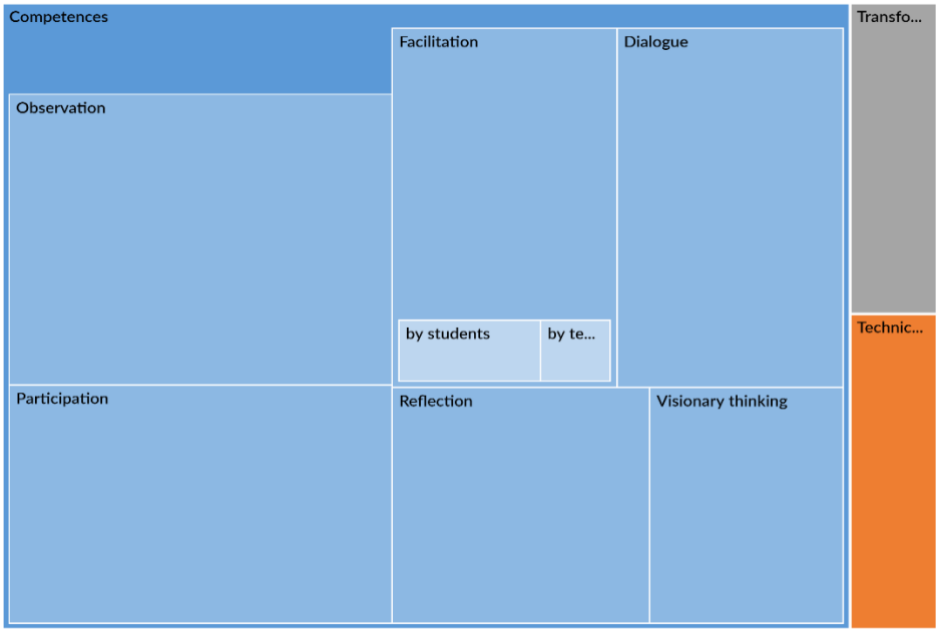


Figure 2: Hierarchical map compared by the number of coding references for the first data collection

Considering the core competences we can see that *participation* and *observation* were the most frequently coded, followed by *facilitation* and *dialogue*, while as the last year reflection and visionary thinking were coded less frequently. Still, compared to the last year we had an increase in the frequency of coding for *reflection*, here it is difficult to argue, but this can be linked to the fact that students understood better second question of evaluation (Q2: *What experiences and competences do I bring to the Action Learning Module activities to make it a success?*), or to the previous experience they had during the BSc studies about social capital and NGOs in the agri-food sector, higher overall maturity and work experience of one student in development projects.

Some of the students comments we would like to highlight are listed below:

- "*We have to remember that the public sector has its responsibility toward defining laws, instructions and obligations to succeed and implement sustainability*" – indicating students awareness about the importance of policymakers and public institutions level for the transition towards sustainability.

- "*…we have to think about our most valuable and effective experiences, avoid judging, create a sense of order, focus on motivation, and to be consistent*" – demonstrating observation and reflection competence.
- "*We need to have knowledge about people and their needs exactly, and all related challenges they face, what is the nature they are living in and all related aspects. We should know and consider the different situations of people and territories, we should have the skills of treating people well, understanding them and respect their privacy and traditions very well*" – where students observes the importance of local context and tailored approaches.

3.11.3.1.1.1.2 Self-assessment of competences

To be performed at the end of the course.

3.11.3.1.1.1.3 Students' final reflection document (individual)

To be performed at the end of the course.

3.11.3.1.2 Results

Here we will report on the shifts based on the observations by coaches and interaction with students. Since our final data collection and data analysis will be done at the end of the course, some of the sections will not be completed.

3.11.3.1.2.1 How do students experience such a learning process with respect to:

3.11.3.1.2.1.1 Learning goals?

To be performed at the end of the course.

3.11.3.1.2.1.2 View on competences needed for sustainable development?

To be performed at the end of the course.

3.11.3.1.2.1.3 Recognition of own competences and competence development?

To be performed at the end of the course.

3.11.3.1.2.1.4 Transformation?

To be performed at the end of the course.

3.11.3.1.2.2 To what extent does the education enhance the students' competences

Our students have showed different levels of development. They all tried in adapting and understanding the new approach to the learning.

3.11.3.1.2.2.1 Observation?

Students have showed commitment to understand the attitude implied in this skill, interviewing actors in their selected local contexts without expressing any overarching judgment or bias. This time observation has been limited to distant contacts for the impossibility to travel and has limited the scope of possibilities. Students have, nonetheless, been able to report a good picture of their own case.

3.11.3.1.2.2.2 Reflection?

They have been able to organise notes and materials for their investigation carried out in remote modality. A review and improvement of the approach used in their interviews leading to a better execution of the second assignment has shown an improved level of reflection abilities. However, this has been affected by the initial limited consideration paid to support literature that was suggested by coaches to provide a theoretical background for their activities. In some cases, group reflection has not led to group improvements, whereas individual competence and experience have contributed to better individual results.

3.11.3.1.2.2.3 Visionary thinking?

At the moment of the reporting, a full picture on the level achieved in this skill handling is not possible. The limited interactions with local actors have hampered the opportunity to grasp the concept of visioning in its full potential. A field visits organized in May to facilitate field experiences, will probably provide a good opportunity for reflecting on the visioning and where it can stand in their activities design.

3.11.3.1.2.2.4 Participation (engagement)?

Students have showed a good level of participation in activities and in the exchanges with coaches, sharing their doubts, achievements, and ideas, reflecting on their suggestions and integrating them in their work. They have also improved their participation in peer learning activities, discussing within the group how to design further steps in their assignments. They effectively interacted with key informants and actors from the territory, remotely, they showed interest in the role of each of the actors and tried to prepare questions that could clearly define roles, interests, conflicts, objectives, etc.

3.11.3.1.2.2.5 Dialogue?

Students have been able to discuss progress about their findings among themselves, with the coaches and, in some cases, with the local actors. The results of this process are expected to be conveyed in the final assignment and presentation.

3.11.3.1.2.2.6 Dealing with "the challenge of the whole" (systems thinking)?

Students were able to perceive importance of the system approach and thinking, their analysis of sector actors, identification of their challenges, networks, relations, etc. demonstrated their ability to look at the system as a whole, to analyse it and to make interpretation of findings.

3.11.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.11.3.2.1 Methods of data collection and analysis

Teachers' reflection was collected in oral form, following finalization of their involvement in our case study. Usually, the working group was making short meeting with the teacher to get the feedback from them. In case of the coaches, we followed the format proposed by project research protocol for data collection (reflection).

3.11.3.2.1.1 Teachers and coaches reflection document

Teachers involved in the action learning were visiting professor, experts on the social capital and very curios and open to participate in our case study. They expressed their support for innovative learning methodologies such as action learning. Still, their involvement was based from few days of teaching to up to one full week, thus not allowing them to follow the whole process, however this positive feedback is important indication for us, while we must increase participation of teachers affiliated to CIHEAM.

In the sections below we will make an interpretation of the coaches feedback:

- This year a new element has been introduced in the design of the AL activities, a content focus on social capital aiming at stimulating students' reflection on its contribution to sustainable development in rural areas. The activities were designed to drive the students to investigate the role of social capital in a specific context, and with reference to a specific initiative (cooperative, association, other) identified by each student in his/her home country. The outcomes of this novelty have both raised issues and contributed to progress in some aspects.

- Literature has been provided in a well thought and support oriented way but unfortunately sometimes disregarded by students as they felt overwhelmed with course assignments and considered it not an integral part of their training path.

- The introduction of a central theme – the social capital, to conceptually frame and practically steer the activities for their skills development has produced mixed results. On one hand, students seem to have appreciated the conceptual framework presented by an academic expert on social capital as well as the complementary lectures by an experienced practitioner and international activist. On the other hand, it has become

clear that students did use the reading references provided on the topic to improve their group reflection and presentations as well as their individual essays. Also, the initial attempt to orient group activities on a further thematic sub-focus (like value chains, cooperatives, women's empowerment within social capital) has created confusion and reinforced, for some students their original lack of interest in the theme itself, considered not relevant to future professional interests.

- Interlinkages with taught disciplines and modules within the master program remain invisible

- A group dynamic was not entirely achieved. It was more a work done according to individual strengths and recombined in a final product.

- Interaction with local actors has been weak and difficult to become functional to the needed information collection. However, students have seriously committed in trying to get through local actors and design good interviews.

- We have recorded a medium development of participative and discussion skills, also due to the obstacles posed by the pandemic. Visioning is still not very much developed, there is a constraint in working out a common path with the actor each of them selected, but this is mainly due to impossibility of direct relationship with them. We have recorded an improved level of reflection during the discussions for feedback after the assignments.

- Just like last year, sharing the exercise and the experience between coaches was not only pleasant but also very convenient since we could actually integrate our background and coaching styles, ensure students regular coaching sessions and support able to cater for students' needs and our personal and institutional commitments.

3.11.3.2.1.2 Course reflection focus group/interviews

To be performed at the end of the course.

3.11.3.2.2 Results

3.11.3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.11.3.2.2.1.1 From lecture hall to a diversity of learning arenas

The third cycle activities were unfortunately deeply affected by the ongoing pandemic situation. The start of the MSc programme was 1st December 2020, with the first 3 months of the course held online. Students arrived in CIHEAM campus only at the beginning of March 2021. Between December and March the main learning arena was

an online lecturing hall (CIHEAM Bari e-learning platform and applications for live lectures and meetings).

However, our desire to reduce the effect of this obstacle resulted in the creation a forum to have a constant exchange with students. We decided to engage students with agri-food sector stakeholders in their countries of origin since the beginning of the course. This was done by different means in observation of COVID 19 restrictions and limitations of action (it was mainly done over the phone, email, WhatsApp). As a result, students got in contact with different realities of social capital in their countries, such as farmers' organizations, agricultural cooperatives, women associations in the sector of agriculture, food and rural tourism, etc.

During the period of distance learning, students attended a calendar of online seminars on the topic, which provided them with the necessary theoretical background for better preparation of interviews with stakeholders and to improve their ability to analyse and elaborate their findings. Upon arrival to Italy, students continued coaching/facilitating sessions in presence.

