Next
FOOD
EDUCATING THE NEXT GENERATION
OF PROFESSIONALS IN THE AGRIFOOD SYSTEM

D2.6: Annual case development report (year 2)

WP2 – Action research facilitation

EUROPEAN UNION

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Contents

1 Introduction

In this document, we report the activities and outcomes in each of the 12 Nextfood cases. A template for reporting these outcomes was developed and sent out to each case (see Appendix 1). The template covers both descriptive elements of the cases (e.g., title, host institution, type of activity) and reports of the case development and case research. A filled-in template was then returned from each case and used to write this document.

The second year of the Nextfood case work started after the previous round of deliverables had been submitted in the end of June 2019. The remaining summer months were affected by holidays, but also planning of a workshop focused on case development and improved case research. Since both the master manual for case development and the research protocol were formally finalised in June 2019 it was expected that the cases would implement the instructions in those documents to a greater extent in the second year of the case work than the first year. During the winter months, the cases were at various stages in the cycle of planning, implementing and reflecting on their case work, although many were running their courses. At the beginning of 2020, more detailed instructions on how to analyse the case research data were shared with the cases by the coordinating NMBU team. The sharing of the document describing the analytical activity was followed up with monthly video conferences with the cases individually to ensure good communication around how the cases should report their case development. As the covid-19 pandemic struck in February/March many case leaders had to perform makeshift transformations from physical to online education. Luckily, all cases managed to complete the courses they had already started, however the plans for the coming cycle remain uncertain for some cases.

Throughout this document, we first present a summary of the responses from the Nextfood cases on the topics listed in the template. Thereafter, the case reports from the individual cases follow.

2 Case development during the second year

In this chapter, we provide a summary of the content of the individual case reports. This summary is structured after the topics in the case reports and covers some of the main elements from the second year of case work.

2.1 ID-cards

This section of the case development reports aims to give the reader a quick overview of the type of course the case is hosting. It covers topics such as ‘title’, ‘level’, ‘credits’, ‘timeline’, ‘institution’ etc.

In addition to covering a wide geographic area, the cases also reflect a diversity of educational courses. Many cases run graduate level courses in Agroecology or other topics related to sustainable food systems (NMBU, Mekelle, ISEKI, USB, UNISG, CIHEAM). Some cases run undergraduate level courses focused on narrower topics related to farming and food (SEKEM, Oradea, AFS/IHU). The Oradea case also includes high school students as learners. The Kerala case offers a certificate course in Agroecology for post graduate students. In addition to higher education cases, the Skogforsk case is a vocational course for forestry professionals and the case at UoC attracted three farmer trainers, three agrifood entrepreneurs and three researchers for their certificate course in Agroecology aimed towards farmer trainers. The SEKEM case also aims to target food system entrepreneurs with their second case activity “Bootcamp Entrepreneurship Course”.

The 12 Nextfood cases runs at various intervals, times of the year and lengths with the shortest being the one-week master course at UNISG and the longest being the undergraduate/high school, seminar-based course at Oradea which lasts almost an entire calendar year. The cases start and finish in a staggered pattern throughout the calendar year.

Regarding the number of learners and the categories, the cases display a large diversity. Some cases have only a handful of learners, whereas the largest courses attract close to 100 students (AFS/IHU). As mentioned, in many cases there are multiple categories of learners. All cases employ a multi-actor approach, meaning that their case activities involve several types of actors, however some cases target their education directly to multiple learner categories (Oradea, Mekelle, Skogforsk, UoC), whereas the other cases fulfil this criterion more indirectly.

2.2 Status

In this section of the case reports, the cases were asked to report on their progress with implementing the six areas of shifts deemed essential for succeeding with employing the Nextfood approach (see D3.1 Educational approaches for a description of the six areas of shift).

From lecture hall to a diversity of learning arenas

All cases report employing several learning arenas in their courses. Visits to nearby farms or other food and farming system venues are often highlighted. The cases report that moving from the standard lecture-type education and out into the field was always welcomed by the students. They further report that it is not only enjoyable for the students but also improves the educational value of the activities.

However, achieving a diversity of learning arenas is not simply about moving the lectures from inside campus buildings and out into the field, but also about the way in which one interacts during the educational activities. One good example of a diverse adaptation is the ISEKI case, which is running entirely web-based. Despite not having the possibility to physically change arenas, they nevertheless have an impressive diversity with for instance “virtual visits” to a company or institution, “soft skills workshop” practicing oral presentation skills in addition to “project review” sessions where the student groups meet individually with the course leaders.

From lecturing to co- and peer-learning

This shift is targeted towards the transition from having a system where knowledge and insight is supposed to be transferred from the lecturer to the students, to a system where students also intentionally and directly learn from each other. Several of the Nextfood cases report having implemented various peer-learning activities. Group work supports co- and peer learning, and learners engage in group work in most of the cases.

In the Greek case, during this cycle, a major educational transition resulted in a substantial shift towards co- and peer-learning. In a bachelor-degree course focused on farm animal reproduction systems, the course facilitators abandoned lecturing as the main teaching method and replaced it with a wide range of co- and peer-learning activities. To mention a few, they employed an activity called “hotspot”, focused on group reflection processes and presentation of group ideas, “peer review” on a literature review assignment, “construct-deconstruct-reconstruct” which is a group activity deepening the understanding of a concept, in this case being pregnancy diagnosis in farm animals. While the Greek team alongside other case leaders report that students welcome such alternative learning methods, it takes more effort from the course facilitators, for instance in terms of planning and follow-up.

From syllabus to supporting literature/a diversity of learning sources

This is a shift from a situation where theory is viewed as the main source of knowledge to an approach where a diversity of learning sources may be used. 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. Teachers will then be more concerned about *how* the students think than *what* they should think.

Many of the Nextfood cases report the use of a variety of learning sources, but often the activities mentioned are better listed under the previous or the next shift. Nevertheless, the Mekelle case reports that their students have discussions with Farmer Training Center (FTC) committee members to learn about the present situation there, instead of reading about it in a written document. Students at Mekelle stay 10 days in the field attempting to grasp aspects of the food and farming systems while relating to the current situation with the goal of improving it. This dynamic of leaving the pre-defined syllabus and encouraging situational learning is strongly present also in many other cases, particularly at CIHEAM, NMBU, ISEKI, Skogforsk, UNISG and Kerala.

In several cases, such as Oradea, AFS/IHU and USB there are formal requirements to follow a certain pre-defined syllabus, which may restrain some of them from freely pursuing this shift. However, by focusing on peer-learning and a variety of learning arenas and sources, all these cases have successfully shifted towards the ideal Nextfood approach to a large extent.

From textbook to a diversity of teaching aids

While learning from real-life situations and a variety of learning sources is important, the value of existing theory should not be underestimated. Good theoretical understanding is important for understanding real-life experiences. However, with the current wealth of easily accessible information, it is important to employ a diversity of teaching aids rather than only textbooks. Many cases list an impressive list of teaching aids that are used or is available to the learners. However, to fully achieve a shift to efficiently using a diversity of teaching aids, it is important to not only provide a long list of aids, but also to facilitate learners in using them. As a good example, the Kerala case used mainly short presentations and videos to explain concepts while also encouraging students to share their field experiences using similar methods. They report that while the students were presenting their case work, the other students were closely watching and thus peer-learning was also taking place.

From written exam to a diversity of assessment methods

All of the previous three shifts, focusing on moving from lectures, syllabus and textbooks towards a more diverse learning situation should ideally be strengthened by also making this diversity formally important in the assessment methods. We have good reasons to believe that students will, with time and effort being limited resources, focus on the tasks that most likely will affect their assessments positively. Thus, it is essential that students are rewarded for contributing to the learning community.

At the NMBU case, students are assessed with equal weight put on five elements: two group reports, one individual reflection document, their contribution to the learning community and an oral exam. Students report that while this is at times unfamiliar and challenging to know how to relate to, they also say that it alleviates some of the standard exam-pressure and frees them up to focus on doing their best on a day-to-day basis.

Some cases, such as the Kerala case, and the Calcutta case also include peer-assessment. The USB case and the ISEKI case reports includes comments from external stakeholders in the evaluation. The diversity of solutions to this shift is large among the cases, however, as the USB case leaders point out in relation to this shift, some cases are bound by formal requirements from the university, similar to the syllabus requirements. Another challenge to moving away from written exams entirely is that the larger the courses are, the more time consuming it is and the more effort it takes to assess the learning successfully and justly. Here we also need to consider students' attitude towards classical exams vs. innovative evaluations methods, since the second might be seen by some students as very subjective way of evaluation.

From lecturer to learning facilitator

While the first five shifts are mostly focused on what the learners experience as a result of the Nextfood approach, this last important area of shift targets the teachers. The Greek team summarises this shift as "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."

Many cases report that there are signs of resistance towards leaving the role as a lecturer among teachers involved in the education. Furthermore, many cases call for increased training in how to become proficient learning facilitators as this is not a part of what a teacher normally learns. The USB case points out that not only are teachers unfamiliar with this role, but also students find it hard to take the opportunity to take charge of their own learning as they are used to being told what to learn and how to do it. At CIHEAM they highlight importance of having the balance with regular courses provided as parallel to action learning: "…when delivering content we always try to be innovative and to provide the part that has not been covered by the course programme. Thus, we facilitate the learning and serve as a guide among those two sources/pillars".

Nevertheless, all cases report that they are making efforts to improve their abilities to be a course facilitator rather than a lecturer. And since this shift is tied to the first five shifts in that it is up to the teachers to arrange the educational environment for the learners to thrive, this shift will remain in focus moving forwards in the case development processes.

2.3 Data analysis

Following the research protocol (D2.1), the cases have collected data on the development and implementation of their activities. In this section of the case report, the cases were asked to report on how this data was collected, the analysis process, what the data indicates and whether there were any significant factors influencing the validity and reliability of the findings.

The analysis was guided by two amendments to the research protocol, one document described how the case leaders should analyse text data and one describing the process of analysing the numerical data gathered. The amendments are in Appendix 2 and 3.

For this cycle, the main focus regarding the research process has been on the research questions pertaining to the implementation phase of the case work. In this phase, there are mainly two research questions listed in the research protocol (D2.1, p.12-13):

How do students experience such a learning process in terms of

- *How they adapt?*
- *What it requires from them?*
- *What it gives them?*
- *What is missing?*

How and to what extent do various educational activities enhance the students' abilities to deal with 'the challenge of the whole', including to take or facilitate informed action, and the competences considered necessary for doing so (observation, reflection, dialogue, participation and visioning)?

The first questions are best answered by using a data-driven approach where we explore how learners describe experiences with the "new learning landscape". Conversely, the second question should be answered by a more concept-driven approach where we look for instances where the learners describe how and to what extent various educational activities have helped them develop the six core competences.

To answer these questions, the cases have individually collected data and reported their findings under a number of categories. The following sub-chapters consists of a summary of key findings from cases.

Student's understanding, contributions, and expectations

At the beginning of the semester, students were asked to reflect and provide answers to questions related to their understanding of the course topics, their contribution potential and expectations to the course. At the end of the course, students were again asked the same questions in order to compare their thinking before and after their participation in the course.

Questions that were asked at the first and last week of the course:

1. What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agrifood and forestry systems?
2. What experiences and competences do I bring to the educational activity to make it a success?
3. What are the questions I would like this educational activity to help me find an answer to?
4. What are the competences I´d like to train/improve in this educational activity?

<u>UNISG</u>

Initial questions	**Final questions**
Many "What" questions Brief questions Questions on agroecology and sustainability Questions on the general concepts Demonstrated interest to agriculture in general Questions like "Where food does come from?" from the students without agricultural background	Many "How" questions 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 Interest to future and sustainable development of agriculture Global questions related to policy-making and financial issues Specific questions: "are we setting the right standards?"

Examples of different questions asked by the students at the beginning and at the end of the course:

Initial course expectations:

I have the feeling that it's going to be a very interesting course especially because we are going to experience on the field what we are studying. That is already very important for me (especially because, at least in Italy, we have a more theoretical approach).

Final question:

May I apply sustainable approach just by myself or I need a sustainable network in order to be as much as sustainable as possible along the whole cycle?

May I become an agroecologist? Or would it better being a group of experts (about different fields) in order to get enough knowledge to face all the agroecologic cycle?

Where can I start to agroecology? From experiences/case studies or theory?

Is Agroecology applicable for real or just in part, or it is just a dream?

The differences between initial and final questions could be interpreted as increased students' interest in sustainable agri-food systems and their role in it. In turn, this is referred to as part of students' transformation.

Summarizing, the students' transformation could be described by the following issues:

- Asking wider, more critical questions;
- Realising existing gaps in agri-food systems;
- Willingness to apply the core competences into students' future;
- Deeper understanding of agri-food systems through creating connections/bridges between the different pieces.

University of Kerala

On knowledge skills and attitudes needed to support sustainable development: Students in their learner documents have tried to understand agroecology in relation to the changes happening to traditional farming systems in Kerala. They highlight the need for government policy change on the one hand, and, stress the need of recognising and inculcating farmer's experiential learning to formal (University) learning systems on the other. To them, change in attitude, capacity to think multidimensionally, understanding diversity, system thinking and interdisciplinary learning are the essential skills needed.

On experiences and competencies to make educational activity a success: Most of the students connect their disciplinary background and subject knowledge as their contribution to the course. Many students feel that their experience of doing field work can help them in the course. Students have delineated two experiential learning systems that make the course superior; one in the classroom where peer learning teach you basics of human psychology and sociability while practising competences, and other at the field, with many stakeholders where the competencies are applied.

On questions: Most of the students were eager to know about the new learning method, that could possibly overcome the shortcomings of conventional style of learning. They tried to explore the features of the learning system so that they could identify an optimal, adaptable learning style for themselves. And along with that, scope for and features of agroecological farming was an important question that they needed an answer.

On competence to be improved: Students wanted to improve soft skills- especially interpersonal/ communication skills. Also, all the students felt practising the five competencies as valuable.

UoC

At the University of Calcutta, some interesting points came up. 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. Most of students had a preconception that this was about organic farming. But after this course they reflected that this course showed them 'how to transform', 'what are the complexities' and 'where is the scope of change'. The students claimed to have transformed from a sedentary state to an engaged state of mind.