3.11.3.2.2.1.1.1 Supporting forces and how to build on them

Responsiveness of the students, their commitment to the work, and the creation of social relations within the group and with the coaches confirmed that challenges due to distance learning were smoothly overcome. Yet, distance learning poses several difficulties and requires additional commitment and creativity from the action learning team. Thus human capital remains one of the key elements and supporting force for the case study implementation. Here the proper recognition at the institutional level should be present, to keep the involved personnel motivated, and as well to have possibility to better balance the work load related to action learning.

3.11.3.2.2.1.1.2 Hindering forces and how to deal with them

We cannot start this section other than with pandemic condition, being the main hindering force in general for case study preparation, to the levels which could be indicated as overwhelming. Here flexibility of staff and modern technologies absorbed to some extent negative impact, but we are sure that the learning outcomes would be better if we had condition for work as in the previous two years.

3.11.3.2.2.1.2 From lecturing to co- and peer learning

The "mixed" model approach, co-learning with stakeholders, within the students group and with coaches was, as in the previous cycles, the main model adopted. During the topic-related seminars learning facilitators were involved to follow the lecturers but also to participate in the knowledge acquisition with the students. What was particular in the first three months, is that we were "information-dependent" from the students, since they were the ones who had direct contact with sector actors, conveying findings

afterward to us. This was enriching for the coaches, since we obtained information and knowledge about 9 different realities of social capital, all around the Mediterranean basin.

To provide learners with the “peer-learning” dimension, we invited our previous year students to share their experience and reflect on the previous cycle of action learning, further they were open to students questions and shared their ideas for this year action learning activities. Co-learning as in the previous years was promoted with group activities and interaction with sector stakeholders.

3.11.3.2.2.1.2.1 Supporting forces and how to build on them

This year we had higher number of staff involved in the case study implementation, compared to previous two years. This proved to be enriching, bringing additional arena for dialogue, increased creativity, and as well possibility to share the work load. We hope to keep this trend for the next year, and to even more integrate our action learning activities within MSc path.

3.11.3.2.2.1.2.2 Hindering forces and how to deal with them

What we faced as an obstacle in peer-learning was the fact that last year students were back in their countries due to the pandemic (making their thesis in mobility mode). Thus, we had to reduce their contribution to online interventions, while last year peer-learning involved their participation in field visits and some initial exercises with the students.

3.11.3.2.2.1.3 From syllabus to supporting literature/a diversity of learning sources

During the third cycle, we placed focus on exercises related to assessment frameworks for social capital assessment, which required students to explore previous studies on social capital, to interact with stakeholders and to know their profiles and activities better. A combination of individual and group work was fundamental for the setting up of their work process. In order to individually approach their chosen local actor they had to develop a methodological framework (resulting in a check list for interviews) within their work group. After that they would individually conduct the interviews and then organize another session of group work to discuss and elaborate their findings in order to prepare a common presentation to be delivered to all classmates and learning facilitators.

This approach was applied as well to make students combine knowledge from the lectures and seminars, information available in the research articles and reports of international cooperation projects, findings coming from interactions with stakeholders and knowledge co-created within the group/s. After each contact with the actors, they were invited to reflect on the findings and the experience, based on which they were planning further activities and interviews.

3.11.3.2.2.1.3.1 Supporting forces and how to build on them

Here we observed students progress over time, in fact, they showed an improvement of their knowledge base and research abilities, which were later reflected in the improvement of the presentations delivered. Young generations nowadays are very much IT oriented, which was supportive during the online phase, which should be further exploited in the coming year.

3.11.3.2.2.1.3.2 Hindering forces and how to deal with them

Majority of the students are coming from “conventional” world of education, thus their initial confusion about the methodology still remains challenging for us. The same applies for the sector actors, despite having some of them very passionate to share the experience, still we cannot distinguish for if the financial compensation is one of the main motivations to get involved within our activities.

3.11.3.2.2.1.4 From textbook to a diversity of teaching aids

As we highlighted at the beginning of the report our e-learning platform was a new teaching aid, compared to the last year. Forum established within the platform supported dialogue, space for questions, exchange of the literature, etc. Considering that new generations are more and more “technological” we consider it as an interesting teaching aid, to be used even during the residential course. As in the previous years, we coupled it with the use of videos, presentations, and after students arrival to Italy with flip charts, poster preparations, etc.

Their arrival enabled us to have direct interaction, however, it also meant for students to continue the interaction with their country stakeholders remotely. This required additional flexibilities from actors involved, since all representatives of social capitals have their regular work duties, and even some are not that familiar with the use of applications for video calls.

3.11.3.2.2.1.4.1 Supporting forces and how to build on them

Pandemic conditions reduced our space for activities, students managed to keep the interactions alive, allowing them to build on information already collected with the new one, and to use them as the source of knowledge on a real case (life) context and problems/challenges actors are facing. When onsite visits were finally done in Italy, this shift got additional positive impulse.

3.11.3.2.2.1.4.2 Hindering forces and how to deal with them

Identification of literature supporting the process but not overloading the students at the same time remains a small challenge for coaches, which again should be addressed better in the planning stage.

3.11.3.2.2.1.5 From written exam to a diversity of assessment methods

Our assessment methods do not reflect the standard of the classical examination. This shift for our case study is the more constant. Thus we kept using comprehensive evaluation all along the course duration, including students presentation, group reporting, individual preparation of argumentative essay and students participation and contribution in exercises. Again, apart from the self-assessment test proposed by the project research protocol we used an additional questionnaire at the end of the course, looking for insights on how students perceive methodology used, support of the coaches, alignment with their MSc programme, and if the activities performed according to them could contribute to stakeholders involved in the case study, and even wider at the sector level.

Group report further facilitated dialogue competence and requested from students to work as a team, to communicate and to arrive to shared proposals and solutions. Students were engaged in the analysis of their selected stakeholders (representatives of social capital in the agri-food sector) and needed to report as a group about their networks, relations, distribution of power. They could discuss the benefits for their main actor, the structure of the network and potential conflicts, and finally to envision a potential scenario showing what would be the reality if the actors were not the part of social capital.

As an individual assignment, we used an argumentative essay, since last year experience confirmed how beneficial it was. This format requests students to combine their personal experience with actors and information coming from the literature, where they need to provide arguments but as well contra-arguments, all supported by the evidence.

3.11.3.2.2.1.5.1 Supporting forces and how to build on them

At the end of the course, students will prepare a final group presentation, to be presented to concerned stakeholders and researchers and staff from CIHEAM Bari. As last year, in the final conference we involve our institutional representatives, apart from the staff directly involved in the “NextFood” project, to further support desired institutional shift for innovative forms of education and learning.

3.11.3.2.2.1.5.2 Hindering forces and how to deal with them

Assessment methodology is not something that we define at the beginning of the action learning activities, but it is more fluent activity which we adapt/change based on the course progress and observed reactions from students. This is something which is seen by students as disturbing factor, and again we would associated this to more “conventional” way of thinking. However, with the course finalization we expect that students will appreciated this approach, and see its advantages, since it calls for flexibility, but as well for creativity and constant dialogue among group members.

3.11.3.2.2.1.6 From lecturer to learning facilitator

As we reported for the previous years, our action learning activities are part of the MSc course, where students are receiving a significant amount of classical lectures, thus our role again was defined as learning facilitators, which are trying to "get the best" of lectures already delivered to the students and to combine it with our action learning methodology. What is important to highlight for this third year of case study is that we provided significantly more space during the course for action learning activities, being now in form of a teaching unit, with more time for topic-related seminars and lectures. This possibility came from the fact that course coordination was changed, with a new coordinator being more open to action and experiential learning. This allowed us to have even a full week of lecturing devoted to action learning, with lectures familiar with the methodology, thus giving additional support to personnel who had the role of coaches.

In the two previous years, we were dividing students in the group around the middle of the course, while this year to overcome the gap coming from the online initial part we divided them into the groups from the very beginning, giving more time to coaches and students to create strong bonds and the atmosphere of co-learning.

3.11.3.2.2.1.6.1 Supporting forces and how to build on them

Higher involvement of staff was supportive during this year, still the place for improvements always remains, and it would be desirable to have even more lecturers and regular MSc course syllabus involved in action learning activities, which remains our important aim for the last year of the case study implementation.

3.11.3.2.2.1.6.2 Hindering forces and how to deal with them

Our action learnings were structured with coaches going after different group of students who independently worked on phenomenon, open and action-oriented cases. Our coaches complained that we need to ensure to students' sets the same treatments and experiences and feel uncomfortable if things take different directions for different students' groups. Here maybe increase dialogue in the planning stage could help to overcome present challenge.

3.11.3.2.2.2 What such a change requires from teachers, students and institutions

Flexibility, a lot of flexibility, open mind, a bit of courage, good planning and institutional support.

3.11.3.2.2.3 Coaches perception of the greatest challenges to achieving such a change

Here we list some of the main challenges highlighted by the coaches involved in the case study implementation.

- Distance learning (on-line part of the course) brought several challenges, especially in terms of dialogue and relation development between students and coaches. It is also somehow in logical contradiction with the action learning approach (hand on experience), thus this was one of the greatest challenges for the third year of case study implementation. Further, multi-actor approach is desirable, but at the same time difficult to manage, and less efficient when we come to the learning outcomes?

- Another challenge is still conveying the concept of "visioning", which becomes even more complicated to acquire without direct interaction with actors.

- A main problem is to have an action learning totally integrated in a master course. It needs coordination among a wide range of teachers and researchers who are used to discipline driven and oriented activities. It needs a strong coordination and sharing of objectives.

- The involvement of stakeholders has been challenging, more dictated by good relationships with teachers and/or on services provision mechanisms (paying fees to actors for their interventions) rather than by a real concern on activities and action learning results.

3.11.4 Concluding remarks on the case development since the previous reporting

3.11.4.1 *The most useful and inspiring experiences (supporting forces)*

It was very inspiring to see happiness of students when they got in direct contact with the actors. Even though online phase was challenging, it was useful to learn how to work fully online with and action learning approach.

3.11.4.2 *Main obstacles/challenges encountered (hindering forces)*

The open questions (challenges) for us, are the following one:

- Are sector stakeholders sufficiently ready to be part of action learning activates? Do they have as well more "conventional" approach, and do we need thus to educated as well sector actors, and not only to work at the level of educational institutions?

- How to shift a whole course syllabus to action learning, rather than a single module. How to improve the visioning skill development in students.

3.11.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

Good planning helps, but in specific conditions of this year margins for planning became very narrow. One of the lessons is that more exchanges between the students

groups need to be scheduled in the activity program for cross-contamination and alignment. Further, we concluded that individual essays should be designed and proposed as an integral, complementary part of the main learning path. Any deviation from this main path has proven to produce confusion and waste of students' learning energy and commitment

3.11.4.4 *Plans for how to move forward into the next cycle*

⇒ Longer focus on an agreed package of tools for data collection and analysis;

⇒ Further expose students to multiple actors, activities, landscapes from the territory, possibly organise their direct longer, practical, involvement in some specific on field activities;

⇒ Envisage various intermediate meetings with local actors in connection with the different phases of the exercise (we already conveniently did some which in our opinion proved to be very useful);

⇒ Organise in advance a package of relevant references to share with students. Such references should be of course relevant for the topics addressed in the exercise; at the same time clear, explicit connections should be created with taught disciplines and materials distributed within the master program;

⇒ Plan a series of relevant seminars/webinars on specific topics of common interest.

Pictures of the activities




3.12 University of Kerala (UoK)

3.12.1 ID card

Course title:	Certificate Course on Agroecology Action Research and Education
Level:	Post Graduation
Language:	English
Host institution(s):	Centre for Agroecology and Public Health (CAPH), Department of Economics, University of Kerala
Course leader(s):	Dr. Manju S. Nair (Hon. Director (CAPH), Professor, University of Kerala and Dr. Anupama Augustine, Research Associate, CAPH.

Learner categories and number per category (demographics)

9 students in total, 5 Female, 4 males

Age- 20 -30: 9 students

Nationality: Indian- 9

Social Science background: 7 students

Natural Science: 2 students

3.12.2 Extended summary of development of the case since the previous reporting

3.12.2.1 *Actions taken since the previous report*

Kerala case completed initial planning, implementation and review in the cycle 2. It included a planning workshop ahead of commencement of course, conduction of 28-day certificate course on agroecology and a Focus Group Discussion to review the course in which students, mentors and facilitators participated. Assignment documents (answers to initial and final questions, supporting and hindering forces and reflection sessions), self-assessment of competences, learner documents, teacher reflection documents and transcript of FGD were generated. All documents were cleansed and analysed using the software NVIVO. Learner documents were coded based on the coding tree provided. As the analysis revealed peculiar relationship among educational activities and competences, additional 'relationship codes' were used for analysis.

3.12.2.1.1 Planning

A workshop was conducted for planning the Agroecology Course in Kerala on 16/11/2020 at Centre for Agroecology and Public Health. The objective of the Workshop was to do a reflection of the previous course in terms of the intended shifts that NEXTFOOD envisions and to plan for the upcoming course. Eight participants representing students, mentors, researchers, teachers associated with the course contributed to discussions. The workshop succeeded in refining the curriculum in order

to conduct the course as a regular course to materialise the intended shifts envisioned in learning and research, abiding to the Covid 19 pandemic regulations in the state. The major decisions included in course schedule comprises,

- ✓ Intensify peer learning: Zoom and WhatsApp group meetings to intensify peer learning, online sub groups to do group activities
- ✓ New Teaching aids: Introduce new educational activity such as 'Photo Novella', conduct of online expert sessions, documentary making etc
- ✓ Introduce new learning arenas: Implement training classes for students at field, invite experts to field and conduct of interactive sessions.
- ✓ Assessment techniques: Introduce teacher reflection documents, alumni to act as mentors and support continuous assessment of students.
- ✓ Supporting literature: Online literature review and response paper writing sessions, peer review of response papers.

3.12.2.1.2 Implementation

Certificate Course on Agroecology: Action Research and Education' the 28-day course was conducted during 18-11-2020 to 14-12-2020. The course provided post graduate students an opportunity to practice 'Next food' model of action learning and there by enhance competences like observation, reflection, dialoguing, participation and visioning. The team included nine students, three farmers as facilitators at fields, three mentors and two course facilitators. High light of the course include;

- ✓ Participation at agricultural fields by students in groups
- ✓ Competence training
- ✓ Online interactive sessions and peer learning sessions

The pedagogy adopted in the course helped the students to engage with the four phases of Kolb's learning process - starting from concrete experience to reflective observation, conceptualisation and active experimentation thus providing real life experience, supplemented by theoretical knowledge. A group of three students were assigned to a particular farm, which formed the centre of the course. During the initial week of the course, students spent two days in the farm participating in farming activities and conducting in-depth interviews with the farmers and neighbours. Students also gained competences in observation, participation, reflection, and dialoguing through this process. Along with the works on rich pictures, mind maps and presentations based on their real-life experience in the farm, the students were provided with supporting literature and interactive sessions with experts. During the third week of the course the students revisited the farm to relook the happenings and activities in the farm and had joint visioning sessions with the farmers on the future of the farm and the ways to achieve the intended future. The students finally prepared a client document, which provided a detailed understanding of the current situation, the sustainability aspects, intended future, the supporting and hindering forces and ways

to achieve the intended future. A copy of the client document was provided to the farmer and the findings of the document were also disseminated.

3.12.2.1.3 Reflection

Teacher reflection was done at the end of each activity using the Nextfood template. The facilitator who guided the activity and one mentor who supported in the activity filled in the template.

3.12.2.2 *Research results since the previous reporting*

3.12.2.2.1 Students', teachers' and other stakeholders' experiences and learning

The course was a new learning experience for both students, teachers and farmers, - the major stakeholders in the course. As a case we succeeded in fostering transformative learning in agroecology with the support of students and farmers.

Students at University of Kerala, being trained in conventional learning techniques, had scepticism in the beginning about the methods of learning, as they were given a flexible curriculum with new educational activities. Many of the students joined the course with expectation to gain practice in farming, and understood agroecology at par with agriculture. However, towards the end of the course they understood the importance of new learning pedagogy through practice, and gained competences. Students started to be aware of sustainability issues in the surroundings, and tried to find feasible solutions by adopting system thinking and agroecological position, especially after participation at fields. Students opined that many of the competences they learned are tools for life long learning and the course made attitudinal changes in them to appreciate diversity and peer learning. The course used Kolb Learning cycle and the students are given an opportunity to experience learning by doing. Field work made indomitable impact in student learning. The existing knowledge of each student also helps in effectively carrying out action research and in understanding new pedagogy. The groups having members from diverse discipline made the learning experience multidisciplinary and multidimensional for students.

Farmers acted as facilitators in the course and to them, it was a whole new experience. They haven't been in a University for all these years, and participating in activities instilled sense of responsibility in them and their social status improved. They guided students at the field and these interactions helped students to learn farming techniques, issues faced by farms and economic, social, and cultural aspects of sustainability issues. Most of the farms are small holder farms and farming activities are a part of daily life in which all members in the family participates. So that, it was tedious for the farmers to find time to interact with students and arrange facilities for participatory action. However, they seemed satisfied with the new role entrusted to them, and understood about learning and research happening at university and how they can contribute towards it. Also, the client document prepared by students was helpful for farmers for documentation and for further expansion of farming activities.

Facilitators, supported by mentors informed students about the new action learning pedagogy and the significance of gaining competences. Various action learning tools including transect walks, photo novella, peer group activities, literature seminars, field work and interactive expert sessions were introduced. Of the various tools used, based on the student feedback, most effective tools were identified. This helped facilitators to evaluate each educational activity and refine their timing, duration and method of facilitation. It was a learning for the facilitators to recognise their altered role in education and understand how they can nudge students to indulge in various educational activities and gain from it. Meticulous planning, choice of method of instruction, division of activities into individual or group, subject knowledge, ability to create rapport with students, being impartial, finding fields and convincing farmers, establishing good assessment mechanism, conducting teacher and student reflection sessions, understanding student perspective, being accommodative to student's inhibitions, time and resource management, communication skills, team work among facilitators/farmers are important factors that effect quality of facilitation. However, there was administrative and institutional limitations in experimenting this new model of education as this demanded revision in existing model of learning at University. Also the COVID-19 pandemic and the resulting social restrictions, limited the scope and time available for action research facilitation.

3.12.2.2.2 Outcome of the case development process, including effects of making the essential shifts

The major objective of the course was to experiment the Next food model of experiential learning and there by initiate a transformative learning process which can ensure sustainability in agri-food systems. And the course succeeded in implementing the following shifts

a) From lecture hall to learning arenas

Transect walk, reflection sessions at field, interactive sessions with experts at field, participation at field, photo novella etc. were the major educational activities that opened new arenas of learning to students. Student feedback shows that they welcomed the new change and these shifts provided an opportunity to connect to nature. Also, these activities enhanced dialoguing and participation skills as it involved dealing with multi stakeholders. Similarly, interactive sessions with stakeholders instilled visionary thinking and photo novella enhanced observation skills.

b) From Lecturing to co-peer learning: Peer learning was fostered through educational activities such as IGP model discussions, preparation of client document, joint visioning sessions and group work. These activities helped students to recognise own competences and those of peers and to learn from each other. To students, dialoguing seems to be the one competence that determines the quality of peer learning. And enhancing the competence makes each of these educational activities easier and better.

c) From syllabus to supporting literature: Instead of sticking to a definite syllabus students were encouraged to acquire knowledge according to their interest. In this

regard they were given training to read research articles and to write response paper. This activity has helped in improving the reflection competence of students.

d) From textbook to a diversity of teaching aids: Power point presentations, rich pictures, mind maps, videos, online sessions, dialoguing sessions were used as teaching aids. Students found rich picturing and mind mapping as very creative tools of learning as it allows to represent observations without prejudices and is a way of brain storming. Creating power point presentations and video documentaries improved the technical skills and creative quotient of students.

e) From written exam to a diversity of assessment techniques: Peer review of documents, reflection documents, focus group discussions, and assignments were used as assessment techniques. And this shift in the evaluation process helped students to learn without unhealthy competition and enabled an understanding of holistic development of students.