AFS/IHU

Knowledge, skills and attitudes that we need to support sustainable development:

In the Greek case, students identified a number of *skills* to support sustainable development. The most prevalent skill-needs that were voiced were communication skills, persuasion skills, referring to the need for effective communication with farmers and the ability to overcome cultural and educational barriers between stakeholders of the system (academics, professionals and farmers). Also, a great majority of students were very clear about the need for evolving the educational system to include more action-learning skills that would benefit a basic level of competences with which they enter their professional field, namely their environmental consciousness, professionalism, ability to provide or recommend solutions, ability to conduct experiments.

What skills and competences students bring to make the educational activity a success:

There were also a number of concepts/codes that emerged while discussing the skills that a student can bring to the action-learning model in order to make it a successful experience. These skills could be roughly categorized as individual skills, in which we could also include personality traits, individual knowledge skills and motivation for self-improvement and team skills.

The main code *Individual skills* was linked to a number of sub-codes such as organizational skills, critical skills, structured thinking, taking initiatives, information-processing skills, knowledge application skills, discussion skills, project-learning skills, taking action skills. *Personality traits* was linked to a number of sub-codes such as personal thoughts, personal beliefs and being open-minded. *Self-improvement* was linked to a number of sub-codes such as problem-identification skills, learning by mistakes, willingness to learn, willingness to work, personal experiences, query expression and information seeking skills.

The identified *Team skills* were linked to a number of sub-codes such as team spirit, solidarity, group participation skills, classroom participation skills, teamwork skills, cooperation skills, communication skills, transfer of personal experiences in the classroom, sharing of experiences and active participation.

What students expect to gain from the action-based model activities and what skills they would like to further acquire:

To us, the most interesting emergence of student expectations was the opportunity for knowledge. We found this interesting because it was linked to a number of sub-categories of concepts that, we feel showed profound motivation for action-based models of education and for change. For example, our students were concerned with how to put their practical knowledge into practice, recognizing that there is a vast difference between academic knowledge and knowledge application (competence). They also expected that through the action-based activities they would better aquire sufficient knowledge for the labor market, which was a significant concern for a great number of students.

Another significant sub-code that emerged in the domain of expectations was that within the action-based model, students expected to find ways to understand their gaps in knowledge and to take more action in order to cover these gaps. This is significant because it shows elevated levels of self-awareness and a further need for better self-awareness. We were also pleasantly surprised by the expectation for more team spirit, solidarity and facilitation. Students expressed an expectation to learn how to help others with the knowledge they acquired.

In terms of desired competences, they emerged in four main categories. Namely, *Language excellence* such as foreign language acquisition and improving competence in foreign languages, *instrumental competencies* such as knowledge application, problem solving skills, thinking skills, group working skills and digital skills, *generic competencies*, such as self-confidence, critical skills, motivation, argumentation skills, debating skills, experiential learning skills, action-learning skills, putting-theory-into-practice skills, creativity, motivating group members skills, learning skills and participation skills and finally *research skills* such as information- seeking skills, data collection skills, information evaluation skills, research skills and scientific writing skills.

CIHEAM

We observed that for first data collection that students are much focused on very technical aspects of agricultural science, thus they decided to code it separately. This was done as well to follow possible shifts within course duration, thus to see if with time students will indicate less technical knowledge and skills, giving additional space for project core competences.

Mekelle:

At the beginning, students were wondering what the visit to the rural setting would add to their previous experience since they had been working together with farmers for some years. On the other hand, they still had the interest to know how the problems of a given community can be identified in participatory manner, how they get into the farmers' idea which they didn't tell them yet and how the theory is useful in the practical world. This implies that from their previous work experience they were worried about the community problems. This was a motivational force for the action learning activities.

At the end of the courses most of the technical expectation raised during the beginning of the action learning process were answered for both the first and second cycle students. The tendency showed that they were transforming to a different kind of questions such as career development, sustainability, integration of actors and disciplines, systemic view, participation and learning issues. However small group size was raised as a challenge to explore and learn more from the action based education activities in the case.

Self-assessment of competences

To track development of the core competences (observation, participation, visioning, reflection and dialogue) of learners, self-assessment was conducted at the beginning and at the end of the courses. The self-assessment was conducted by learners filling in a questionnaire where they were asked to rank their level of competence on several statements related to each core competence on a scale from 1 (Novice) – 9 (Expert). The full version of the questionnaire is located in Appendix 6 of the Research Protocol (D2.1).

Below follows a series of tables including the results of self-assessment of competences in the cases that managed to gather data both at the beginning and the end of their courses during the second cycle of case work. The tables describe institution, number of leaners, average scores at the beginning and end of the course, difference between the two and the results of a paired, two-tailed, t-test with significance levels: * = p-value < .05, **** = p-value < .01, *** = p-value < .001)

NO - NMBU (n=17)

	Avg start	Avg end	Diff	Sign
Observation	4,1	6,3	2,2	***
Participation	5,3	7,0	1,7	***
Visioning	3,6	6,1	2,5	***
Reflection	5,2	6,6	1,4	***
Dialogue	4,5	6,9	2,5	***

ET - Mekelle (n=3)

	Avg start	Avg end	Diff	Sign
Observation	3,1	6,7	3,6	***
Participation	3,8	7,0	3,2	***
Visioning	3,2	7,3	4,2	***
Reflection	3,6	6,9	3,3	***
Dialogue	4,8	7,0	2,4	***

AT - ISEKI (n=39)

	Avg start	Avg end	Diff	Sign
Observation	5,6	6,2	0,6	N/A
Participation	6,5	6,7	0,2	N/A
Visioning	5,5	6,3	0,8	N/A
Reflection	5,9	6,6	0,7	N/A
Dialogue	5,8	6,3	0,5	N/A

GR – AFS/IHU (n=43)

	Avg start	Avg end	Diff	Sign
Observation	5,9	6,1	0,2	n.s.
Participation	6,0	6,4	0,5	n.s.
Visioning	5,9	6,1	0,2	n.s.
Reflection	6,1	6,2	0,1	n.s.
Dialogue	6,1	6,5	0,4	n.s.

IN - Calcutta (n=9)

	Avg start	Avg end	Diff	Sign
Observation	3,9	7,3	3,4	n.s.
Participation	4,4	7,7	3,4	n.s.
Visioning	4,3	6,9	2,7	n.s.
Reflection	4,6	7,9	3,3	n.s.
Dialogue	4,3	6,9	2,7	n.s.

IT - CIHEAM (n=14)

	Avg start	Avg end	Diff	Sign
Observation	5,2	6,8	1,6	**
Participation	5,4	7,3	1,9	**
Visioning	4,7	7,3	2,6	***
Reflection	5,7	7,2	1,5	**
Dialogue	6,5	8,0	1,5	**

IN - Kerala (n=12)

	Avg start	Avg end	Diff	Sign
Observation	4,2	5,9	1,8	***
Participation	4,5	6,3	1,8	***
Visioning	3,7	6,3	2,5	***
Reflection	4,0	6,5	2,5	***
Dialogue	5,0	6,3	1,3	***

IT - UNISG (n=44)

	Avg start	Avg end	Diff	Sign
Observation	5,8	6,4	0,6	***
Participation	6,1	7,1	1,1	***
Visioning	5,2	6,6	1,4	***
Reflection	5,6	6,4	0,8	***
Dialogue	6,6	7,3	0,7	***

NMBU

In the NMBU case, we found a significant increase in all the core competences. At the start of the course, students were most confident in their competence mastery of participation and reflection, with dialogue and observation following and visioning obtaining the lowest average score. At the end of the course, on average, the students ranked their competence level higher on all competences resulting in a less than 1 scale point difference between the average end score of all competences. The largest increase was in visioning and dialogue.

The significant increase in self-assessment ranking indicates that throughout the Agroecology MSc course, students developed their core competences of the Nextfood approach. The three competences with the lowest average scores at the beginning of the course saw the largest increase, which may be due to observation, visioning and dialogue being less familiar competences than participation and reflection. There may also be a difference in difficulty between the competences. Arguably, mastery of reflection is more difficult than mastery of participation, which may explain why reflection had the lowest increase.

ISEKI

The data suggests that student confidence improved for all five core competences. The improvement was most striking for Visionary Thinking where students rated themselves at 5.5, a competent performer at the start of the competition, and at 6.3, a proficient performer at the end of the competition. It is important to note that students were ‘forced’ to complete the end evaluation and requested to complete the start evaluation.

UNISG

The average results of start and end self-assessment tests demonstrate the equal growth in the same competences after both courses (in 2018 and 2019): the highest growth was demonstrated in Participation and Visioning competences.

Participation competence was mentioned by the students in their several written documents. Whilst visioning competence was not mentioned in terms of its progress or as a part of the students’ transformation.

Besides both these competences, sufficiently high growth was in Observation competence (in 2018) and in Reflection (in 2019). As was mentioned before, Observation and Reflection competences were developed by the students during their farm visits. The differences between their growth could be explained by the personal students’ assessment of their competency level.

University of Kerala

The average scores of the self-assessment of competences reveals a substantial increase in all competences of students. At the beginning, students were confident about their dialoguing and participation skills, but they were doubtful when it came to visioning and reflection skills. At the end of the course, all the competences were on an average rated high, particularly, visioning and reflection showed the highest improvement. This shows that the course enabled students to think imaginatively and the recurrent reflection sessions were fruitful. The lowest average score was for Observation skill at the end of the course showing very minimal improvement. This shows that students tried hard to improve those skills in which they were very poor, and conversely, the other three competences – observation, participation and dialoguing – were not cared much.

UoC

At the University of Calcutta, almost all the self-assessment average values increased from the start of the course to the end of the course but we did not find any significant statistical increase in the overall development of the core competences of the students. But there were significant increase in many of the sub divisions of core competences such as to carefully observe a situation in field, recognise values and goal conflicts of different stakeholders in society, able to inspire change by helping a group develop and align around a shared vision, 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.

CIHEAM

For CIHEAM the highest increase was achieved for visioning, and this was partially expected since visioning was quite new for all students, even as a term (difference of 2.6). The increase in score for the other four competences had a value from 1.4 to 1.9, all being significant.

Mid-term course evaluation

A frequent and regular evaluation of the course activities by the learners gives the course facilitators an indication of how the course is received by the learners. This input can assist the teachers in making changes to the course and also provide valuable data to reflect upon after the course has ended. Some courses also collected evaluations during the middle of the course, generally a method suited for longer courses.

AFS/IHU

During the mid-term evaluation through discussion and reflection students have identified a number of supporting and hindering forces through the experience gained from the course.

In terms of the core competences, Dialogue and Participation were identified as the most prevalent supporting forces. Dialogue was said to stimulate interest outside the classroom and personal interest. Participation, stimulates positive interaction, a sense of belonging, motivation, team spirit and becoming active in the field.

There were also a number of hindering forces identified. Mostly, students were concerned about the infrastructure. For example, there was considerable lack of up-to-date computers and software, lack of familiarization with the software or the mere number of computers. That is, the lack of suitable spaces, the building accessibility and general building maintenance. Finally, general lack English language skills were considered as a hindering force to the course development because students were unfamiliar with related terminology and could not easily follow the research project which was also the team project.

CIHEAM

We observed strong increase in the “participation” competence among students’ answers. We attribute this finding to the fact that the mid-course evaluation was done after the period of frequent field visits and interactions with different actors. This illustrates for us how change of arena helps to build desired competences among students without direct need to “teach” about them.

Final course evaluation

A frequent and regular evaluation of the course activities by the learners gives the course facilitators an indication of how the course is received by the learners. During the course implementation, learners may perceive a situation differently than after the course is over. Therefore, it is important to collect evaluations from the learners after the courses have ended, when they are given the time and space to reflect upon the experiences at a distance.

University of Kerala

For the students, the course was a transformative one, at a very personal level as well as in an academic perspective. Students cherished the diversity of stakeholders, teaching techniques, learning arenas and resources. And these diverse experiences made the students to initiate self-directed and self-motivated learning. Apparently, the students became capable to reflect up on their learning styles, curriculum activities which made them understand that learning is not a lone time affair, rather it should be lifelong one. Comments from students are given below,

‘I felt an organic connection with society, so I feel that this course will be the first step towards transforming me into a responsible citizen’

I joined the course and it changed the way I think, the way I approach particular issues of social importance and I deal with other people.

‘Most productive days in my life and there was this urge created in the mind to continue the work I do in a more powerful way.’

UNISG

“Thinking of the Agroecology education, this experience made me aware of the importance of all the steps of a conscious analysis. The five core competences to become an agroecologist, but also to analyse situations or subjects, are a good path to follow. First, the observation makes you aware of the scenario, helping you to create a rich picture of a situation, and to carefully examine situations before drawing conclusions. Then, the reflection is view as the ability to think deeper and embed the

experience, adding your personal knowledge and the main theories. That for me was the Achilles´ heel, just because my impulsivity leads me from the study directly to the solution. That's the reason why I love working in a group; what I don't have or what I am not good at is balanced from other people. Participation and dialogue are in fact very important; the contributions of everyone, the process of reflecting together are fundamental. In the end, go beyond existing thought patterns and think in a newer way is the main goal. That's visioning: the willingness to take risks and not to be inhibited by a fear of failing. If learning is an active and social process, not a simple transmission of knowledge, visioning is also about learning, but from the future."

This part of the reflection could be interpreted as a positive perception of the course methodology and understanding the necessity of each core competence.

"Especially, the self-assessment exercise, that I did in class the first day, helped me to understand better what my strength and weaknesses are, giving me a good hint about what I should work on in order to improve and to reach my future professional aspirations that I predetermine for myself. I think this exercise was also useful to realize that, before conducting an interview on the field, which evidently leads you to judge the person you have in front, it is important to know yourself, in order to be as objective as possible in the final evaluation of the whole experience and to internalize in a positive way all the potential teachings."

This text could be interpreted as very positive and useful appreciation by the students all core competences and their practical application.

AFS/IHU

Drawing from our student focus groups we could start to develop a theoretical conversation about the process of how skills develop into competences. It was evident from our focus groups that the action-based methodology was a very novel experience for students. In their vast majority they perceived this as a positive experience and those who found it challenging were keen to appreciate the effects it had on their development. However, they tended to concentrate their conversation and their analysis on the skills they acquired and on the skills that they would like to acquire in the future. We, as researchers, have identified a fine line between how students speak when they are referring to skills and when they are referring to competences. For example, when it comes to reflection, students were mostly able to reflect on what helped them and why rather than how it helped them. We believe that developing a more personally reflective (competence) stance, would help in the transference of knowledge between academic life and professional life since it is a more internal process that incorporates personal factors in the equation.