To students, the new educational strategy is not just a process of creating knowledge, instead is a mediative process of reconstructing one's knowledge and attitude accumulated over these years of conventional education by applying action learning tools. Educational activities have led to enhancement of competences among students. One educational activity has fostered more than one competence and improvement in particular competences in turn improved quality of certain educational activities. Relationship between particular educational activities and competences were analysed using coded data. Based on consistency (number of students talking about same relationships) relevant relationship and their nature were unearthed. Relation is of two types. Firstly, one way relationship where the activity enhanced the competence, but competence enhancement does not improve quality of activity. Secondly, Symmetrical relationship, where both educational activity and competence reinforce each other. From the analysis of learner documents selected action learning tools are combined with competences based on the results from initial coding, and they include;

a) Photo Novella- Observation (One way): Photo novella, an activity introduced during the fourth week of the course, to enhance technical skills turned out to be one that enhances observation skill. From the student feedback it was felt that photo novella can be used as an activity to teach students observation and reflection skills and has to be introduced during the first week of the course.

b) Transect Walk- Observation (One way): Transect walk, the first outdoor activity of the course serves its learning goal, since students, from their experience felt that it helps in improving observation skill and to connect to nature.

c) Peer Group Activities- Dialogue (Symmetrical): Narration of peer group activities invariably shows the importance of dialoguing in making peer learning effective. This finding throw light into the fact that dialoguing as

a competence has to be introduced earlier in the course. Currently, dialoguing sessions are planned to make students competent at field, to dialogue with stakeholders.

d) Interactive sessions- Visionary Thinking (Symmetrical): Quality of interactive sessions depend on the capacity of students to think. Visionary thinking has helped students to listen to interactive sessions and to ask sensible questions.

e) Response paper/ Literature seminars – Reflection (One way): Literature seminars primarily aims at co-creation of knowledge. But the student feedback proves that reflection is the skill that decides the quality of literature seminars.

These insights become significant because the scheduling of each educational activity is very much important in deciding the learning outcome; that is the competence development. Goal of each educational activity has to be decided based on student feedback and establishing relationship among various educational activities and competences can actually help in measuring the transformation in students as a result of each educational activity.

3.12.2.2.3 Supporting and hindering forces for implementing the Nextfood model

Conduction of the course was a joint effort in which various stakeholders including students, teachers, farmers and university authorities played their respective role. The major focus was to transform the learning process to match the intended shifts in Nextfood approach, and this necessitated introducing new learning arenas, teaching aids, peer learning and assessment mechanisms. However, Covid 19 pandemic hindered the plans to conduct the course in May and there were apprehensions relating to conducting it offline.

Here, an **experienced team of alumni students and facilitators (including farmers) having a vision to conduct the course** offline, to adhere to Nextfood approach acted as the major driving force. The planning workshop acted as a session to brain storm different ideas so as to modify the course to the distinctiveness of pandemic time. During planning workshop important decisions like convincing administrative staff through dialoguing, extending the learning arena to online platforms, introducing new teaching aids such as photo novella and limiting the selection procedure to include day scholars only were taken. And these decisions helped to reduce the limitations put forward by pandemic. **The urge to find alternatives** was another driving force. For instance, students were not allowed to travel to long distance due to the lockdown, so that nearby farms were arranged to do field work. And similarly, since the botanical garden was closed due to lockdown, administrative sanction was gained to use the farm inside campus to conduct transect walk. Another important factor was **time management and optimum use of**

resources. As the students were not allowed to spent beyond working hours in the campus, many of the group activities were coordinated and implemented online.

However, difficulties related to transportation, lack of technical knowledge, lack of clarity from authorities about possible actions to control pandemic (extent of lock down), uneasiness to convince students about certain learning pedagogies etc. acted as hindering forces. The team tried to mediate the hindering forces through joint effort. And this required persistent discussions among team members to refine/modify educational activities with out harming the core theme of action learning.

3.12.3 Data on the development of the case since the last reporting

3.12.3.1 *Students' responses, learning and competence development*

3.12.3.1.1 Methods of data collection and analysis

Learner documents, teacher reflection documents, self-assessment of competences, answers to initial and final questions were collected during the course. Nextfood templates were used for data collection. Collected qualitative data was cleansed and analysed using NVIVO. Self-assessment of competences was analysed using SPSS software.

3.12.3.1.1.1 First week (day) & last week (day) of the course

3.12.3.1.1.1.1 Student's understanding, contributions and expectations

Students were asked the initial questions during the first day of the course and final questions at the end of the course, since the course was a 28-day course. The exercise was planned as a reflection exercise and students presented their thoughts in the classroom. A written copy was emailed by students for the purpose of documentation.

3.12.3.1.1.1.2 Self-assessment of competences

Self-assessment forms were filled in by students at the beginning and end of the course. An introduction was given to the students on how to fill in the forms. The assessment scores were filled in to excel sheets and then imported to SPSS and analysis was done.

3.12.3.1.1.1.3 Students' final reflection document (individual)

Students submitted final reflection document at the end of the course. An interactive session on 'how to write a reflection journal' was conducted during the second week of the course. Students wrote daily log and used the insights to write reflection journal. Initially a draft document was submitted and facilitators commented on it. Within one-week soft copy of final reflection document was submitted by the nine students. The documented were named and stored in NVIVO.

3.12.3.1.2 Results

3.12.3.1.2.1 How do students experience such a learning process with respect to:

3.12.3.1.2.1.1 learning goals?

Student experiences relating to learning process are evident in the response to the initial and final questions and from the learner documents. Regarding learning goals, there is a change in the perception of students towards the end of the course as compared to the beginning of the course. Most of the students joined the course with an aim of augmentation of knowledge relating to natural resources, participatory/action research, agroecological concepts and sustainable development. But at the end of the course, students felt that practical know how and identifying opportunities for change in the immediate surroundings is important for sustainable development in agri-food and forestry systems. Students highlight attitudinal changes as a major transformation happened during the learning process and this has helped them to redefine their earlier learning goals. To them, the learning process nurtured empathy to other stakeholders including peers, and acceptance towards diverse viewpoints. And, students started to see learning as a self-directed one, where collective intelligence defines the quality of the process.

3.12.3.1.2.1.2 view on competences needed for sustainable development?

Initially students were not aware of the 'Nextfood model' and the competences it promotes. To them, skills that accentuates creative thinking, communication skills, leadership skills, listening skills, critical thinking skills, analytical skills and the ability to do hard labour were those skills needed for sustainable development of agri-food and forestry systems. Seemingly, these skills have to be accompanied by certain attitudes including empathy, readiness to accept changing habits and technology, courage to break conventional thinking, initiative, confidence to work at field etc. in order to make an impact in sustainable development. By the end of the course students gained clarity of thought and talked of the Nextfood competences which is a combination of both attitude and skill. The need of observational skills, dialoguing, reflection and visioning were highlighted by the students. At the same time, importance of improvising basic skills such as reading skill, writing skill, presentation skill and research skills, along with skills in observation, dialoguing, reflection, participation and visioning which decides the quality or pace of competence development was also discussed by students.

3.12.3.1.2.1.3 recognition of own competences and competence development?

All students have identified possessing some of the competences when they came to the course and experienced an enhancement with regard to competences. These competences include theoretical knowledge (of subject they have been specialised in post-graduation), ability to do field work, personal experiences, communication skills and analytical skills. Students are of the opinion that they started to be more positive and trained themselves to search for sustainable solutions rather than struck indifferently at problems. They gained more confidence and became more committed to the cause of sustainable development. These changes were accompanied by attitudinal changes and this enabled students to think holistically. The course enabled to develop observation skills, reflection skills, dialoguing, visioning and coordination skills. "More importantly, it helped me to develop a mind set to act as a change agent"

(Learner Document 2021). Activities in the course has helped in making observation and reflection more focused, and to instil qualitative research capabilities in students. And this made students to understand the gap between theory and practice.

“Transect walk helped me to improve my observation skills and while I drew the mind map, I understood the difference between observation and reflection. Field visits and rich picture helped me to polish my skills of observation, reflection, participation, dialoguing and vision. Literature review helped me to read an article in an efficient way within a time limit and that too without missing any key points. Because of the IGP model I learned to face my fear of rejection and I expressed my ideas without any inhibition. As the class had students of diverse academic backgrounds my abilities to dialogue also improved. While talking to students of different academic background than that of mine I tried to understand their ideas without any prejudice and bias. Thus, I myself tried to improve my abilities and there were many opportunities to do so”. (learner document, 2021)

The results from self-assessment of competences invariably show an enhancement in the competences. The percentage change in the mean scores shows that, students experienced greater enhancement in dialoguing (83%) and visioning (76%) while participation (38%) showed the least improvement. Students have marked more than average score to each component of dialoguing, which implies that they have a good understanding of the difference between debate, discussion and dialogue and about how to practice dialoguing. However, regarding visioning exercise, one student has marked below average score while others have shown greater improvement. Statistical testing of the null hypothesis of no significant differences in competences - pre and post course was done using paired t test and the alternative hypothesis of significant improvement in the competences is accepted.

3.12.3.1.2.1.4 transformation?

Reflection documents reveal the transformation each student experienced through out the course. And this transformation can be understood in two facets. Firstly, the impact the course made in each student’s personality; the way in which they see and understand their roles and responsibilities as humans, which can trigger change that is lifelong. Student opines that “the course has changed my way of approaching life. I realized that the competences I learnt from the course could be applied to my personal life to be a better human being. I could reflect on my strengths, weaknesses, opportunities and threats to vision for my future. The experiences I gained through the course will leave a lifelong imprint on my approach to myself and my surroundings”. Secondly, students discussed the envisioned transformation needed to bring in sustainable development in agri-food and forestry systems. In this regard, visionary thoughts relating to role of government and technology in ensuring sustainability, practicability of agroecological farming in Kerala, incorporating professional goals along with sustainability goals, being an agent of change are surfaced. In addition, students have keenly observed the sustainability issues in the chosen field and has made visionary action plans to turn the field sustainable.

In short, student's opinion regarding learning process can be summarised in the below testimony-

"The course was a testimony to understand that group work and knowledge adds more than individual thinking. Getting engaged in a group enhances our listening skills, ability to empathize, developing a collective vision and evolving in a healthy environment within the learning space. This automatically answered my question whether this (skills, attitudes and learning goals promoted in the course) would provide a long-term solution to the problems (relating to sustainable development in agri-food and forestry systems) we face and the answers turned out positively. (Learner Document, 2021).

3.12.3.1.2.2 To what extent does the education enhance the students' competences of:

3.12.3.1.2.2.1 observation?

Students experienced enhancement in the competence of observation while participating in educational activities such as transect walk, rich picturing, mind mapping and photo novella. The tool of transect walk familiarised students a new learning arena, the real world outside classroom and it was introduced to improve the competence of observation. Students note that "The exercise helped me to improve my observation skills. (Facilitator) corrected us that we were supposed to observe the things in the way they are without any prejudices. With the activity I realised that I was never been a good observer, since every time when I observe, I was trying to connect it with a previous experience rather than treating it afresh/ raw." The discussions after the transect walk helped students to jolt out the qualities of good observer which include being non-judgemental, ability to see minute details, open mindedness and unbiasedness. Students practiced to imbibe these qualities in the later observation walks. They wrote "While observing the observer just observes without initiating any analysis, judgements or drawing any conclusions. Thus, an observer simply imprints the sights as it is". And students found the activity quite helpful to reduce their addiction to phone. A student writes "As a person I never had the habit of observing my surroundings. For the first time I kept my phone away and started to observe, and the journey from a phone maniac to keen observer started there".

Another activity that enhanced the skill of observation is Photo Novella. The topic of Photo Novella was - what you see depends on how you view the world. To students, "It helped us to think about our view of life, and to get out of the comfort zone to search for new things. It was a meditative process to hear our own subconscious mind, to listen what it tells and thus improved observation and reflection skills." Also, rich picture and mind mapping helped students to understand the process thoroughly. "While drawing rich picture we started to dialogue with each other and were amazed at the diverse viewpoints we have but, were able to depict it with clarity using rich picture. Mind map is a powerful tool to understand any complex concept. While I drew the mind map, I understood the difference between observation and reflection"

3.12.3.1.2.2.2 reflection?

Reflection Sessions were planned to improve the competence of reflection. Instead of lecturing, students were given opportunity to reflect both individually and in group in the classroom as well as outside (at field), after educational activities. Based on the reflection sessions students feel that "the course polished my skill of reflection….reflection is a skill built on the foundations of observation. A good observation always leads to a better reflection but all reflections may not instil the ability to observe well. Being active and curious during observation helps us to reflect better". Good reflection involves deduction, critical analysis and brain storming. All students have opined that the reflection sessions after each educational activity have helped them to evaluate each activity and to improve their competence. And thus, it decides the quality of learning process. For instance, Interactive sessions has improved the reflection skill of students. Interacting with academicians, farmers, activists and administrators has helped the students to think critically and reflect on implication of each experience. It was evident that better reflections from the part of students improves the quality of interactive sessions. Similarly, reflection sessions improve the quality of literature review. Students were given an opportunity to read literature relevant to the course and initiate self-directed learning. "After the session I learned how to read a paper with a short span of time and how to identify the important points in research articles. The fact that we were provided an opportunity to write and review research articles improved our capability to read, write and reflect."

3.12.3.1.2.2.3 visionary thinking?

Visioning sessions were practiced in classroom to improve the competence. Students actively participated in the session and shared their visions, and it helped them to execute joint visioning in the field. The visioning session "made me to realise that why should we have to vision, need to be optimistic and hardworking to reach our goal and need to push ourselves forward in failures of our lives. Visioning helps to create a concrete image of desired future and improving the competence helped in successfully creating a joint vision with farmer." In addition, interactive sessions with farmer and experts triggered visionary thinking among students and they started to connect the concrete issues at field to agroecological/ sustainability issues. Furthermore, they started to critically analyse current educational and agricultural policies and connect it with the need for promoting sustainable solutions. Here the need to become an agent of change is stressed up on, and importance of shared thoughts, actions and insights are highlighted. And students start to ask themselves "what have I done till this age to make food production sustainable?". Many students have found visions to deal with these issues in which starting an organic farm, changing food habits and shifting to eco-friendly life style forms some impressive points of action

3.12.3.1.2.2.4 participation (engagement)?

Field work at selected farms improved the participatory skills through interaction at field. Participation at field, oriented students towards the new learning approach. Students feel that they were able to create a rapport with farmer families and understanding the fam encouraged them to do farming, and thereby connect with nature. Students has linked participation with Kolb learning cycle and has explained

how observing the organic farming system marked the beginning of participatory learning. This helped to reflect upon farming and food systems and link the concrete issues to theories and concepts learned in classroom. Later, these learnings were used in joint visioning and in preparation of client document. "The field work, were thus key to this action research and education program as it offered the students first hand, raw experience of practice, philosophy, aesthetics and economy of agriculture and agriculturists. Through the field visits, I realised the actual happenings in the daily life of a farmer and the reasons why the existing policies fail". Client documents reflects student experiences relating to participation and how they learned the art of participation through practice. Students feel that 'my greatest learning from the course is the importance of being engaged in action. Collective action can make huge impact, which has to trigger from individual engagements.'

3.12.3.1.2.2.5 dialogue?

Dialoguing sessions, IGP model discussions and online platforms increased the competence of dialoguing. Dialoguing sessions helped to awake the sense of a listener and practice the competence. To students, these sessions helped students to understand difference between debate, discussion and dialogue. "With this activity I acquired the capability of how to dialogue with a person. The importance of listening and understanding your colleague was felt from the activity". (Learner Document, 2021). IGP model was followed in class with a vision to provide students an opportunity to learn in group and also to improve the communication skill of students. "The IGP model that we followed throughout the course is a simple yet powerful device. It offered me opportunities to improve my communication skills. And when we share our reflections in the group and plenary the whole class listens to what we say. And it made me feel so confident. The model is so strong that it makes you brain storm yourself and any complicated theories can be made simple through peer learning. It improves competences including dialoguing and reflection." To overcome the challenges of pandemic some of the sessions were online and this showed how effectively we can conduct dialoguing sessions online. "I learned how important social media are in our lives. We started whatsapp group/google meet and initiated dialoguing with group members. Use of social media and technology made our interactions easy, especially in this pandemic time. And our technical skills and knowledge were enhanced". Also, field work provided an opportunity to dialogue with other stakeholders

3.12.3.1.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

Students opine that educational activities transformed the way in which problems relating to sustainability are viewed, and triggered an attitudinal change in deciphering solutions. In this regard, observation and reflection sessions played an important role in creating a deeper understanding of agroecology and sustainability. In the learner documents, while explaining agroecology, students discuss about diverse dimensions of agroecology and conflicting boundaries that sustainable development shares with agroecological approach. Here, the interconnections and interactions with biotic and abiotic elements in various overlapping systems has been highlighted and perceptions of various stakeholders is bought in. Besides, students succeeded in connecting these conceptual issues to the farm in which they participated with different stakeholders and

felt that “farms speaks louder than these disciplines”. For instance, student opines that “The farm that I was assigned is itself a specimen of agroecology as a practice (methods of farming), scientific discipline (interrelations in the farm) and movement (transition over a period to agroecological farming from conventional farming)” (Learner Document, 2021).

The educational activities such as response paper writing and participation has instilled capacity and courage to critically examine the development policies adopted so far, and to them “it is high time that effective action is taken for redressal of ecological imbalances in the nature” (Learner Document, 2021). Students in their reflection documents have elaborately cited problems such as inequalities in resource allocation and distribution, link between farming and food systems in defining health of population, impact of environmental issues such as climate change on agriculture and plausibility of emergent sustainable solution such as natural farming. And the current crisis is attributed to “lack of planetary consciousness in which the planet is not understood and felt as a giant organism but as one giant honey pot for everyone to consume. To bring any sustainable plan of action into practice, we first need this planetary consciousness that would remind us that the planet too is living, breathing entity and our own survival along with all other life forms depends on its well-being”. Here, students understand the course as an interdisciplinary initiative from academia to create common platforms where different stakeholders including government officials, farmers and researchers can engage in dialogue and contribute to reach mutually beneficial, innovative and sustainable solutions. They feel that “this could be our silver line of hope, to develop a planetary consciousness, to have a vision, to find meaning and give dignity back to life of today and of tomorrow”. (Learner Document, 2021). And in this, adopting soft systems methodology and enhancing green skills and soft skills have a crucial role.

The learning process has also enabled students to critically examine the conventional learning process and here, need for multidisciplinary learning arenas and action learning tools has been stressed. Students understand the new learning system as a hope to fill the critical gap between theory centric education by including flexible, dynamic and grassroot level experiential learning process. Through this, informed and responsible action as well as cocreation of knowledge and innovation can be fostered, as today’s motto is ‘think globally and act locally’.

How various educational activities have enabled students to understand the versatile aspect of agroecology is best understood in the student testimony- “Shri. Raveendran (farmer) gave us practical tips to grow vegetables and to make organic pesticides, and Vinod, the techie farmer introduced us to polyhouse farming and its technicalities. While, Anshuman (farmer trainer and activist, WHH) stressed up on farm management, Prof. Josekutty (Sociologist) talked about historical evolution of agriculture and its role in societal development. Professors from NMBU widened our view by sharing thoughts on importance of visionary thinking and being agroecologists. All these interactions

revealed the multi-dimensional nature of agroecology and the fact that everyone has a different story to tell." – Learner Document.]

3.12.3.2 *Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education*

3.12.3.2.1 Methods of data collection and analysis

3.12.3.2.1.1 Teacher reflection document

3.12.3.2.1.2 Course reflection focus group/interviews

Interviews with students were conducted at the final day of the course and the answers were recorded. Each interview took around twenty minutes and the objective was to know student feedback with regard to learning process.

3.12.3.2.2 Results

3.12.3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.12.3.2.2.1.1 From lecture hall to a diversity of learning arenas

3.12.3.2.2.1.1.1 Supporting forces and how to build on them

1. Introducing new learning arena pre- requisite permission from University authorities, and so far, we have got support. However, it is important to convince the authorities about the outcome/impact of the course, so that the shift can be generalised.