In our analysis, we found it interesting and significant that by enhancing participation there was also a heightened sense of **responsibility** towards the work and toward each other. It also helped students become actively involved in a process and see themselves as active agents in a system. For our case, the transition to a more sustainable agro-economy and an action-based model of education requires a great deal of personal, attitude change and effort and so we believe that a heightened sense of responsibility toward the self and others and the development of the competence of participation will be vital for such a change to happen.
The need for more action-based activities and connectivity between the University and other stakeholders.

The students almost unanimously expressed the urgent need for more participation, more practical experience and greater connectivity with real life conditions and the real market. Some students showed a heightened awareness of the complexity of the systems they are dealing with and a heightened ability to perceive the status quo and the need for changes in the field. However, most students repeatedly and in every occasion express the need to become more aware of the different stakeholders in their field and to become more actively involved in the real life experience of their future profession. Farmers and in some instances professors, on the other hand, observe that students lack on the competence of participation due to lack of practical experience.

CIHEAM

We found that visionary thinking for all three data collection points was the least coded competence. This is supported through our interaction with the students, most of their requests for clarifications and support where addressing visioning and vision development for their group report. It was challenging for them to distinguish vision from observation and to understand how broad and free in imagination their vision can be.

Students' final documents

Since many of the cases have educational activities including group work and individual reflection on the learning process, these activities often culminate in reports. The reports contain reflections on the learning process and are valuable sources of information for understanding how students experience the transformation processes.

AFS/IHU

Our second cycle activities also included a number of interviews with representatives of different stakeholders in the system of agriculture and who also represent different levels of experience and expertise. Namely, we have interviewed two students who are completing their placement and are about to complete their degree in IHU, a newly appointed agronomist of the AFS who has recently completed his degree and two agronomists with many years of experience in the field and who also work for the AFS.

Through the interviews we tried to identify different factors that contribute to the present situation and thus try to identify possibilities for change toward more sustainable development. The common factors that were identified between all parties involve:

- Issues of trust
- Highly antagonistic environments
- Lack of personal, social and economic motivation for change
- Lack of common visions
- Stagnant mentalities
- Unwillingness to listen and to understand each other's needs and experiences (lack of constructive communication between stake-holders)
- Lack of infrastructures and government support
- Questionable sources of educating and informing themselves (mainly the internet and the media) which leads to fragmented and superficial knowledge.

- Given opportunities and safe environments of educational activities, all parties gain insight, motivation, emotional readiness for transformation and relish communication between actors.

Mekelle

Students were asked to reflect on how useful the core competences to carry out were for their course tasks and in their learning process. Students explained that observation, dialogue and reflection sessions inspired them to look deeper than what they used to do. These competences helped them to open the door for participation and visioning. Students reflected that the action oriented learning process helped them to relate theory to practice easily, innovate on the existing real-life problems, and identify root causes for the problems and to look for solutions for emerging issues such as gender aspect.

NMBU

At the end of the course, students write individual reflection documents where they describe their learning process throughout the semester. By analysing the contents of these reflection documents, we made the following key findings:

- Visioning as a competence is mainly learned by the students during the three-day introductory seminar in class. However, students also increase their competence mastery by facilitating visioning sessions in the case work, however, the learning is then attained through facilitating others' visioning and not directly through practicing it themselves.

- Reflection is a competence students describe learning and practicing throughout the course in multiple settings. While many students describe reflection as demanding and challenging, most students appreciate the added value they gain from experiences by reflecting on them afterwards.

- Observation: Most students mention that they thought observation was a rather unnecessary competence to develop, but that they realized through the first educational activities that introduced the competence of observation that they had prejudices and assumptions that they wouldn't have become aware of without trying to observe neutrally.
- Dialogue: Students emphasize that they learn the dialogue competence through working together with peers. On being introduced to the concept in class, it seems to be common that students think of it at being banal and unnecessary, but soon realize that it is quite challenging, tiresome and requires focus and attention. From this disorienting experience they start realizing that bad communication and group work challenges often stem from lack of dialogue.

- Participation: Several students mention that participation enabled them to become better at dialogue and observation, and some students also mention participations helped to train the competences of facilitation, group work or visioning. Therefore, it seems that students regard participation as a competence that allows for interaction with other competences. They highly value participation as a competence to understand systems from within, and also to understand values within and attached to a farming system.

- Facilitation: When reflecting on their own experiences as facilitators, students refer quite a bit to difficulties they encountered in striking the right balance. For example, students mentioned that they experienced it to be difficult to abandon the participant-mode enough in order to be a good facilitator in a workshop for stakeholders. When reflecting on facilitation as the approach used by teachers/learning facilitators, students first and foremost remember being frustrated with the lack of clear guidance that they are used to from previous education. But they all mention that they find the approach rewarding in the end.

- Transformation: Transformative learning is a deep and long/endless process, and the reflection documents from one semester is probably not enough data material to fully see this process with the students. However, some traits can be recognized, such as the emphasis on the competence development for shift in mindsets. Being introduced to the competences (all represented except vision at this point) does represent a shift in the way the students relate to learning, themselves and the outer world. Students describe the experience of being part of the program as a journey using words and phrases such as “I now understand”, “previously/before … now”, “feeling more prepared”, “realized”.

UNISG

Achievement in observation competence was underlined by many students as they had observation activities during farm visits. Participation competence was improved due the students’ involvement into group work activities and different experiences on the farm.

Dialogue competence was improved in the students’ group work during their farm experience. The students mentioned that they improved their ability to communicate to the farmers.

After the course, the students’ reflection competence was improved due to their written exercises. They had to write a Reflection document. Notwithstanding provided guidelines for the Reflection document, the students wrote them differently. It demonstrated different ways of the student's reflection such as:

- Only recap of the course activities;
- Listed course activities and provided citations from reading materials that impressed the students;
- Only personal reflections on the course activities that included personal reaction, attitudes and perception of the farm experience.

University of Kerala

Students submitted their learner documents at the end of the course. Major findings from the course include the following;

Enabling factors (conditions): There are some enabling factors (like understanding concepts of agroecology, adapting multidimensional thinking, critique of existing learning systems etc.) that enable students towards competence development. i.e, the knowledge is a major determinant in competence development.

Two-way process: All the students experienced development of the five competences during the course period. At many times, the process of competence development is a two-way process- accruing particular competences helped students in effectively taking part in educational activities, and in turn, particular activities helped students to polish/ acquire particular competences.

Observation: students practiced the skill of observation during ‘Transect walk’ and field visits. To them, observation is a very good starting point towards practicing other competences, especially, reflection. Rich picturing and group sessions after observation walks has helped students to define the features and requirements of good observation. Observation requires focus, concentration, presence of mind, active involvement, patience and the competence have to be systematically practiced. However, it is important to make students understand, how to comprehend and interpret the observation they made in an unbiased manner.

Reflection: Reflection is one competence that decides the strength of the action learning process. Students practiced reflection frequently during reflection session at class and at field and learned how to do reflection in a systematic way. They relate it with reflective observation in Kolb’s learning cycle and documents that it is important to minimise the emotional/ cultural thoughts to have a good reflection and it is a use full technique in daily life. Sometimes, students get emotionally attached to particular ‘reflections and this leads to disproportionate importance attached to reflections.

Participation: Students practiced participation with various stakeholders and most of the students have highlighted the experience during field work and during group sessions. Participation brings in realistic elements and helps to develop innate interests of students and here academic background, cognitive ability and interpersonal skills are important determining factors. It also removes prejudices and create an arena for multidisciplinary learning. Even though students gained participatory skills during the course, very few of them connected the knowledge generated through participation with a possible agroecological transition.

Dialog: Students improved their dialogue skills and they felt that this improvement helped them in participation, peer learning and during interactive sessions. Facilitation plays an important role in refining the skill of dialoguing. Learning to listen to others, changing the dominant attitude, clarity in thoughts are essential to practice it and dialoguing brings patience, reduces ego and expands horizons of knowledge. The scale of improvement is different for students, it ranges from shifting from argument to dialoguing or from discussions/ debates to dialoguing.

Visionary thinking: includes visioning exercise in classroom and with farmer and visionary thinking related to agroecological transition. After visioning practices, students feel lack of visioning as a major issue with public policy choices and understand it as motivation for action.

Students also learned from each other and this facilitation helped them to improve knowledge and do group activities in a better way. Transformation in the learning style, thought and techniques are marked as learning outcome by students. In short, the course was a transformative learning experience for students. It was self-directed, innovative, flexible and holistic.

UoC

Students submitted individually their learner's document at the end of the course and the vision document for the farm they have worked on during the course as a group. 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.

Most common reflection about the course were that if the curriculum were structured it would have been helpful and also few of the teachers could not follow the nextfood model during the sessions. So students struggled to follow the sessions and felt these were unrelated.

The core competences learned through the course came up various times in the reflection documents and the summarized competences learned are following.

Observation: Students are encouraged to observe a situation or a problem, and they express themselves in term of rich picture before analysing.

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.

Visioning: Students draw a future vision followed by reflection on a situation, in an uninhibited way - revealing the capacity to go beyond existing thought patterns.

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.

Participation: Students work together in group and with other stakeholders – and recognize conflict of values and goals and empathically engaged with each other.

Analysis based on reflection documents submitted by students 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.

- The learning methods are 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.

CIHEAM

As general achievements we conclude that students have been able to produce a coherent and very good final report of the experience; present and discuss results within a public event and shown interesting presentation skills. From the final reports, we concluded that students cached very well the meaning and the importance of the competencies and have worked along the project with the right attitude, finalized in skills development. They have improved their understanding and capacities in reflection, participation and dialogue, which was very much connected to the activities such as field visits and their team dynamics.

AFS/IHU

A reflection document, prepared by one of the course professors, provided feedback and a description of his involvement, the perceived development of students' competences, main themes and issues and a plan for further improvement of the course "Farm Animal Reproduction".

He described the inclusion of action based activities as an enhancement to the course. He made considerable changes to the ratio of theoretical and action based activities and thus achieved to allow for a considerable amount of practical experience. He commented that this would be to their benefit in terms of their professional desirability and managed to help them develop good attitude toward their sector, quality, up to date knowledge, communication skills, team building skills and problem solving skills that would not be possible otherwise. He also observed significant improvement in student marks.

Drawing from the focus group that we organized with the professors that took part in the action-based activities and a representative from the IHU Institution there were a great number of concepts that arose with regards to factors that may influence the development of an action-based culture of education within the University. They provided us with very fruitful insights with regards to the current situation, the particular needs for implementing the model and their recommendations for the future.

They showed considerable creativity in their thinking, willingness and motivation to participate and willingness and motivation to communicate and create a fruitful dialogue.

With regards to Institutional and managerial factors, they mentioned a number of hindering forces that may effect change. The most prevalent of them were Bureaucracy, the need for more staff and class allocations, the criteria by which professors are hired and assessed, the time that is needed for such large institutions to change, lack of vision in many cases and the force of the existing status quo in the field.

Regarding teaching methodology they mention that it depends mostly on the character and the willingness of the teachers to adopt alternative teaching methods. It is not engraved in the institutional culture or formal vision and they say that it should be. Some ways to reflect such a vision would be an effort to include teacher training in the Institution and to include teaching methods in the teacher assessments. Moreover, it would be important to make more effective use of the teacher assessments and to learn from them.

Another interesting point made by the IHU officials was with regards to relationship between the University, its professors and its students. That is, many solutions lie in giving more attention to communication and relational issues between the actors within the University. They mention that it is important to pay more attention to faculty needs and to student needs. This would require developing a way to make these needs heard and to identify and specify them. However, they recognise the need to facilitate more practice-based methodologies and to better utilize the University farm as an important given.

Comments from the main stakeholders in agrifood- or forestry systems

University of Kerala

Students, as a group of three, were send to three different farms during the first and third weeks of the course. Comments from the farmers are given below.

”Many students have visited the farm as a part of their educational activity. But it was for the first-time students joined me in agricultural activity. All of them were eager to participate in harvesting and watering, which was a source of inspiration for me”- Shyla Basheer. (Farmer)

“ It was a great experience for me to discuss my visions to students about the farm, and the way in which they developed a feasible plan to do so was amazing. I will try to develop my farm accordingly”- Vinod, (Farmer)

CIHEAM

One of our actors well described students’ achievements: “students set up concrete and strategic ways for having community-based actions around the selected products on which we wish to engage as soon as possible…”, and almost all of them put in focus terms such as: emotions, motivation, passion, etc., being touched with students commitment to the work and wish to help main actors of the project.

Mekelle

Farmers and farmer advisors were the main stakeholders involved during the action oriented learning process. During the orientation at the FTCs it was explained that MSc students will work with them to learn about the farm and food system activities. From their feedback we found that the farmers gained new knowledge from the interaction. They started to question about their usual way of doing such as plating eucalyptus tree at the farm edge of the irrigated fields. One farmer also raised the issue of providing training for both the husband and wife which implies that he started to realize the importance of gender issue. The farmers also appreciated the students approach “being learning facilitator than top down commanding”. As a result some expressed this experience to be expanded to all parts of the region and expected this to come as policy in the future. This might be due to the fact that the process built trust among farmers.

Teachers’ final documents

University of Kerala

A transformation from the role of teacher to that of facilitator was the most important achievement felt by teachers. And this transformation brought the following insights,

1. Unlike in conventional education system of monologues, the new learning system rendered an opportunity for democratisation of knowledge creation and dissemination in which both students and farmers contributed, and played an active role.
2. Being facilitators, there was the opportunity to respect and nurture the feelings and emotions of students during educational activities which are innate and organic, which are not considered in the conventional classes.
3. Usually the learning outcomes are evaluated by a term end examination, in which the student perspective on the curriculum and conduction of course are not captured. The continuous evaluation techniques helped us to think from the aspect of students and understand what all activities (competences) they practiced and what knowledge they gained and how they adapted to it.
4. The course provided opportunities for enhancing soft skills of both students and facilitators.
5. Managing a heterogenous group of students in the action learning course, imparted essential skills to deal with scepticism and expectations of each students and it was a new experience for the teachers who always considered students as one homogenous group.