2. Cooperation from stakeholders such as farmers, LSG officials has made new learning arenas successful. It is important to keep them motivated in future also, for which stakeholders also has to benefit from the course. This can be done through continuous association and implementing action plans in client document

3.12.3.2.2.1.1.2 Hindering forces and how to deal with them

1. Introducing new learning arenas need more time, energy and resources. So that more resources have to be mobilised.

2. Lack of focus among students when they are not inside classroom. This can be resolved by making students understand about the nuances of action learning pedagogy. Intensive planning, defining learning objectives and outcomes can improve focus of students.

3.12.3.2.2.1.2 From lecturing to co- and peer learning

3.12.3.2.2.1.2.1 Supporting forces and how to build on them

1. Student feedback proves that peer learning become effective when students are from diverse background. Selection process has to be done in such a way that students from both science and social science disciplines are included in every course.

2. Judicious group division: Students have to be divided into groups maintaining gender quotient, capabilities and personality so that each group has the right blend of students. Diversity Ice breaker is a good test to understand students. Also, reshuffling

groups to do certain activities before finalising groups, gives a chance for facilitators to understand group behaviour of each student.

3.12.3.2.2.1.2.2 Hindering forces and how to deal with them

1.Peer learning becomes difficult when physical presence is curtailed due to pandemic like situation. Here, the feasible way is to depend up on online groups and monitoring the activities.

2. Peer learning creates free- riders: Making the continuous assessment strict is one way to find and motivate free riders. Also, monitoring division of work within the group and maintaining close contact with group members can help to identify free- riders. Here introducing an individual grading system can help.

3.12.3.2.2.1.3 From syllabus to supporting literature/a diversity of learning sources

3.12.3.2.2.1.3.1 Supporting forces and how to build on them

Flexible curricula to include student's choice of subjects: the flexibility in curricula that enables students to choose certain topics for class room discussions/ presentation/ experiment ensure diversity of learning resources. This has to be kept in future courses also.

Students with digital literacy: Promote students' ability to learn from digital sources and support students who doesn't have the facilities.

3.12.3.2.2.1.3.2 Hindering forces and how to deal with them

1. Unavailability of certain books/articles: many of the supporting literature related to the course is not available at University library and Centre doesn't have a library. It is important to raise the issue with library authorities and establish essential infrastructure.

2. Inability to Identify relevant literature: As the students are from diverse background, some students find particular topics (which forms base of the course) very difficult and this effect right choice of literature. Formulating an expert group to create a repository of essential articles/book in relation to the course and providing support to learn it can solve the issue.

3.12.3.2.2.1.4 From textbook to a diversity of teaching aids

3.12.3.2.2.1.4.1 Supporting forces and how to build on them

Existence of smart classroom: smart classrooms enable use of diverse learning resources successful. Diverse teaching aids such as power point presentations and multimedia resources are used to explain concepts.

Software/online tools such as MindMapple makes teaching aids effective. Purchasing and familiarising these tools to students can make these aids effective

Experienced facilitators: Mentors has to be trained to become facilitators so that the quality of instruction is not compromised

3.12.3.2.2.1.4.2 Hindering forces and how to deal with them

Lack of innovative educational activities: More educational activities have to be jolted each year. Educational objectives and outcome of each activities has to be defined clearly and they have to be assessed each year.

Lack of resources to experiment with new teaching aids: Developing a standardised teaching aid is laborious task and special care has to be given to develop teaching aids.

3.12.3.2.2.1.5 From written exam to a diversity of assessment methods

3.12.3.2.2.1.5.1 Supporting forces and how to build on them

Continuous assessment mechanism is practiced. This can be developed in a way to introduce grading system

Peer review is practiced for reviewing response papers. This can be extended to other educational activities

3.12.3.2.2.1.5.2 Hindering forces and how to deal with them

Difficulties to extend the course to university system: University follows credit-based system in which written exam is an important factor deciding merit. Discussions with authorities may lead to feasible outcome

Diversity among students make it difficult to provide grades to students. Asking more focused questions (in writing reflection journal) can reduce this issue

3.12.3.2.2.1.6 From lecturer to learning facilitator

3.12.3.2.2.1.6.1 Supporting forces and how to build on them

Acceptance of revised role of lecturer by all stakeholders: Facilitators are trying to change their conventional role and are ready to unlearn.

3.12.3.2.2.1.6.2 Hindering forces and how to deal with them

Disagreements with in academia about teacher's perceived role: More discussions and deliberations have to be conducted.

Cultural factors that prevent cordial relationship among teachers and students.

3.12.3.2.2.2 What such a change requires from teachers, students and institutions

The Nextfood approach envisages cocreation of knowledge systems where there is a circular flow of knowledge among all stakeholders including students, teachers and farmers. This presumes a change in the conventionally assigned role of each

stakeholder in the education system which has to come from attitudinal changes. This attitudinal refinement has to come from reflection, dialoguing and joint visioning of stakeholders. Here, teachers have to respect the active role given to students in deciding the curricula and in conduction of educational activities and has to act as a catalyst. Institutions has to come out of the comfort zone of dealing with 'information' and has to start to act in society by creating a platform where relevant stakeholders can meet. Students, has to be more responsible, informed and prudent so that after the education process they are capable of dealing with real life issues.

3.12.3.2.2.3 Teachers´ perception of the greatest challenges to achieving such a change

The greatest challenge to achieve such as change is the difficulty to balance the conventional responsibilities given in a University system on one hand, and to modify skills, attitudes, and knowledge according to changing (ought to be) education system on the other. Action learning make teachers answerable to students and other stakeholders which naturally puts teachers in a more responsible and socially committed position. Being given with multiple responsibilities of teaching, research and administrative work, teachers lack the time, energy and skills (soft skills and technical skills) to catch up with the envisaged role of facilitator in action learning curriculum. Here the quality of the education process largely depends up on the capabilities instilled in the students and how various stakeholders are coordinated

3.12.4 Concluding remarks on the case development since the previous reporting

3.12.4.1 *The most useful and inspiring experiences (supporting forces)*

The most inspiring experience is conducting the course offline, amidst of pandemic without compromising the exquisiteness of Nextfood approach. It proved the existence of a good team where various stakeholders including students, teachers, alumni and farmers worked together to materialise the vision of conducting the course as per planned curriculum.

Useful experience includes,

i) the learnings from sub group meetings (new educational activities, data analysis methods and experiences of other cases)

ii)Analysing data using NVIVIO and establishing relationship codes to compare various educational activities

3.12.4.2 *Main obstacles/challenges encountered (hindering forces)*

Major hindering force was the social restrictions because of pandemic

3.12.4.3 *Lessons learned from the inspiring experiences and from dealing with the challenges*

Lesson learned includes,

Competence development are essential not only for students, instead it helped facilitators also, in planning, implementation and review of course.

Clarity of vision, through planning and team work can help in dealing with challenges.

Peer learning (with in and across cases) provided great insights in the cycle.

3.12.4.4 *Plans for how to move forward into the next cycle*

Kerala case plan to conduct another course in which the three stages of planning, implementation and review will be followed. Insights from the current cycle will be incorporated in the coming cycle.

3.13 University of Chile (UCH)

3.13.1 ID card

Title:	MSc in Agroecology (Magíster en Agroecología)
Level:	Master program
Language:	Spanish
Institution:	Faculty of Agricultural Sciences, University of Chile (UCH).
Leaders:	Osvaldo Salazar, Ricardo Pertuzé, Andrés Muñoz.
Researchers:	Claudia Rojas
Timeline:	Creation process: May 2020 – May 2021
Learners:	Not applicable yet.

3.13.2 Initial planning:

3.13.2.1 *Exploring the present situation in the case*

During the course of the project, new possibilities to develop education at the postgraduate School of the Faculty of Agricultural Science, University of Chile (UCH) were identified, which opened the opportunity to disseminate and test the Nextfood (NF) outcomes in Chile. UCH, is developing a MSc-program in Agroecology and will, with the support of the project, incorporate elements of the NF approach into the course structure. The program seeks to contribute a new vision to agriculture and agroecosystem research in Chile. There are more than 20 national universities that teach agricultural sciences, most of which share a focus on productivity destined to export agriculture, leaving aside agricultural production for internal consumption, such as those of farmers and indigenous communities with the consequent loss of local knowledge and agrobiodiversity. From the same perspective, few agricultural sciences faculties manage to generate an inclusive vision of sustainability, which is reflected in the scarcity of public policies for sustainable development that reflect the needs of multiple sectors. The group of teachers in charge of creating the program knew that using the traditional lecture based teaching method was not the right path to achieve the main objectives of the program. In order to learn about agroecology, there is a need to build linkages between students and the real field, the environment, the society and other stakeholders. There is also a need to work from an interdisciplinary and multi-stakeholders perspective. That is why, the Msc in Agroecoly is looking to promote experiential and action oriented learning during its implementation.

The request to include UCH as a Study Case was approved in March 2021, which is why the case is just initiating. The program is also under revision by the University Central Services and then by the Chilean Ministry of Education (will be starting in March 2022). In the meantime UCH team, have been working closely with a group of

teachers, who are in charge of the creation of the program and have the role of conforming the “Academic Committee of the MSc-program in Agroecology. At first, UCH made a proposal to the project coordinator with the motivation of applying some of the project outputs into the new MSc- program in Agroecology. The primary idea was to take it as a “Sub-case study”. During the last year (May 2020 – May 2021), NF UCH team participated in several meetings related to the creation of the program and contributed in the creation process of the program in which a document (creation form) was filled and delivered to the University Central Services. The document describes the program in terms of main information and features, impact, projection, formation and development aspects, curriculum, among other topics. In September 2020, the Academic Committee, jointly with the NF UCH team, organized a workshop to inform the participants of the activities developed in the process of creating the Master in Agroecology, facilitate the creation of contact networks between the participants (invited teachers) and encourage interdisciplinary participation in the courses of the program. In December 2020 the UCH team organized a workshop with NMBU and the project coordinator. The aim of the meeting was to introduce teachers from the program into the concept of action learning. It was an interesting and fruitful opportunity, to give the first step as a Case Study. After the approval of the European Commission Coordinators to include the Msc-program in Agroecology as a Case Study in the project, UCH took part in official activities organized by WP2.

Although the initial planning workshop has not been performed yet, many activities lead us to have primary ideas to fill in the first section of the report (Initial Planning). There is a plan to perform the initial workshop during July 2021.