UoC

The final reflection documents received from teachers raised a few point on running of the course-- It is a challenge to keep practitioners/farmer-trainers for such a long course. There were suggestions for both sides. The idea of breaking it up into 7 days of theory, 7 days of practical came up. But a couple of risks were also expressed related to this suggestion. As this is a free course, there is always a possibility of someone coming and not coming back for the next class. The second risk is that if someone is coming from afar, it might be difficult for them to come and go so frequently as would be required with this new suggestion. A third challenge mentioned was that if they are going back to the practice, they will miss the collaboration possibilities.

Mekelle

Supporting and hindering Institutional factors were identified based on the focus group discussion with department heads and quality assurance heads.

It was identified that the institutional policy at Mekelle University supports the shift from being lecturer to learning facilitator, from written exam to diversity of assessment methods. In addition, interdisciplinary research is encouraged at MU. The University vision by 2025 is to bring impact and innovate on community problems. The Ethiopian higher education policy supports to link students to farmers and end users. These all situations are supporting forces for the NF approach to be implemented.

However the dominance of narrow discipline curriculums, high budget demand from interdisciplinary researches, and hierarchical process of decision that may create bureaucratic issues and poor motivation of students for education were the major hindering forces to implement the NF approach.

CIHEAM

The coaching team considered that despite the limitations and constraints imposed by the COVID-19 outbreak - students' involvement and commitment have been satisfactory throughout the whole period from the beginning to the end. They put a lot of efforts in finalizing their presentation to the local actors as well as the report, exploiting coaches' recommendations and suggestions. Coaches reported to be very happy for being able to accompany them on this journey.

2.4 Cycle reports

In this final section of the case development report, the cases summarise their case development- and research efforts according to the structure of planning, implementing and reflecting. While most cases count the previous case cycle as their first official Nextfood run, a few cases have now completed two cycles and provided reports from both cycles (NMBU, ISEKI and AFS/IHU). The main focus for the past Nextfood case work cycle has been to improve the running of the courses and to initiate the data collection, which both pertain to the implementation phase. In the coming cycles, we will also focus more on establishing good routines for structured reflection and analysis of the case development process. Further, as the cases run multiple cycles, these cycle reports should ideally represent a condensed narrative of the improvement of each case. However, since many cases have only completed one full cycle, this dimension of this chapter is not fully functioning yet. Nevertheless, these cycle reports provide a good summary of the most important aspects and events from each case.

3 Case reports

3.1 Norway - NMBU

3.1.1 ID card

Title: “Agroecology: Action Learning in Farming and Food systems”
Level: MSc

Credits: 30 ECTS

Language: English

Institution: Norwegian University of Life Sciences (NMBU)

Leaders: Geir Lieblein, Tor Arvid Breland, Anna Marie Nicolaysen, Charles Francis

Researchers: Lutgart Lenaerts, Åsmund Steiro, Vebjørn Stafseng

Timeline: 12.08.19: Course start
06.12.19: Course end

Learners: 20 total, 16 female, 4 male
Age ≤ 20: 3, 21-25: 11, 26-30: 4, >30: 2
Norwegian: 5, EU: 9, North America: 4, Oceania: 1, Africa: 1
Single degree: 9 Double degree: 11
Agricultural study background: 9
Natural science background: 7
Social science background: 3
Other: 1

3.1.2 Status

1. **From lecture hall to a diversity of learning arenas**

The Norwegian Nextfood case is a 30 ECTS MSc course called “Agroecology: Action Learning in Farming and Food Systems” (). The students’ action learning revolves around their holistic inquiries into local farming and food systems for the purpose of facilitating improved sustainability. Supplementing the students’ activities on these two main learning arenas, are mostly interactive classroom sessions with activities transforming the classroom into a diversity of learning arenas, where theory is also drawn in on demand to support the students’ reflection on their observations and activities in the casework. Reflection sessions on a weekly basis and writing of a reflection document are particularly important learning arenas in this respect. Examples of other learning arenas are field excursions, attendance in and arrangement of public meetings, meetings with experts and guest lecturers (as demanded by the case work or the students), presentations of plans for or results of field visits to farming and food systems cases, writing of client documents for the students’ key stakeholders, writing commentaries on literature, and peer reviewing of the students’ writings. The major purpose is to shift to action in real-life cases as the starting point for learning and support this action with a variety of resources on other learning arenas. This is considered desirable for learning in general and, in particular, for fostering the competences required for dealing with the challenge of the whole in real-life, complex situations in agri-food systems.

This shift is appreciated by most of the students, and most of them prove through their performance in course activities, course deliverables and oral exam that their achievements of major learning goals usually range from good to excellent.

Among obstacles to including a wide variety of learning arenas is the challenge of allocating the activities in a good balance at appropriate times, given the needs determined in the students’ case work and the availability of resource persons such as stakeholders in the field and other experts. Moreover, students have different preferred learning styles and are to a varying degree prepared for and adaptable to this diversity. Communicating this shift and its purpose and facilitating its internalisation among all students has proven a challenge in some cases. This has sometimes caused confusion and impatience, which influences not only the motivation of the students directly, but the entire learning environment.

Our team needs to learn more about how to effectively communicate and facilitate internalisation of the shift from classroom lecturing as the main learning arena to the diversity of arenas necessitated by the action learning strategy.

From lecturing to co- and peer learning

In the MSc course (our case), the core idea is to start the learning with observation of a real-life phenomenon and ask the question: what is there? This is followed by the questions: what does it mean, what could or should be, and how can or shall it happen? This sequence is consistent with Kolb’s (1984) cycle for experiential learning, which builds on the premise that the best learning has an experiential origin which is followed by reflection supported, for example, by theory. Consequently, we have moved from starting with extensive lecturing and reading of theory about ontology and epistemology first, to shorter introductions needed to get motivated for and started with observations and actions on real-life phenomena. Then, consistent with the sequence of questions listed above and Kolb's (1984) learning cycle and in a process of interactive co-learning including teachers and students, we bring in theory as a means of making sense of the observations and experiences regarding the content of the situation dealt with (ontology) and the process of inquiry and learning (epistemology). One example is a morning excursion to a nearby mixed animal and crop farm where students and teachers communicate with the farmer about what we observe and what she has to tell about various aspects of the farm. In the afternoon, the students bring up items that stood out as prominent during the visit, the teacher places them in a conscious manner on the blackboard, and finally draws a farming system model including general systems and agroecological concepts considered useful in the cases where the students are involved in action learning. Another example is the flipped classroom approach applied to action planning according to soft-systems methodology (Checkland and Poulter, 2006). At the time the student groups need it in their farm case inquiry, they are asked to read specific chapters in the textbook before we have a session where we first reflect on and discuss the "theory" before applying it on information that the students have already collected from the cases.

The farming and food systems inquiries imply extensive peer learning in all phases of the work. The complexity of the situations requires that student groups be composed of 4–6 members with different educational backgrounds and preferred learning styles, who complement each other and through dialogue exchange information about and views on the situations. The process also includes case clients, teachers and other resource persons as participants in the co-learning endeavour. Peer learning is also central in literature seminars, where students write commentaries on assigned literature, present these to fellow students in groups of about four students, receive feedback and discuss various aspects of the literature dealt with. Similarly, peer commenting is systematically used at presentations of the students' group work and after hand-in of drafts of client and reflection documents.

Indicators of the peer and co-learning's effectiveness are the wealth of information that the student groups bring back from their case visits and the synthesis of the information in view of the challenge of the whole. Others are the visions and suggestions for action that the student groups present in the documents written for their clients. There are also several examples of clients being very appreciative of working with the students. The students' individual reflections (reflection sessions, reflection documents and the oral exam) show that most students appreciate highly learning from in-the-field stakeholders and fellow students.

An obstacle to peer learning is that individual students have different motivation for and ability to commit to the mutual responsibility needed for this type of learning. Poor motivation or capacity for involving in peer and co-learning processes may have serious impacts not only for the learning of the students concerned, but also that of their teammates or even the entire learning community. When it occurs, it is a challenge for the teachers to this problem adequately, since it is difficult to know whether the root cause is, for example, more or less persistently limited social competence or lack of social training among students that have mainly attended lecture- and theory-based courses.

We need to learn more about how to facilitate the process of co- and peer learning, particularly about how to stimulate good group dynamics, how to identify destructive interactions and when and how to interfere when there are destructive patterns. We also need a better understanding of how to train students to take responsibility for establishing and maintaining constructive group dynamics, which would make possible more self-organisation of peer and co-learning sessions in addition to the casework. Finally, we need to learn more about how to facilitate even better inclusion of the students' expertise in co-learning activities.

From syllabus to supporting literature/a diversity of learning sources

An emergent property of an action learning course with students having diverse backgrounds is the need for a dynamic syllabus. Apart from knowledge about farming and food systems' structure and functioning as (agroeco)systems ("content", ontology), how to make a inquiries into such situations in order to facilitate improved sustainability, and how to learn and develop competences to deal with such situations ("process", epistemology), what the students need to learn depends on the cases they explore and what the students already know. Therefore, we have no fixed syllabus but encourage students to seek a variety of learning sources. First and foremost, we encourage the students to view literature as support for their exploration of the cases and not the other way around. Consequently, we have recommended reading on the fundamental ontological and epistemological topics and provide further suggestions on demand when it comes to more peripheral or case-specific matters. The basic premise is to "let the phenomenon speak" and, thus, determine what theory to include instead of having a comprehensive reading list containing material that may or may not be relevant to the systems inquiry context. Further, to better equip the students with ability to use literature in support their action learning endeavours, we arrange literature seminars throughout the semester. Each year we update the supporting literature included in the literature seminars to fit the needs of the current edition of the course.

By not having a pre-set syllabus, we observe that the students more freely focus on using the theory they find useful to support the exploration of their particular case. Also, the students express appreciation during the literature seminars for having the opportunity to read articles that are relevant to their case inquiries. Finally, the focus in the course has definitely shifted from only knowing towards mastery of processes and fostering of competences needed to take informed action.

A challenge of moving away from having a fixed syllabus is that some students may feel they have not gotten a full overview of what they should know and, based on previous experience with theory being considered as the superior form of knowledge, may feel that they do not learn anything significant. It can sometimes be hard to enable the students to trust that they do not need to have full knowledge of all the components in the system before they can contribute to improving it and help them see that theory on "content" and "process" pertaining to purposeful human activity systems, in this case farming and food systems, is more fundamental in a course in agroecology than theory on components and sub-processes. It is also a challenge to make space for reading and reflection, considering that inquiries into open-ended real-life cases may sometimes acquire a dynamics that overrides the need for delving into literature.

We need to learn how to build the students' trust in the described process even better. Many students who come from a traditional education system are used to first spending many hours in lecture halls and behind desks reading up on the theory and being given a certain lens through which they should view a situation or phenomenon. When we start with action learning in situations out there, the challenge is how to better enable students to internalise the idea and trust that this process, albeit reversed in relation to what they are used to, is in better agreement with people's natural way of leaning and will not only make them more knowledgeable, but also enable them to become life-long learners and agents of meaningful change.

From textbook to a diversity of teaching aids

The students' involvement in real-life cases necessitates the use information sources other than regular textbooks. For instance, there might be information on webpages, social media, pamphlets, reports, scientific and other articles etc. that are more relevant for learning about the cases than any textbook. In our course, good textbooks are recommended as a central part in a diversity of teaching aids, but not to considered exhaustive even if being read from beginning to end. In our course, we have a session on various sources of information and how to read, interpret and use them. The ability to critically examine pieces of information and to be able to connect them and make sense of the diversity is considered paramount. In our course, we support the students in doing this by enabling them to train the ability of reflection.

The students often express appreciation of a structured process and time set off in the course for reflecting on the multiple experiences they encounter. Through reflection students often discovered connections between pieces of information that they did not see straight away, which enables them to better understand the complex systems under inquiry.

A challenge in using a variety of teaching aids is that, despite the value of diversity, it can be a substantial task to find relevant, reliable valid and good literature. Even though "the right answer" to a question in a complex situation can often not be found in a textbook, this does not mean that answers found elsewhere are necessarily better. It is nearly impossible for the teacher to have full overview of all the possible sources the students might encounter. Therefore, it is essential to address this challenge by enabling the students themselves to become able to discern between valid and invalid sources.

We need to learn more about how to enable the students to become independently good at using a diversity of teaching aids. Most students are used to leaning on a textbook and may often be inclined to prematurely ask what is the "correct" answer to a complex question without exploring different angles. We need to learn how to better enable the students to explore multiple sources while suspending judgement and then to practice reflection and dialogue to reach a deeper understanding of the matter in question.

From written exam to a diversity of assessment methods

In order to justly evaluate the students' achievement of the learning goals in an action learning course, we employ a several assessment methods. Our students are evaluated on (a) their participation in the learning community, (b) two group reports on the two project works, (c) an individual reflection document describing their learning in terms of content and process, and (d) an oral exam where the focus is on presenting their learning and responding to challenging questions. The purpose of evaluating the students this way, is to shift the students' focus on learning "what should be learned" towards how the learning is happening and towards self-critically reflecting on their learning process. Specifically, the rationales for evaluating the students' contribution to the course are that in a course that is highly dependent on participation, we need to award those who contribute more to this community than those who contribute less and that participation is an important competence that needs to be trained.

Several students have said that this approach is very empowering compared to having a written exam where only your knowledge is being tested.

A challenge is that a variety of assessment methods often results in a higher workload for the internal and external evaluators. One concrete challenge is how to evaluate the individual student's contribution to the group reports and level of participation in the entire learning community. The challenge is how to measure this intangible facet.

We need to learn more about how we can assess the students' participation in the course. As of now, we base the evaluation on their attendance and our shared understanding of their contribution. However, we lack full insight into, for instance, what happens when they are doing most of the casework. We could possibly consider including a self- and peer evaluation.

From lecturer to learning facilitator

Our course is based on the notion that teaching should not be equaled with learning. Therefore, pure, traditional lectures have almost entirely been replaced by short introductions followed by facilitated, student-active processes triggered, for example, by case-derived topics and tasks and supported by various resources, including literature. In our course, there is a larger complexity of different elements and types of sessions than in a more traditional, lecture- and textbook-based course. The major purpose is to provide conditions under which different types of learners can learn rather than teaching theory, facts and methods the classical way. In other words, we are trying to de-learn ourselves as teachers transmitting knowledge to the students and are trying to learn how to be facilitators of their learning.

It is very difficult to single out any indication on whether these efforts have had the desired effects. Sometimes, some students crave more lectures while others at the same point in time express appreciation of participatory, student-active processes. It is hard to discern a justified demand for a good, traditional lecture as source of information from a wish to just escape from demanding student-active learning into calm, well-known waters. The fact that individual students and facilitators are different and perform variably adds to the "noise" in our data on this matter. Nevertheless, despite variations over the years that our course has been running, the fact that we are still running this type of course is evidence that we get sufficiently appreciative feedback from our student to believe that the approach is effective in the pursuit of key learning goals.

Considering that everyone in our team have their educational experiences from a lecture-based system, switching from lecturer to facilitator is a challenge. It requires planning, practice and reflection, for example, by means of relevant theory. It is also a challenge to rely on a process that balances abandonment of control, for example, when it comes to which topics and facts to address, with control over fundamental principles and processes, e.g., egalitarian dialogue and participatory processes.

Moreover, being a learning facilitator who attempts to provide the best conditions under which students with different backgrounds and preferred learning styles can learn in a given session, is a huge challenge. One aspect of this challenge is to become well coordinated as a team of course facilitators and appearing as a united group who consistently provides clear instructions to the students. To enable this, we have found that good preparation is paramount. Ahead of this cycle, we spent time dividing the responsibilities of the different parts of the course and scheduled regular meetings among the team to coordinate our efforts. Another major obstacle with respect to becoming a learning facilitator we have found is time management. If one is to continually attempt to provide the best possible conditions under which the students can learn there are almost no boundaries as to how well prepared one can be. However, time is a limited resource and striking the right balance between preparing well enough and not setting the bar too high is challenging.

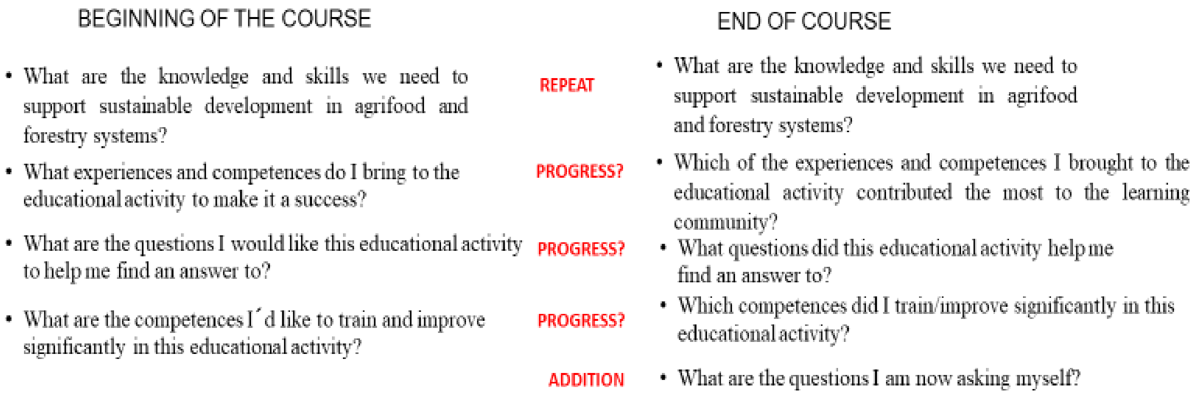
In our team, we could benefit from learning more about facilitation as such and about how to allocate our time between this activity and all the other tasks we have. We feel that we still have a lot to learn in this area.

3.1.3 Data analysis

The Nextfood case at NMBU revolves around the annual four-month MSc course in Agroecology, where development of the core competences through action-learning is central in the student's learning goals. The course is facilitated by a team of seven, where four core facilitators are mainly responsible for supporting the students through their learning process, while the others are mainly responsible for driving the research activities connected to running the course. Throughout the course, students were continuously asked to reflect on their learning process, both structured and unstructured. In this section of the report we will describe and present an analysis of three categories of student reflections that were recorded during the course. Finally, we will present the evaluations students gave of the course.

Students' understanding, contributions and expectations

At the beginning of the semester, the students were asked to reflect and provide answers on four questions related to their understanding of the course topics, their contribution potential and expectations to the course (Figure 1). The students responded to this as a take-home assignment during the first week of the course. At the end of the course, the students were interviewed individually regarding the same topics. In the interviews, we mainly focused on whether the students felt they had progressed in relation to the topics raised. In the middle of the course, students were given another take-home assignment where they were asked to reflect on the core competences of the course and their progress with achieving the learning goals.



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: Overview of the questions asked to students at the beginning and end of the NMBU Nextfood case.

At the beginning of the semester, when asked about knowledge and skills needed to support sustainable development, the students were very ambitious. Many of them mentioned the need to have knowledge of the whole system and not only the parts and emphasised the need for good communication skills to help raise awareness of systemic issues. At the end of the semester, most students still repeated the same needs, however with more targeted answers, for instance elaborating on “communications skill” by wanting to practice the competence of dialogue while hosting workshops with multiple stakeholders.

Regarding the experiences and competences the students brought in to the course, the diversity is quite striking. Some students highlighted their experience from farming, others their academic merits, while others focused on entirely different attributes such as proficiency in photography, illustration and enthusiasm. When being asked which of these experiences and competences contributed the most, in hindsight, many students expressed that they felt it was a difficult question to answer. However, many of the same aspects were brought forward. Some of the students discovered aspects of themselves they were not aware of from before. Most of these aspects pertained to the multi-faceted skill-set necessary to succeed in working in teams.

At the beginning of the semester, the students listed a plethora of questions they would like the course to provide them answers to. Ranging from specific topical questions, approximately like ‘what is agroecology?’ ‘what characterises farming in Norway?’ and ‘how to develop sustainable agriculture systems in developing countries?’, to more overarching questions pertaining to personal development, approximately like ‘how can I contribute to sustainable development?’, ‘how can I become a better change agent?’. At the end of the semester, inevitably, many students had to admit that they still had some of the same questions as coming into the semester. However, many pointed out that they got answers to questions they did not know they wanted to have answers to, such as how to lead a visioning workshop, how to reflect, and how to effectively work in groups. Several of them pointed out that the course was more about personal development than learning about agriculture systems.

When asked which competences they would like to train, most of the students emphasised the core competences put forward by the course. It should be noted that at the time of answering these questions, the students had already been introduced to the core concepts of the course. Furthermore, some students mentioned wanting to increase their competency to communicate in general, to think critically, to analyse a situation etc. At the end of the semester, most students felt they had improved their competence mastery in general. However, several of the students pointed out that they felt they lacked the chance to really practice and master the complex competences put forward by the course. As an example, many students pointed out that the visioning competence had only been introduced to them briefly and then they had the chance to practice it twice during the case work, but they felt they lacked a chance to repeat the process enough times to really master the skills necessary to be competent at visioning. Similar to the previous question, most students highlighted that they had become much better at working in groups during this course.

Finally, the students are asked during the interview, which questions they are asking themselves at that moment, at the end of the course. Most students then go directly to questions regarding their personal futures. They are eager to know how to apply the competences they have improved on during the course, both after their studies are finished, but also during the studies. The students who come to take the Agroecology master program at NMBU almost without exception shares the desire to be a change agent in trying to improve the sustainability of agrifood- and forestry systems. This shared attitude results in many questions regarding how to best contribute to this shift. Finally, many students ask more pressing questions such as which courses to choose for next semester and how to go about preparing for their thesis work.

Self-assessment of competences To track development of the core competences of students, a self-assessment was conducted at the beginning and at the end of the course. The self-assessment was conducted by the students filling in a questionnaire where they were asked to rank their level of competence mastery on several statements related to each competence on a scale from 1 (Novice) – 9 (Expert). The full version of the questionnaire is located in Appendix 6 of the Research Protocol (D2.1). Table 1 summarises the responses from the 2019 class.

Table 1: Average scores of self-reported competence development among MSc students during a course partly focused on developing the competences. The scale used was 1 (Novice) – 9 (Expert). N=17.

	Average scores			Significance
Competences	Start	End	Diff	P value[1]
Observation	4,14	6,33	+2,19	<.0001***
Participation	5,30	6,98	+1,68	<.0001***
Visioning	3,57	6,06	+2,48	<.0001***
Reflection	5,19	6,63	+1,43	<.0001***
Dialogue	4,48	6,93	+2,45	<.0001***

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

[1]: Results of a paired, two-tailed, Student t-test.

At the start of the course, students were most confident in their competence mastery of participation and reflection, with dialogue and observation following and visioning obtaining the lowest average score. At the end of the course, on average, the students ranked their competence mastery higher on all competences resulting in a less than 1 scale point difference between the average end score of all competences. The largest increase was in visioning and dialogue. To test the statistical significance of the differences between the self-assessment numbers at the beginning and the end, a paired, two-tailed Student t-test was run. The p-values show that the increase in self-reported competence mastery was highly significant for all competences.

The significant increase in self-assessment ranking indicates that throughout the Agroecology MSc course, students developed their mastery of the core competences of Nextfood. The three competences with the lowest average scores at the beginning of the course saw the largest increase, which may be due to observation, visioning and dialogue being less familiar competences than participation and reflection. There may also be a difference in difficulty between the competences. Arguably, mastery of reflection is more difficult than mastery of participation, which may explain why reflection saw the lowest increase. Furthermore, when starting the course, many students have a limited understanding of the competences and may thus overestimate or underestimate their level of mastery. We have reasons to believe that many students overestimate their abilities to reflect at the beginning of the semester, only to later realise it was only after truly understanding and experiencing the difficulty of mastering reflection that they understood how much they still had to learn. Such overestimation in the beginning may explain why reflection is the competence with the lowest increase, while simultaneously being the competence given most time, emphasis and facilitation during the course. Despite the possibilities of overestimating their own competence level at the beginning of the semester, none of the students reported a decrease in their average score throughout the course.

Reflection documents

As a part of the student’s final course evaluation, the students write individual reflection documents where they are asked to demonstrate their abilities to link relevant theory to practice and to use experiences from the course to do so. These documents thus contain valuable insights into both how the students experience the learning process and which educational activities they deem to support their competence development. To analyse the content of the reflection documents, they were anonymised and imported into the qualitative data analysis software NVivo for coding. We used a pre-defined coding tree, which was developed particularly for this purpose. See Appendix 2 for further elaborations regarding the coding and analysis methods.

We present a per competence analysis:

Observation

Most students mention that they thought observation was a rather unnecessary competence to develop, but that they realized through the first educational activities that introduced the competence of observation that they had prejudices and assumptions that they wouldn’t have become aware of without trying to observe neutrally. The activities that brought along that inside at the beginning of the course were transect/observation walks, and observing a person eating. Some students also mention that they realized during farm visits that they needed to set aside assumptions and prejudices in order to observe neutrally. At a later stage in the course, most students found observation a useful competence to fully understand a complex situation. Several students mention that without actively and consciously practicing observation, they would have had a narrower view on the system at hand. In that regard, students mention educational activities such as rich picturing and farm visits including walk-and-talks with farmers as very useful activities to not only train observation, but also value the competence as contributing to systems thinking. The interaction with farmers has been mentioned several times as a means to enrich observations and understand a complex system in more detail and nuance. Several students regard the interaction with farmers to be part of observation, and hence refer to interviews and talks with farmers as educational activities that train the competence of observation.

Quotes:

“When we first took the first observation walk around Ås in pair during the first week of the semester (August 15th,2019), once we reunited in class after the experience, we listed the characteristics of a good observer. Here are the characteristics: open-minded, focus, non-biased, take time, detached from your own experience, curious, use all senses, have a welcoming attitude, passive observer (not action oriented), coherent and descriptive. This is what I tried to practice while observing during the first visit on the farm.”

student 393_2019

“Observation took place over several unguided and guided walks with the farmers, this allowed for our own chance to explore but also supplementary information from the farmers which helped give a little further context. We were able to further our observations on the second trip, which also helped fill in any missing gaps.”

Student 394_2019

Participation

When reflecting on educational activities that enable development of the competence of participation, students often describe also the development of other competences. Several students mention that participation enabled them to become better at dialogue and observation, and some students also mention participations helped to train the competences of facilitation, group work or visioning. Therefore, it seems that students regard participation as a competence that allows for interaction with other competences. They highly value participation as a competence to understand systems from within, and also to understand values within and attached to a farming system. In that respect, several students regard participation as essential to changing a system for the better.

In order to gain those in-depth insights in systems in general and farming systems in particular, participation was for several students a way to build trust with the stakeholders, particularly with farmers. Several students mentioned that the fact that they started off by participating in the work on the farm, not only enriched their understanding of the farm from within, but also helped them to build trust with the farmer(s) who would then share a lot of information with them during interviews later on. Linked to that, few students link participation to training in interviewing techniques as well.

Quotes:

“Over the course of the food case, my knowledge on the food system became more comprehensive. This case allowed me to understand better what is the current situation in Oslo, but also what are the hindering and supporting forces and what can be done to improve the system. Speaking with different stakeholders made me realise about the social component of urban agriculture and its importance in urban settings, which is something I did not fully grasp prior to this case.”

Student 393_2019

“In our active participation on the farm we were able to understand what are the most important things for them in regard to the success of their farm and where could we eventually come up with positive and meaningful changes or additions to the farm to create enthusiasm and excitement. I don’t think we could have gathered as much detailed information without participating to the work at the farm. One concrete example is how they call the cow barn a cow house instead because it is important for them to recognise that this is their home and they take good care of it to have a desirable environment for the cows to live in.”

Student 393_2019

Visioning

The competence of visioning is described by most students as something novel yet at the same time appealing and apparently useful. As opposed to some of the other competences, they have a few distinct moments during the semester where most of the descriptions of learning this competence revolves around, namely the introductory in-class seminar and the subsequent visioning workshops held in relation to the case work. In relation to the visioning workshops, many students focus their descriptions on facilitating the visioning of the resource persons from society who are the main participants in these visioning workshops. Consequently, the students do not directly practice their visioning abilities throughout the semester in the same way other competences are practiced.

Throughout the reflection documents of the students, visioning is described in an appreciative manor. The students praise and support using visioning more in efforts to improve the sustainability of food and farming systems as it relieves the constant focus on challenges and opens up for new, fruitful ideas to emerge. However, they also describe the challenge of facilitating such circumstances. Many point out the necessity of communicating in a dialogue as opposed to discussion or debate while visioning.