3.13.2.2 *Envisioning the intended shift*

As it was pointed previously, the initial planning workshop has not been performed yet, the information was extracted from the creation form and the meetings described in point 1.

1) The Msc in Agroecology aims to form professionals characterized by their ability to develop **reflective** and **analytical thinking** that allows them to approach their professional or research work based on the concepts and principles of agroecology, **integrating interdisciplinary** biophysical, ecological, socioeconomic components and food. The graduate will develop **leadership** and **communication skills**, **recognizing socio-economic, cultural, gender and ancestral knowledge aspects**, which allow an **effective connection with society**.
   Specifically, the aim is to develop professionals with:
   - Deep **knowledge** of **agri-food systems** that integrates **innovation, agroecological management, sustainable technologies** and **multiple forms of knowledge** to the construct and apply new agricultural paradigms.
   - Ability to understand and promote the **links between agroecology and society** in order to contribute to **human well-being** and **sustainable development** of **agroecosystems.**

In addition, the Msc in Agroecology has an hybrid modality:

- *Professional*: the graduate will specialize in the **application** of agroecological principles for the management of the agroecosystem and agri-food systems, which allow **integrating** professional **skills** to effectively **link agroecology with society.**
- *Academic*: the graduate will be able to **deepen** their **knowledge** of the **functioning** of agroecosystems and generate scientific evidence for the efficient management of natural resources in the agroecosystem and agri-food systems. This will allow developing **interdisciplinary research** that **generates knowledge** to optimize agroecological management and the linkage of agroecology with society.

The program has four lines of research: Biophysics, Ecological, Socioeconomic, and Food. Within these lines of research, differentiated academic and professional profiles will be offered, which would allow students to choose their lines of development. These lines of research will permit graduates to have a wide range of knowledge that allows them to address the solution of both environmental, socioeconomic and food problems in different spheres of the agri-food system. **The interdisciplinary vision is the hallmark of this master's degree and what will distinguish it to our graduates in the professional and research context**.

2) The profile, curriculum and modalities presented, involve new challenging topics to implement at the University, which implies a big change at an institutional level. In that sense, it is important to have a vision about what does the program needs in terms of educational methodologies to achieve the goals presented, because if the topics are new, also the way to teach those topics should be innovative: How do we move from traditional classroom into a diversity of learning arenas? How do we promote co and peer learning? What other resources can we use apart from lectures and textbooks? How can we become learning facilitators rather than lecturers? How can we develop interdisciplinary thinking and perspective between students and teachers? What are the most suitable assessment methodologies?

Some ideas for moving from traditional lecture based education to peer learning, diversity of learning arenas and teaching aids:

- After the meeting with NMBU the task was to explore the Tool Box and identify the main points that UCH is looking to strengthen. The idea is to set a second meeting to approach those identified points and start with a “training” experience to apply those topics in the case.
- The main outcomes from the workshop performed in 2020 with the program teachers (described in point 1) were to merge some of the courses proposed with the aim to have a better order in the Study Plan, and also include a more

systemic and holistic vision of the program. Thus, the number of courses was reduced and each curse integrates different disciplines.

- To perform the initial planning workshop, with the focus on the shift towards action learning.
- Have a meeting between the program teachers to share experiences about the new methodologies that are being applied on their courses, and how these methodologies could be implemented in the program (this could be part of the initial planning workshop).
- Before the program starts (second semester 2021: August-December), there is an idea to make a pilot of the course "Link of Agroecology with Society", a mandatory course of the program. This course seeks the linkage between students and social organizations through team and interdisciplinary work. The student's team will carry out a diagnosis and proposal for improvements in an agroecological system through participatory research. Finally, the student team must present the results of the study and the proposal must be uploaded to a website as a model experience for dissemination and free access to the entire community. The idea is to implement the Nextfood approach into this pilot experience, in order to start with the action research process within the case, and have a first learning experience before the program begins.

  The action learning will be based on the development of the five core competencies in students: participation, observation, dialogue, vision and reflection regarding the link between agroecology and society. Lecturing will move to peer-learning through the establishment of interdisciplinary teams of students (if possible with different backgrounds) who will be linked to a social organization: farmers or agroecological farmers' cooperative, neighborhood group with urban gardens, indigenous community, schools with gardens, community offices focused on rural development, and agroecological corporations or groups. It will also test another assessment method, moving from written exams to developing a diagnosis and proposal for improvements in the agroecological systems students are working with through participatory research.

3.13.2.3 *Determining what it would require to make the intended shift*

What would it require from:

The learners: students must be open to new ways of learning: the ability to adapt in interdisciplinary work groups, be open to work in the field and with communities (outside the classroom), learn how to communicate with other stakeholders, be open to work side by side with their peers.
The facilitators: open minds, time, disposition and motivation to apply new methods in the classroom, motivation to build new networks, be open to apply new assessment methods, expand the learning resources, to work in teaching groups.
The institutions: resources for activities outside of the University (work with social organizations), promote the building of teaching teams to facilitate the work in each course.
Other stakeholders: time and disposition to work with students, motivation to build new networks.

Supporting forces:

- The institution is open for new proposals and will be supportive with the team involved in the program.
- The group of teachers working in the program have visionary ideas and the motivation to make changes in the traditional system.
- Interdisciplinary teaching teams.
- There is interest from students to apply for the Msc in Agroecology. In 2018, the postgraduate school of the Faculty of Agricultural Sciences applied a survey in undergraduate students and graduates, in which 23% of the respondents were interest in coursing a program related to agroecology. Additionally in 2020, a new survey was applied which included graduates and professionals of the area, 361 professionals answered the survey and 18% of the respondents were interested in study a master program in agroecology.
- The current context in the environmental and food system field requires this kind of initiatives in order to form professionals with the needed skills to deal with the new challenges that society is facing.
- There is no other Msc in Agroecology in Chile, which gives the opportunity to be pioneers in the implementation of action learning related to agroecology.
- The opinion on the importance of developing a Master's Degree in Agroecology in the country has been requested from representatives of potential employers, scientific societies or national and international organizations; they all support the program and state that is necessary.

Hindering forces

- The current sanitary context due to the COVID-19 pandemic. How do we promote educational aids and participatory learning in a virtual/digital environment?
- The challenge of conforming new interdisciplinary working teams (members from different Faculties, Universities and/or Countries) How do teachers deal with physical distance? How do teachers deal with the coordination and organization of the courses?
- The challenge of start a new program with a Study Plan that includes almost only new courses in a pandemic context.
- Implementation of Nextfood approach in all courses?

3.13.2.4 *Planning of implementation*

What needs to be done when and by whom?

1. Initial planning workshop: it must be organized by the UCH Nextfood team, inviting the Academic Committee of the program, students and other relevant stakeholders. It should be performed before the educational activities start.
2. Design the pilot course “Linkage of Agroecology with Society”, to be implemented by the program coordinators, NF UCH team as researchers in the process and a small group of students.

3. Implementation of the pilot course during the second semester 2021 (August-December 2021). The implementation should be in charge of the NF UCH team and the program coordinators.
4. Reflection about the experience, after the course is finished. The reflection will be a process lead by UCH team with the support of NF WP2 partners and the course participants.
5. Systematization and analysis of research data collected in the pilot course. That should be after the pilot course is implemented and the reflection stage. The data should be analyzed by the UCH team.
6. Planning of the implementation of Nextfood approach in the Msc in Agroecology that should be starting in March 2022. The planning should involve NF UCH team, program coordinators and other interested teachers, students and other stakeholders.
7. Implementation of NF approach in the first Semester of the Msc in Agroecology (2022).

Timeline

June 2021	*July – August 2021*	*Aug – Dec 2021*	*January 2022*	*March – July 2022*
Organization of initial planning workshop *Design of pilot course*	*Initial planning workshop*	*Implementation of the pilot course* *Reflection on the process*	*Analysis and systematization of research data* *Planning of implementation*	*Implementation of the first Semester Msc Agroecology*

3.13.2.5 *Planning the immediate next steps*

The immediate step from here will be to organize and design the initial planning workshop, to be performed in July-August 2021. It is also important to start planning and designing the pilot course to implement the Nextfood approach, as a primary experience for the Msc in Agroecology. During the second week of June there will be a meeting with the program coordinators with the aim to plan and discuss these two activities.

4 Appendices

4.1 Case development report template – Reformatted

1 ID card

1.1 Course title, level and language

[Text]

1.2 Host institution(s) and course leader(s)

[Text]

1.3 Timeline of the activities covered in this report

[Text]

1.4 Learner categories and number per category (demographics)

[Text]

2 Extended summary of development of the case since the previous reporting

2.1 Actions taken since the previous report

2.1.1 Planning

[Short description of how the course planning was done and its outcome, e.g., in terms of plans for the essential shifts]

2.1.2 Implementation

[Short description of how the plans were implemented, including the essential shifts]

2.1.3 Reflection

[Short description of how teacher reflection was done]

2.2 Research results since the previous reporting

[Short text based on the gathered and analysed data regarding:]

2.2.1 Students', teachers' and other stakeholders' experiences and learning

2.2.2 Outcome of the case development process, including effects of making the essential shifts

2.2.3 Supporting and hindering forces for implementing the Nextfood model

[Concluding wrap-up of the data in force field terminology with particular focus on the essential shifts]

3 Data on the development of the case since the last reporting

3.1 Students' responses, learning and competence development

3.1.1 Methods of data collection and analysis

3.1.1.1 First week (day) & last week (day) of the course

3.1.1.1.1 Student's understanding, contributions and expectations

[Text]

3.1.1.1.2 Self-assessment of competences

[Text]

3.1.1.2 Students' final reflection document (individual)

[Text]

3.1.2 Results

[Presentation of data (e.g., table about students' self-assessment of competences) to be referred to while answering the questions below.]

3.1.2.1 How do students experience such a learning process with respect to:

3.1.2.1.1 learning goals?

[Text]

3.1.2.1.2 view on competences needed for sustainable development?

[Text]

3.1.2.1.3 recognition of own competences and competence development?

[Text]

3.1.2.1.4 transformation?

[Text]

3.1.2.2 To what extent does the education enhance the students' competences of:

3.1.2.2.1 observation?