Quotes:

“To be introduced to the visioning tool (Lieblein, 2019) was an eye opener for me and many others, since it is not just about setting a goal, but to also involve your feelings in an ideal scenario in the future.”

Student 404_2019

“We had a guided visioning both with our farmers and our stakeholders in the food case. In both cases I noticed that most of the participants were not really able to let go of current issues and plans. This is not really surprising, since most of us are used to concentrate on problems and possible solutions rather than what future we want to achieve. It takes training to let go of the present and really experience the future.”

Student 401_2019

“In carrying out these exercises, we found our farmers to be very engaged and felt that our intervention was useful for them. (…) Perhaps through these exercises, it allowed our farmers to dare to dream and plan ambitiously and comprehensively for the future instead of just going about their day to day operational activities.”

Student 408_2019

Reflection

The students describe reflection as the quintessential competence to focus on throughout the semester. Many describe the practice of reflecting as challenging from the very beginning, recognising that the state of mind necessary for good reflection can easily be affected by for instance poor observations or poor conditions for dialogue. Thus, reflection is described as the competence linking together all the competences in the sense that learning to master the other competences is best done through also reflecting on the experiences with them.

Students describe having improved their abilities to reflect in a multitude of situations during the course: in organised weekly reflection sessions (both teacher- and student-led), case work, in dialogue with peers, at workshops, through individual reflective writing and in solitary outside organised activities. Although most students seem to appreciate the heavy focus on reflection and the continuous practice, some also describe frustrations with having to always dig deeper into an experience, which at times may feel unnecessary when the ontological learning output seems obvious.

Reflection throughout the semester culminates with writing the reflection document upon which this analysis is based. The students often describe having improved their reflection abilities while writing this document. Some even describe that it was not until this final task that they finally understood the importance of reflection. Furthermore, several students praise the impact their improved abilities to reflect have had on their life outside school as they feel more able to connect their goals to their action steps.

Quotes:

Through the various reflection sessions that were facilitated by our teachers, I could see some progress on my reflection capabilities. I can say it was not easy to record the stages of understanding how to reflect from the first step to the capacity I have now.

Student 402_2019

These past five months have often reminded me of the “Inception” movie where we have spent many hours reflecting on our reflections, asking questions pertaining to other questions and observing our own observations. While we may not be in a “dream within a dream”, you have asked us to look within in better understanding that which is happening without.

Student 400_2019

I would argue that in writing this learner document I am perhaps consciously, for the first time, making the links between theory and real-life. I know we have been asked many occasions to identify these associations in class through our reflections sessions and presentations, but I would have to say that this learner document is my first personal, holistic and truthful account of my experience as an agroecology student.

Student 400_2019

Dialogue

Students emphasize that they learn the dialogue competence through working together with peers. On being introduced to the concept in class, it seems to be common that students think of it at being banal and unnecessary, but soon realize that it is quite challenging, tiresome and requires focus and attention. From this disorienting experience they start realizing that bad communication and group work challenges often stem from lack of dialogue. Thus, reflection seems to play an important role in the development of this competence, linking the theory of dialogue to practice. In general, explanations of dialogue are mostly linked to specific experiences where dialogue has or has not been practiced. This includes both case-works (internal in group and external with stakeholders), and in general communication with peers and others.

Quotes:

During the first lecture about dialogue, I felt like it was useless because dialoguing was a normal way of interacting, and we all knew everything about. That was the theory. Then, when we implemented it in practice during the farm case, I realized that I had never really done it before and that it was not natural at all, it was a process we had to force ourselves to follow. Personally, I realized that I was not attentive enough to the other's ideas. I was more focused on trying to give relevant and insightful participation than on really understanding other's ideas and evaluating the relevance of their interventions. This evaluation must of course be unjudgmental and this is another challenge. It was difficult to overcome the desire to reply immediately and to let people fully express themselves, risking that someone else would reply before me and that I could miss the chance to give my point of view.

Student 392_2019

While organizing the second visit – the visioning session – I observed that we lapsed from dialogue-based conversations to discussions. I reflected on farm case project process, of which the above mentioned are key events, to draw two important conclusions: we did not do enough analysis together throughout the process. And the second conclusion is that my communication and facilitators skills were falling short

Student 391_2019

Facilitation (by students and by teachers)

When reflecting on their own experiences as facilitators, students refer quite a bit to difficulties they encountered in striking the right balance. For example, students mentioned that they experienced it to be difficult to abandon the participant-mode enough in order to be a good facilitator in a workshop for stakeholders. In addition to that, one student mentioned to be often in doubt whether to ask questions that would make participants explore a topic in more depts, or move on to the next topic. In spite of these difficulties, several students mentioned that they perceived facilitation to be a crucial competence that they would like to develop further. They also mentioned other competences in relation to training the competence of facilitation, more specifically dialogue and participation. As per which educational activity enabled them to train facilitation, several students mention a visioning workshop with stakeholders.

When reflecting on facilitation as the approach used by teachers/learning facilitators, students first and foremost remember being frustrated with the lack of clear guidance that they are used to from previous education. But they all mention that they find the approach rewarding in the end. Also, they recognize the need for the competence of reflection to be trained in order for the facilitation approach to be successful and turn a student into a life-long learner.

Quotes:

"From these experiences, I have learnt that there is no preconceived way to be a good facilitator because every situation is different in its complexity. Rather, it is a long learning process, as it requires a lot of practice."

Student 390_2019

“I felt in familiar territory for the first farm visit, as I was used to conduct interviews from my bachelor. Why and how to interview was pretty clear to me. However, I discovered what a facilitator was during this semester and this role was totally new to me. I felt that the farmers relied on us as facilitators, they were willing to be active in the meeting but needed directions and encouragements. I lacked self-confidence in this role. For instance, I did not know how to include unexpected participants and their presence rattled me. I had to find the balance between being reliable but step back enough to let space to the participants. It was also challenging to be part of a group of facilitators, because in addition to that, I had to find the balance between participating enough and leave space to the other facilitators.”

Student 392_2019

“Along with trying to condense the activities we had to wrap-up the session and as a facilitator, it was hard to figure out the amount of interventions I should have made. It was challenging to find the right balance between exploring an idea that seems interesting and that would bring something new to the table versus asking the participants to move on because it would be of little relevance to the project. I think facilitation is an essential tool for the future because it provides a more participative approach where the stakeholders are engaged and they are encouraged to come up their own ideas.”

Student 393_2019

“A lot of us complained about the fact that most of the concepts and techniques we had lectures on were only introduced but not enough explained. I myself did not even wonder about them, until I later understood how important they were. I think that the teachers do not go deeply into them during lectures because their goal is only to trigger our interest and make us research and read on the subject. I think that I learn better when I feel that I need what I am learning. To this regard, the teacher’s strategy is quite wise, because we hear about a method, then while working we think that this method we heard about could help us, so we go dive into it with the goal of solving a real work situation.”

Student 392_2019

The teachers were really discreet with few strong opinions or directives. It was quite frustrating to do not get the feedback or guidelines we are used to in the relation between professors and students, but I understood later that it was probably done on purpose. We could of course ask for any information, but it would not come by itself without solicitation. It was also surprising to get recommended to read several books at the beginning of the year without any feeling it was compulsory. I appreciated to be trusted, to be allowed to judge by myself what I needed to read or not. I also felt a need to do not disappoint teachers who trusted me so much as a learner. It pushed me to study a lot more than compulsory homework.”

Student 392_2019

Transformation

Transformative learning is here seen as discoveries of new ways of doing things, in this case ways of learning, ways of communicating and working with stakeholders, ways of viewing the world and practicing the different competences. Students describe the experience of being part of the program as a journey using words and phrases such as “I now understand”, “previously/before … now”, “feeling more prepared”, “realized”. Transformative learning is a deep and long/endless process, and the reflection documents from one semester is probably not enough data material to fully see this process with the students. However, some traits can be recognized, such as the emphasis on the competence development for shift in mindsets. Being introduced to the competences (all represented except vision at this point) does represent a shift in the way the students relate to learning, themselves and the outer world. This could be an interesting point of departure to explore transformative learning.

Quotes:

Now that I am writing this paper and reflecting on my recent casework experiences and my behaviour within groups, all this has become clearer and more meaningful to me. It is obvious that my accommodator style has been verified. Being aware of my learning style has been a great help to reflect on how I behave in group projects and on how I deal with a complex and challenging situation.

Student 390_2019

I believe that this semester permanently changed my attitude toward learning. I want to implement the Kolb’s cycle not only in the educational context but also for jobs, internships and associative activities. The first action step to do not forget what I learned this semester will be to keep a learner diary similar to this learner document, except that it will only be for me, during my next semester

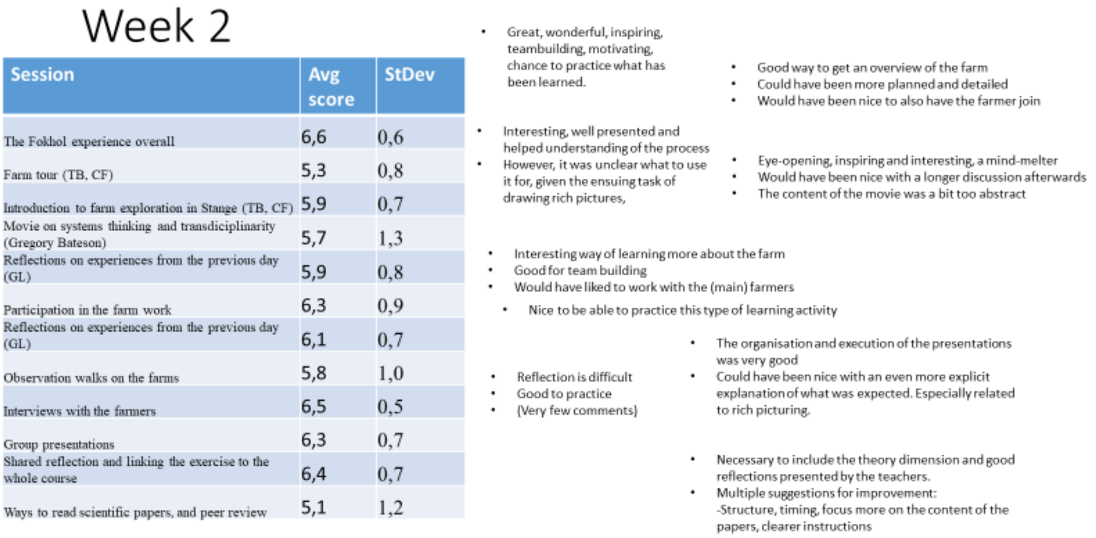
Student 392_2019

But looking back at my previous experiences working on farms in [country] with the principle of phenomenology in mind, I realized I could have grabbed even more information if I had been more aware of my own observation lenses. Another important factor in this evolution was working in groups. Indeed, I could notice how differently others would see a same thing as well as how different things others would spot that I would not and vice-versa. This had a great eye-opening effect on me as I realized how beneficial it was look at a phenomenon from various angles. Of course, the field trips highly contributed to this evolution since they were opportunities for me to practice observation, try out taking different observing positions and train my ability to be aware of my biases right on the spot.

Student 397_2019

Student evaluation of the course

Throughout the semester, students have given bi-weekly evaluations of all course sessions. The evaluations have been conducted as questionnaires, where the students have indicated their satisfaction with the sessions of the course both by assigning a score from 1 bad (worst, insufficient) – 7 excellent (best, sufficient) to each session and by providing written comments. Below follows examples of summaries of the evaluations from the 2019 class.



Week 2

Session	Avg score	StDev
The Fokhol experience overall	6,6	0,6
Farm tour (TB, CF)	5,3	0,8
Introduction to farm exploration in Stange (TB, CF)	5,9	0,7
Movie on systems thinking and transdiciplinarity (Gregory Bateson)	5,7	1,3
Reflections on experiences from the previous day (GL)	5,9	0,8
Participation in the farm work	6,3	0,9
Reflections on experiences from the previous day (GL)	6,1	0,7
Observation walks on the farms	5,8	1,0
Interviews with the farmers	6,5	0,5
Group presentations	6,3	0,7
Shared reflection and linking the exercise to the whole course	6,4	0,7
Ways to read scientific papers, and peer review	5,1	1,2

- Great, wonderful, inspiring, teambuilding, motivating, chance to practice what has been learned.

- Good way to get an overview of the farm
- Could have been more planned and detailed
- Would have been nice to also have the farmer join

- Interesting, well presented and helped understanding of the process
- However, it was unclear what to use it for, given the ensuing task of drawing rich pictures,

- Eye-opening, inspiring and interesting, a mind-melter
- Would have been nice with a longer discussion afterwards
- The content of the movie was a bit too abstract

- Interesting way of learning more about the farm
- Good for team building
- Would have liked to work with the (main) farmers

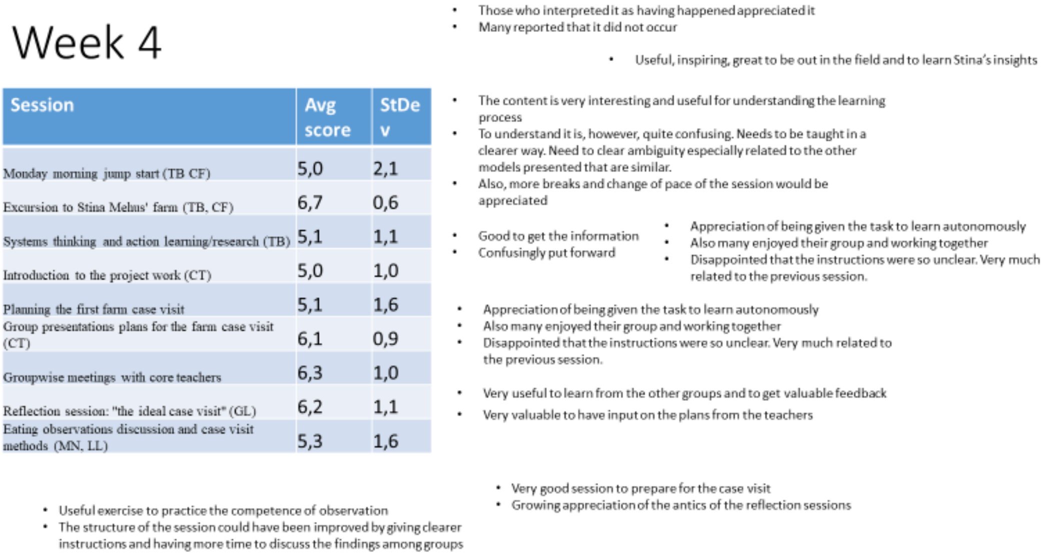
- Nice to be able to practice this type of learning activity

- The organisation and execution of the presentations was very good
- Could have been nice with an even more explicit explanation of what was expected. Especially related to rich picturing.