[Text]

3.1.2.2.2 reflection?

[Text]

3.1.2.2.3 visionary thinking?

[Text]

3.1.2.2.4 participation (engagement)?

[Text]

3.1.2.2.5 dialogue?

[Text]

3.1.2.2.6 dealing with “the challenge of the whole” (systems thinking)?

[Text]

3.2 Teachers’ and other stakeholders’ perceptions of the overall process of developing the case towards the Nextfood approach in education

3.2.1 Methods of data collection and analysis

3.2.1.1 Teacher reflection document

3.2.1.2 Course reflection focus group/interviews

[Text]

3.2.2 Results

3.2.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

3.2.2.1.1 From lecture hall to a diversity of learning arenas

3.2.2.1.1.1 Supporting forces and how to build on them

[Text]

3.2.2.1.1.2 Hindering forces and how to deal with them

[Text]

3.2.2.1.2 From lecturing to co- and peer learning

3.2.2.1.2.1 Supporting forces and how to build on them

[Text]

3.2.2.1.2.2 Hindering forces and how to deal with them

[Text]

3.2.2.1.3 From syllabus to supporting literature/a diversity of learning sources

3.2.2.1.3.1 Supporting forces and how to build on them

[Text]

3.2.2.1.3.2 Hindering forces and how to deal with them

[Text]

3.2.2.1.4 From textbook to a diversity of teaching aids

3.2.2.1.4.1 Supporting forces and how to build on them

[Text]

3.2.2.1.4.2 Hindering forces and how to deal with them

[Text]

3.2.2.1.5 From written exam to a diversity of assessment methods

3.2.2.1.5.1 Supporting forces and how to build on them

[Text]

3.2.2.1.5.2 Hindering forces and how to deal with them

[Text]

3.2.2.1.6 From lecturer to learning facilitator

3.2.2.1.6.1 Supporting forces and how to build on them

[Text]

3.2.2.1.6.2 Hindering forces and how to deal with them

[Text]

3.2.2.2 What such a change requires from teachers, students and institutions

[Text]

3.2.2.3 Teachers´ perception of the greatest challenges to achieving such a change

[Text]

4 Concluding remarks on the case development since the previous reporting

4.1.1 The most useful and inspiring experiences (supporting forces)

[Text]

4.1.2 Main obstacles/challenges encountered (hindering forces)

[Text]

4.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges

[Text]

4.1.4 Plans for how to move forward into the next cycle

[Text]

4.2 Further research development (WP2) – excerpt from Phase 2 working paper

1 Background

We are now into the second half of the Nextfood project, a good time to look back at our achievements in order to step up our work during the remaining time of the project. In our project description (GA) we state that: “NEXTFOOD will challenge the linear view of knowledge transfer as a top-down process from research to advice and practice, and support the transition to more learner-centric, participatory, action-based and action-oriented education and learning in agrifood and forestry systems». The work within the educational cases in WP2 is at the core of such an endeavor.

In our application (GA p.6) we further stated that “To design and implement a research based, learning strategy that effectively fosters knowledge and hard and soft skills needed to make agrifood and forestry systems more sustainable, new curricula and their successful implementation are needed. It is already known that active, social learning having the complex reality as point of departure - with theory in a supporting role - is generally more effective than traditional, theory-based strategies and more suitable when it comes to understanding and handling complex sustainability challenges. However, such educational strategies are still not widespread compared to the dominating theory- and lecture-based paradigm. There is a need to find out more about why, assuming that action-based learning strategies and methods and factors supporting or hindering their implementation should be studied simultaneously and in connection in order to establish successful cases in the short term and to gain knowledge that in the longer term can be used to scale up such strategies».

As such, innovation and research are interlinked for mutual support (action research), through a cyclical approach to case development (plan – implement – reflect – plan again – etc.). During the first half of the Nextfood project we have together kicked off the innovation process towards cyclical learning, and further made initial try-outs of the approach in different settings. In parallel we have initiated a process of researching such an innovation process including the issue of the learning outcomes for the students and other learners in our programs. Overall we have made good progress, but we still have a concern that there is in many cases, based on the reports we have received, a lack of inclusion of some of the core elements of what we have called “The Nextfood approach to education”, as well asthe research on that process. Our view is therefore that it is time for us to shift gear and step up our activities, to enable a delivery that matches what we have promised to deliver: 1) The development of cyclical learning in the educational cases 2) Active research on this development process, and finally 3) Research into the learning outcomes for those that are involved in the cyclical learning processes.

The aim of this document is to provide a base for the necessary step-up of research activities with regard to the research on students’ learning and the case development process. The document provides a condensed overview of how to research both the course development process and the learning outcomes (re. research protocol). As such, it should function as a recipe for helping us to deliver what we have committed to do. We further think that this is the best way to achieve good results in the project. More specifically, the results of the case-specific analyses will be written into the

annual case development reports (D2.5,6,7,8) and will be analysed across cases (similarities, differences) as part of the annual reports on educational strategies (D3.3,4,5,6).

2 Research on learning outcomes and the course development process

A new way of doing education will be important to cultivate the competences needed to deal with the challenge of sustainability in agrifood and forestry systems. Overall, the new approach is characterized by 1) a shift from theory to phenomenon as the starting point for the learning process ('experiential learning') and 2) a shift from knowledge to competence as the focus of the educational activities.

Such a transition towards what we in the Nextfood project have called cyclical learning is demanding and, according to Kurt Lewins field theory, happens in a force field where supporting and hindering forces for change should be identified and dealt with to be successful.

As a result of such an intended transition (conversion), the students meet another learning environment. There is insufficient knowledge regarding how they experience and adapt to such a new learning environment. Further, we need more knowledge about what the teachers do to support the students´ learning, and how they (the teachers) need to change.

2.1 Research questions:

To better understand how students experience the new learning landscape and how teachers can support their learning, we have identified the following research questions:

Table 1: Overview of WP2 research questions

Student learning RQs:

I How do students experience such a learning process? With respect to,
- a) learning goals
- b) view on competences needed for sustainable development
- c) recognition of own competences and competence development
- d) transformation

II To what extent do educational activities enhance the students' competences in observation, reflection, visioning, participation (engagement) and dialogue?

III To what extent do educational activities enhance the students' abilities to deal with "the challenge of the whole"?

IV How do the different categories of learning activities impact on enhancement of the core competences?

Case development process RQs:

V What are the supporting and hindering forces for change towards the Nextfood approach in education?

VI	How can we build on the supporting forces and deal with the hindering forces (reformulated as challenges) for change?
VII	What does such a shift in education require from teachers, students and institutions?
VIII	What do the teachers perceive as the greatest challenge to achieving such a shift?

2.2 Methods

To answer the research questions it is essential that all cases collect data both on their course implementation and on their case development. The following table gives an overview of a minimum requirement of data collection activities.

As indicated in the table above, the necessary templates and instructions for conducting the activities are located in the appendices of this document. We have also linked each activity to the appropriate research questions listed in Table 1.

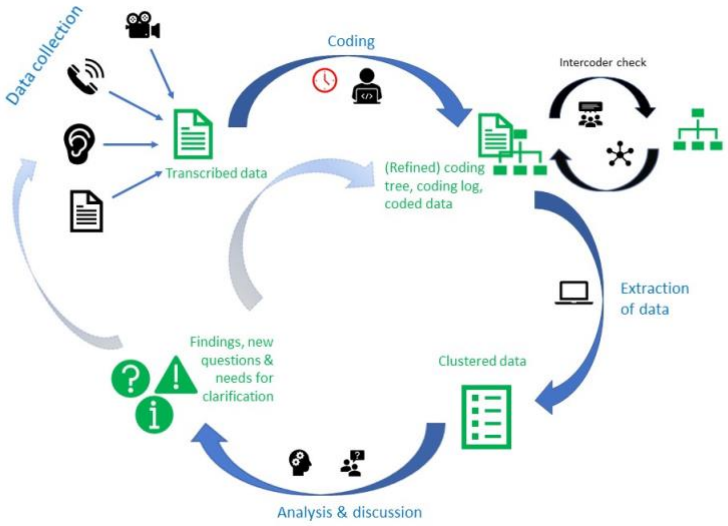
Before any of the data collection can begin, it is crucial that consent is gained from the participants. In Appendix H we have included the consent form template with some minor instructions and suggestions.

Table 2: Data collection process in a Nextfood WP2 case

Activity:	Type:	Appendix:	RQ:
First week (day) of the course:			
Four initial questions	Written assignment	A	I, III
Self-assessment of competences	Questionnaire	C	II
Last week (day) of the course:			
Five final questions	Interviews/written assignment	B	I, III
Self-assessment of competences	Questionnaire	C	II
Student reflection documents	Written assignment	D	I, III, IV
Teacher reflection documents	Written assignment	E	VII, VIII
After the course:			
Identification of supporting and hindering forces	Workshop/FG/interviews	F	V
Action plan development	Workshop/FG/interviews	G	VI

2.3 Data analysis

Content analysis of qualitative data: Apart from the self-assessments of competences, all data collected are qualitative data that can be presented as text. We will analyse those data through content analysis, following the process presented in the figure below. More details about this process of content analysis can be found in Appendix I.



Bivariate analysis of numerical data: Our numerical data –the self-assessments of competences– are scalings, collected using single-indicator scales with scaling devices that have ordinal properties. Therefore, we do a bivariate analysis of those data to measure the difference between two averages. This can be done with a t-test that evaluates whether the averages of two different groups differ on some variables and a check for statistical significance. More details can be found in Appendix J.

3 Required activities checklist for a Nextfood course

Activity	Done ✓	In the case report
Plan & implement the course		
Organize the course as a learning cycle		
Place a real-life case in the centre of the course		
Exercises on all core competences:		
- Reflection sessions		
- Observation		
- Participation		
- Dialogue		
- Visioning		
Literature seminars		
Student reflection documents		
Stakeholder documents		
Teacher reflection documents		
Research the course		
Inform participants and ask for their consent		
Collect data from:		
- Four initial questions		
- Self-assessment: Start of course		
- Five final questions		
- Self-assessment: End of course		
- Student reflection documents		
- Teacher reflection documents		
- Course reflection focus group/interviews		
Analyse the data		
Write up the results		