- Reflection is difficult
- Good to practice
- (Very few comments)

- Necessary to include the theory dimension and good reflections presented by the teachers.
- Multiple suggestions for improvement:
  -Structure, timing, focus more on the content of the papers, clearer instructions

Figure 2: Example of a summary of student feedback to the course run at NMBU as a Nextfood case.



Week 4

Session	Avg score	StDev
Monday morning jump start (TB CF)	5,0	2,1
Excursion to Stina Melhus' farm (TB, CF)	6,7	0,6
Systems thinking and action learning/research (TB)	5,1	1,1
Introduction to the project work (CT)	5,0	1,0
Planning the first farm case visit	5,1	1,6
Group presentations plans for the farm case visit (CT)	6,1	0,9
Groupwise meetings with core teachers	6,3	1,0
Reflection session: "the ideal case visit" (GL)	6,2	1,1
Eating observations discussion and case visit methods (MN, LL)	5,3	1,6

- Those who interpreted it as having happened appreciated it
- Many reported that it did not occur

- Useful, inspiring, great to be out in the field and to learn Stina's insights

- The content is very interesting and useful for understanding the learning process
- To understand it is, however, quite confusing. Needs to be taught in a clearer way. Need to clear ambiguity especially related to the other models presented that are similar.
- Also, more breaks and change of pace of the session would be appreciated

- Good to get the information
- Confusingly put forward

- Appreciation of being given the task to learn autonomously
- Also many enjoyed their group and working together
- Disappointed that the instructions were so unclear. Very much related to the previous session.

- Appreciation of being given the task to learn autonomously
- Also many enjoyed their group and working together
- Disappointed that the instructions were so unclear. Very much related to the previous session.

- Very useful to learn from the other groups and to get valuable feedback
- Very valuable to have input on the plans from the teachers

- Very good session to prepare for the case visit
- Growing appreciation of the antics of the reflection sessions

- Useful exercise to practice the competence of observation
- The structure of the session could have been improved by giving clearer instructions and having more time to discuss the findings among groups

Figure 3: Example of a summary of student feedback to the course run at NMBU as a Nextfood case.

From these two examples (Figure 3 & 4), we observe that the students were overall satisfied with the course sessions during the second and the fourth week of the course. The comments further elaborated the numbers assigned to each session. When looking at evaluations from all weeks, the most striking pattern is that students evaluate sessions where they have an active role higher than when they have a passive role.

During the last week of the course, the students were given a final evaluation sheet where they evaluated the course as a whole and not only the parts. The same scale was used as the bi-weekly evaluations.

Table 2: Average scores of the final student course evaluations of the course run at NMBU as a Nextfood case.

Questions	Average score	Standard deviation
Knowledge of farming and food systems		
a) To what degree have you developed your knowledge?	**4,3**	1,5
b) To what degree has the facilitation by teachers been sufficient?	**4,7**	1,6
Complexity and change		
a)To what degree have you obtained abilities to handle complexity and change?	**5,5**	1,1
b) Do you think that the facilitation by teachers has been sufficient?	**5,1**	1,4
Communication and facilitation		
To what degree have you developed as a facilitator and communicator?	**5,7**	0,9
Do you think that the facilitation by teachers has been sufficient?	**5,7**	1,1
Autonomy in learning		
To what degree have you acquired abilities to be an autonomous learner?	**5,5**	1,0
Do you think that the facilitation by teachers has been sufficient?	**5,2**	1,5
Linking theory to real life situations		
To what degree have you acquired abilities to link theory to real life situations	**5,2**	1,3
Do you think that the facilitation by teachers has been sufficient?	**5,1**	1,6
How has the balance between the different activities been?	**5,3**	1,1
How far were the lectures, seminars and workshops relevant for the project work?	**5,6**	1,0
Did the project work serve as a stimulus for learning during the classroom activities	**5,5**	1,3
How did you find the literature proposed in the course?	**5,3**	1,2

How was the written material received from the core teachers?	**5,4**	1,0
How do you evaluate the contribution from in-the-field-experts	**6,8**	0,5
What is your evaluation of your Food Case Workshop?		
Preparation	**4,6**	1,7
Team-presentations	**5,7**	1,0
Interactive workshop	**5,8**	1,2
Total experience	**5,5**	0,9
What is your evaluation of the case-work?	**5,7**	0,8
The preparation of the farming system client document	**5,1**	1,3
The preparation of the food system client document	**5,2**	0,9
The preparation of the learner document	**5,1**	1,3
What is your evaluation of the teacher-led reflection sessions?	**5,3**	1,1
What is your evaluation of the student-led reflection sessions?	**6,4**	0,5
What is your overall evaluation of PAE302	**5,4**	1,1
How do you evaluate your own contributions to the course?	**4,8**	1,3
Will this course be valuable for you in the future?	**6,3**	1,2
Is this something that you would recommend to other people?	**5,7**	1,1

Looking at the final student evaluations (Table 2), students report that they are satisfied with the course overall. They reported that they were more satisfied with the training of competences than having increased their knowledge level. We also received written comments to these evaluations further elaborating the numbers. The students were in general happy with the experiences in relation to the case work. Many students expressed a desire for more explicit training of certain competences and an even more clear structure of the course.

These evaluations are primarily used to guide the case development process as it gives the case leaders good insights into how the course activities are received by the students. However, we are cautious to interpret or analyse these findings further as we remain uncertain as to how representative the evaluations are. While the bi-weekly evaluations had a high response rate in the beginning of the course, towards the end, the response rate dropped to around 50%. It may be that the other half of the class disagrees with the opinions expressed by those who answered. Nevertheless, these evaluations are crucial for understanding how the students perceived the facilitation of the course.

At the last day of the course, the students were asked to orally share what they particularly appreciated with the course and what they would have done differently if they were the ones in charge of running it the following year. Many of the students stated that they appreciated the new perspectives they gained by taking the course and also various aspects of the action learning approach, which was new to many. Regarding what the students would do differently, they often report wanting to add elements to the course. For instance, many students would like more lectures on key topics, more training of each competences and more individual feedback on their progress. While these are good suggestions, time is a limited resource and it is certainly not possible to accommodate all these suggestions. Heading into the planning of next cycle of case activities, the student evaluation data will be very valuable to have as input to the process.

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Kolb, D. A. (1984). "Experiential learning: experience as the source of learning and development," Prentice-Hall, Eaglewood Cliffs, N.J.

3.1.4 Cycle report

Cycle 1 (Fall 2018)

Planning

The case in Norway revolves around the introductory course in the master program in agroecology at the Norwegian University of Life Sciences. It has been running for nearly two decades and has been continuously updated and reworked based on experiences and feedback from the students. The course usually includes around 20 students and attracts applicants from a large variety of countries. Most of the students are international.

Since much of the content of the Nextfood approach is based on this particular case, the planning of the first cycle consisted of mainly making minor adjustments based on feedback and experiences from the previous year and introducing a peer-mentoring program. We also established an elaborate plan for data collection according to the existing research protocol draft.

The main challenge encountered during this planning phase was to allocate enough time to go through all the potentially useful changes to the course. Since the course is quite established and is running quite well major changes are not necessary and thus requires quite some time and effort to enforce if they are found necessary. Nevertheless, the course leaders are continually looking for ways to improve and update the course and will aim to set aside more time for planning in the coming years.

Implementation

As action researchers and action educators, the course leaders have the dual focus of both facilitating students' learning and simultaneously documenting and researching the process. Since this was the first cycle during the Nextfood project, the NMBU team also focused on developing the action education and action research routines into protocols and manuals for the other cases to follow.

Important areas of data collection for analysis were:

- Facilitators' and learners' reflection documents
- Learners' course evaluations and feedback from key stakeholders
- Learners' self-assessment of competences
- Mapping the learners' learning goals and competence development
- Reflection sessions

Furthermore, the NMBU team implemented a peer-mentoring program, which can be read more about in the previous case development report (D2.5).

During this implementation cycle of the case work, the NMBU team had the challenging task of both running the course as usual and adding the task of mentoring the other cases in the Nextfood project while developing protocols and manuals for running the cases and researching them. To meet this challenge, among the measures taken were adding one more researcher to the team ahead of the next cycle.

Reflection

In the NMBU case, one workshop was conducted in order to reflect upon the first cycle and a second in order to plan the next cycle. These workshops also served the purpose of testing the process and therefore only included the core NMBU team, responsible for both running the case and doing the Nextfood research work.

When recapping the case, the data described in the previous section was distributed to the participants of the workshop ahead of the initial workshop and the following question was posed at the beginning of the reflection workshop: "In the data from the first cycle, what was the most surprising, what is the most interesting to build on, and why? The ensuing discussion focused on the lack of overlap in learning goals between the teachers and the students.

Building on the outcome of the reflection workshops we planned to improve the course script, descriptions of the rationale of the course and be better prepared for the coming cycle.

Cycle 2 (Fall 2019)

Planning

The planning ahead of the second cycle of the Nextfood case work in the NMBU case picked up where the reflection upon the first cycle left. Attempting to make the learning goals of the course in general and the course sessions more clear, several small changes were made to the course facilitation. We aimed to make it even clearer to the students that the course, titled “Agroecology: Action learning in farming and food systems”, is actually an action learning course and will therefore be substantially different than what many students might be used to from more traditional university course.

To achieve the desired change, we revised course documents, made clearer divisions of responsibilities within our team, committed to introducing each session by explaining the relation between the session and the intended learning process, and introduced a “Monday morning jump-start”-session.

Implementation

The second cycle course ran as planned from August through December with the students engaging in various action learning activities, with a focus on two case projects. Throughout the course, data was collected on student experiences with the course, with partially successful attempts of also collecting data on teacher experiences.

Regarding the efforts of making the course objectives more clear to the students, we experienced that most students were more aligned with the course objectives than in the first cycle. However, some students were still surprised by the relatively minor emphasis on acquiring theoretical knowledge on food and farming systems in general. It appears that some students still are not prepared for the action learning approach. The “Monday morning jump-start”-sessions were not particularly successful. The idea for these sessions were to start each week with a recap of last week and a short introduction and conversation focused on what the ensuing week would entail. Unfortunately, many students chose not to be present during these sessions and in the evaluations, students gave a very mixed evaluation.

Reflection

After the course ended, the NMBU Nextfood team focused on establishing instructions for how to categorise and analyse findings from the research activities during the implementation phase of the case work. During this process, we studied the data from the second cycle of implementation. Setting aside a lot of time and effort to really look into the data gathered proved very useful as it allowed us to truly reflect on the experiences and not just recollect the experiences.

The intention of the reflection phase was to conduct a reflection workshop with the data analysis forming a basis for a dialogue on what we learned from the course. However, the covid-19 situation interfered with our plans. With the uncertainties of how the next cycle of the case can be facilitated, most of the case development focus is target to finding practical solutions to covid-19-related problems.

3.2 Romania - Oradea

3.2.1 ID card

Title: Romanian Multi-actor Approach to Sustainable Food Innovation

Level of the course: Mainly Bachelor level but it is also addressed to highschool students. There are two categories of learners with a total of 24 persons involved: 12 highschool students and 12 university students.

Course language: Romanian

Host institution: University of Oradea

Course leaders: Lect.dr. Adrian Timar, Assoc.prof. dr. Anamaria Supuran

Timeline of the activities covered in this report:

31st of May 2019 *First Course* - New foodstuff on the global market
6th of June 2019 *Second Course* - Overview on food products
13th of June 2019 *Third Course – Overview on* raw materials
12th of Sept 2019 *Fourth Course* – Raw materials composition
26th of Sept 2019 *Fifth Course* - Natural bioactive compounds
10th of Oct 2019 *Sixth Course* - Machinery used in agrifood sector
24th of Oct 2019 *Seventh Course* – Handling equipment and infrastructure
7th of Nov 2019 *Eighth Course* - Projecting new foodstuff
22nd of Nov 2019 *Ninth Course* - Production flows Bakery and Diary foodstuff
1st -4th of Dec 2019 National Student Conference "Ecotrophelia"
3rd – 5th of Dec 2019 *Innovativa* Young Scientists International Conf. IXth Edition
05th of Dec 2019 *Tenth Course* - Avanced sensory analysis for raw materials part 1 - animal origin
11th of Dec 2019 "The Future Sounds Good" Local contest in eco-friendly food product development, organized by "Mihai Viteazul" Vocational School
12th of Dec 2019 *Eleventh Course* - Advanced sensory analysis for raw materials part 2 - plant origin
24th of Jan 2020 – Twelfth Course - Advanced sensory analysis for foodstuff part 1- foodstuff
24th of January – Thirteenth Course - Advanced sensory analysis for foodstuff part 2 – drinks
20th of February – Fourteenth Course - Producing natural extracts
25th of February – Fifteenth Course - Food safety implementation part 1 - Risk Analysis
20th of March – Nineteenth Course - Food safety implementation part 2 - HACCP plan – online
26th of March – Twentieth Course - Economical assessment of the new foodstuff online

3.2.2 Status

From lecture hall to a diversity of learning arenas

One of the shifts that the students considered appropriate during the workshop organized with the Norwegian partner was that of the learning arenas. For this reason, 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 "Mihai Viteazul" 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.

The obstacles encountered when changing the learning arenas were those related to the travelling of highschool students. Being under 18, they needed several approval documents from parents and school to travel from home (some highschool students are leaving at about 40 km from Oradea) to Oradea or to attend the field trips, fact that made the process more difficult. Even the time needed to travel to Oradea and the money necessary for paying the tickets to travel to Oradea were mentioned by the students as obstacles.

We also encountered delays due to the fact that the holidays and study period for the highschool students are different from those for the university students, the vacations were in the middle of the course, there were a lot of free days based on legal free days (most of them based on religion), there was also because some of the participants have different religions and the religious free days are not simultaneous and also students have exams in some months. 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. Since the first week of March, all the schools and universities are closed in Romania. The emergency state is declared until the 15th of May, thus there will be no face-to-face activity before this date.

The way in which we are going to overcome the above mentioned obstacles are: the course duration will be shortened, the number of participants will decrease in order to avoid the mismatching of the schedule. The situation caused by the Covid 19 made us think about the organization of the last session on-line. It remains to decide how we could organize the final evaluation and the workshop on reflection.

The facilitators learnt from this experience that changing the learning arenas is beneficial for all the students because it can stimulate and accelerate the educational process by exposing the students to different environments.

From lecturing to co- and peer learning

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.

The obstacles that interfered with this co-working/co-learning environment was 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.

We learnt that every person’s contribution is valuable and every person involved has its definite place within the group.

Other important aspect is that the continuous guidance provided by the teachers (highschool and university) and key stakeholders is also vital in the students’ orientation for their future jobs: the highschool students could decide to continue their studies in the university and get a Bachelor Degree while the university students could decide 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.

From syllabus to supporting literature/a diversity of learning sources

One of the most discussed topics at the beginning of the course (by our students, facilitators and key stakeholders) is 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 allow them to undertake practical activities (eg. educational farms, internships).

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 project, the learning activity can be successful and rewarding.

From textbook to a diversity of teaching aids

Teaching aids – softwares, apps, smartboards, specific furniture/equipment, ppt presentations, quizzes, serious games (board/digital games), portfolio, projects, innovative technologies

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

There were no real obstacles in using these teaching aids. It just took some time for the facilitators to learn how to use the serious game Simplycycle and to identify the most useful aids for the groups they guided. The students enjoyed experiencing new learning forms, fact that was obvious in the way they have got involved, the way they discussed about it and it was also mentioned in some of their diaries. The facilitators explained the importance of each questionnaire and thus, even if sometimes it took us more time, the evaluations were filled in with patience and care.

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

From written exam to a diversity of assessment methods

In the case of our course, the formal assessments methods used so far 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 a presentation followed by a session of questions.

The students' activity was continuously informally assessed when participating in the face-to-face sessions, conferences or food contests.

The students didn't expect so many evaluations during the course, but soon they realized that they are necessary for the facilitators to better design their activities (content of the course, teaching aids/methods, etc). Sometimes, they were saying that it is tiresome after a face-to-face meeting to continue with an evaluation.

The final evaluation will consist in an oral presentation of students' projects (group evaluation of the 6 projects) and a written individual evaluation that includes open-ended questions and a SWOT analysis.

From lecturer to learning facilitator

The transition from lecturer to a learning facilitator was accomplished by taking into account the prerequisites that the students considered a good facilitator should have, that is: having a good background, to approach valuable topics to be discussed within the group, to exploit the assets/competences/creativity of the group members, openness to learn altogether with the group, desire to change something regarding the teaching methods in the way that he/she should stimulate the experiential learning.

All these aspects have been discussed extensively by the facilitators and key-stakeholders before any sessions with the students to start. Each facilitator understood its role within the group and was willing to establish a comfortable learning environment by proposing some ground rules to encourage a positive group interaction (a set of 5 rules: on not being late, not using the phones, there are no right or wrong answers, to speak from experience, respect for others.

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. The benefits now are that our students feel free to ask questions, to speak more on some topics and exchange ideas.

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 Data analysis

First week (day) of the course

<u>Student's understanding, contributions and expectations</u>

At the beginning of the first week, we have sent 3 questions by e-mail to which the students had to answer in a written form. The questions were:

- 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 data were collected; the files were made anonymous; the data was transcribed and uploaded in NVivo (trial version). We created the nodes according to the instructions and we added one more node that was relevant from the first reading of the data – teamwork.

The data is going to be analysed after further instructions and after the purchase of the NVivo software considering that the trial period lasts only for 12 days. The software was not purchased yet by our Acquisition Department because all the acquisitions were postponed due to Covid 19 situation. Starting with 20.05.2020 the Romanian government decided to relax the situation in Romania but not in the educational sector.

Self-assessment of competences

During the first week of the course, we applied the self-assessment of the soft skills under the form of a questionnaire with 14 questions that had in view skills such as: communication, teamwork, decision making, critical thinking. The assessment of the core competences: reflection, observation, participation, visioning have also been assessed. In parallel, we also applied a second questionnaire that was focused on the assessment of some professional skills, such as: knowledge and experience in nutritional characteristics of some food products, food safety, taste, organoleptic qualities, packaging, marketing and communication plans.

We collected all the data from our students. Now we are in the phase of further instruction in order to begin the data analysis.

Mid-course

Student's understanding, contributions and expectations

The data collected will be analysed after further instructions. They are mainly based on the continuous assessment of students 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 and on application of 3-4 questions at the end of each session to reflect upon the learning process.

Self-assessment of competences

The facilitators decided not to introduce this mid-course self-assessment of competences considering that it will be relevant to apply it only at the end of the course.

Mid-term course evaluation (content and activities)

The mid-term evaluation consisted in the presentation of each group's project followed by a session of questions from the part of facilitators, stakeholders and the members of other teams.

Last week (day) of the course

Student's understanding, contributions and expectations

The data are still not collected because of the suspension of courses and they will be analysed after further instructions.

Self-assessment of competences

The self-assessment of the competences at the end of the course is going to be performed immediately after the facilitators receive the final projects of each team for the last feedback. According to the last developments regarding Covid-19, we will not be able to organize the final evaluation until September. The Minister of Education allows only the students that have graduation exams in schools and universities. The Universities must organize all their activities on-line until September. Thus, we are obliged either to wait until September or to organize the final evaluation on-line.

Final course evaluation

The students' activity was continuously (informally) assessed when participating in the face-to-face sessions, conferences or food contests by the facilitators and key stakeholders involved in the course.

The final evaluation will consist in an oral presentation of students' projects (group evaluation of the 6 projects) and a written individual evaluation that includes open-ended questions and a SWOT analysis.

Students' final documents

Stakeholder document(s)

The stakeholder documents were not collected yet from the persons involved in the course. We expect to collect them after the final evaluation (May-June).

Reflection document (individual)

The reflection documents were not collected from the students yet. We expect to collect them after the final evaluation (May-June). At the beginning of the course and even during it, the facilitators helped the students in writing their diaries (learner documents) by offering them guidance in the field of reflexive writing. We gave them several examples in reflexive writing accompanied by a set of minimum rules (e.g. using the first person singular, describing their experiences filtered by their own conscience, etc) so that they could applied it.

Comments from the main stakeholder in farm, food, or forestry about

This section is going to be fulfilled immediately after the final evaluation (May-June) under the form of an interview.

Teachers' final documents

Reflection document

This data will be collected after the final evaluation (May-June).

Institutional factors affecting higher education

A written report of the focus group interview on institutional factors.

Demographics

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

3.2.4 Cycle report

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 highschool and continuing with the University (BSc, MSc, PhD). The education provided in highschool needs to be completed and refined 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 highschool 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.

The next cycle planning will take into account a better matching of the students’ schedule and a more flexible approach.

Implementation

The most useful aspect was related to the discovering 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. Thus, the next cycle will start in October and will be more intensive. We planned to increase the course duration from 2-4 hours to 4 - 6 because our initial assumption that after 2 hours the participants lose attention, was not quite right due to the innovative aspects and practical activities conducted. This will allow us to shorten the cycle duration at half. Also we planned to reduce the number of participants to 3 teams and also the number of participants per team at 2 or 3 in order to decrease the schedule mismatching. Also this structure of the new cycle will allow us to provide more reflection time for the participants.

The COVID 19 experience in the online teaching was promising and we are thinking to switch at least for some sessions to this approach by using Skype.

Reflection

After each session, the students had 15 min of reflection time on 3-4 questions on the learning process.

We planned to organize the reflection workshop at the end of the course but because of the situation caused by Covid 19 we still need to wait for the beginning of the courses.

3.3 Ethiopia - Mekelle

3.3.1 ID card

Title: Learning from Farmer Training Centers: Multi-stakeholder learning platform

Country/Institution: Ethiopia

MSc in Agroecology and Sustainable Development (Course language in English) Mekelle University

May 2019-April 2020

3.3.2 Status

From lecture hall to a diversity of learning arenas

The steps:

We planned students to learn from real life experience of farmers outside of the class room, develop case report that will help them to reflect on the present and future situation of the farming and food system. To let students learn from outside classrooms, the course teaching team in the MSc program for Agroecology and sustainable development, discussed about how to engage the students in such arenas provided that the current curriculum design does not need much change to avoid administrative interference from the university management body.

In the beginning, the linkage between the courses and suitable courses that would enable diversity of learning arenas were selected from the MSc program. For this purpose two practical courses i.e. Agroecological innovations and practices I and II were selected. The two courses mapped and planned to support all other courses in the two semesters to use the input from these practical courses. The Agroecological innovations and practices I course is the first semester course while and II was second semester course. The existing course guides for the two courses was updated to include the core competences of the Nextfood (NF) approach. Before delivering the two selected courses students filled out the initial self-assessment survey one day before the orientation. Then, students and course instructors meet for each semester for orientation to brief how the course can be delivered and how the other courses are interlinked in the updated plan. After the briefing, the students and course instructors then traveled to the selected farmers’ training centers (FTC). May Megelta FTC was selected for the first cycle of action learning while Arato FTC was selected for the second cycle. Students and instructors met at the FTC committee and farmer advisors (extension agents) to describe the present situation of the farming system (Innovation I) and the food system (innovation II). Students started the dialogue at this event. The FTC committee and extension agents together selected individual farm households which would be from the male headed, women headed, model farmers, non-model farmers to be our student client farmers. After the discussion, transect walk was carried out by the students and instructors together to start using the observation and dialogue competences. After the transect walk, the students remained with their client farmers to do their course case work in group of two students for the first cycle students and three students for the second cycle students depending on the number of students admitted in the academic year. On the 10th day, students presented their case work at the FTC in the presence of their client farmers, FTC committee, course instructors and extension agents. All other stakeholders in this meeting showed their perception about the students' work and gave suggestions to each other about the farming and food system of the area. Finally, students returned to campus, submitted their client document for evaluation, and filled out the self-assessment checklist. After a week, the students again called for reflection sessions individually and in group to reflect on the process, and their learning outcomes.

What are the indications that these steps are having the desired effect?

Each steps and activities helped the educational activity and brought the desired effects. The planning phase helped students and instructors to continuously learn from the case work at the FTC in other courses. Other course instructors provided student assignments from the case work and students continued to develop the core competencies of the Nextfood. The course orientation and guideline helped all participating stakes to work on their responsibilities. The excursion and Joint transect walk created the opportunity for students to get diverse learning arenas, such as dialogue, observation, participation with client farmers and peer. The presentation also helped students to cross check the present situation description, learn from different farm owner visions and practices. Client farmers were happy during this process and actively reacted to the students work. Reflection session helped us to see how students are being supported in the learning process and what obstacles they were facing.

What obstacles, if any, need to be addressed?

Even though all course instructors were invited to attend both the first and second cycle of action learning, it was a challenge to get all involved due to the time the course takes. The course schedule for Agroecological Innovations and Practices II course was on June 2019 which did not coincide with the project (Nextfood) reporting period which was in May 2019. The sustainability of the program might be challenged due to its high cost if implemented continuously in the future after the project period.

What I/we in our team need to learn more about is:

While running the action learning activities the issue of what exactly students were learning was one challenging situation that need more time and effort to investigate. In addition, we have to make sure that the students are learning through all the learning arenas including the additional reference materials. We must also adjust the course content and the curriculum of the program to meet the university requirement and incorporate the NF core competencies.

From lecturing to co- and peer learning

The plan

In the plan of the action learning activities, transect walk, grouping students to do the case work, presentation in front of all stakeholders and the student group reflection sessions were planned to encourage co-learning and peer learning among students and stakeholders.

What are the indications that these steps are having the desired effect?

The students case development report was one of the indicators that showed us the peer-learning outcomes as indicated in the result section. In addition, the major shifts were evaluated by the students how useful these were in their case development process during the group reflection session. The students were able to judge their competence development from the self-assessment checklist.

What obstacles, if any, need to be addressed?

Time shortage for all stakeholder involvement was the main obstacle to learn better from the planned activities. Students were also constrained by time shortage to develop better reflection document.

What I/we in our team need to learn more about is:

The major issue that the team would like to learn more about were; which learning arena facilitated better co- and peer learning for students? And how to assess the learning process with the program objective at the same time?

From syllabus to supporting literature/a diversity of learning sources

The steps:

Students were provided additional reading materials after the course orientation. In addition, preliminary discussion at the FTC was held with FTC committee and extension agents to help them describe the present situation. During the students field stay with the client farmers, extension agents were guiding them to help understand the local situation. The field stay for 10 days help them discuss, observe and reflect on individual farm cases that helped them to grasp aspects of the food and farming system.

What are the indications that these steps are having the desired effect?

The students' case development report quality, the reflection of students on the major shifts and the self-assessment checklist provided evidences to cross check the students' learning outcome.

What obstacles, if any, need to be addressed?

There were no prior examples whether the students learn from diversity sources is better than the syllabus or not.

What I/we in our team need to learn more about is:

What came to our mind in the team was which learning source helped students better to do their case development and met their learning goal? And does it fit to all situations or only for few occasions in the learning process?

From textbook to a diversity of teaching aids

The steps:

In the educational activity, we used transect walk across the farmlands, visit at the local market to see the farm products, discuss with client farmers and FTC committee, reflection session individually and student presentation together with all stakeholders, using models and metaphors.

<u>What are the indications that these steps are having the desired effect?</u>

Students showed improvement in their case development report organization and content. In addition, the self-assessment checklist they filled out individually showed improvement. The individual and group reflection also showed the usefulness of the teaching aids in their learning development. The client farmers indicated that this opportunity created learning platform for themselves and witnessed the students understood what they told them.

<u>What obstacles, if any, need to be addressed?</u>

The teaching aids used were not sufficient to be used in the rural setting for farmers and students.

<u>What I/we in our team need to learn more about is:</u>

The team finally came to understand that there is a need to assess the students' level of understanding on the relevant theory and principles. In addition, the students' effective time management during the case work matters on how much they learn. These things have to be clear in the next cycle plan.

From written exam to a diversity of assessment methods

<u>The steps:</u>

The students were given guideline for the preparation of the case development report. In the guideline what is expected from them was clearly indicated. In addition, students were informed to develop more than one case to be used for other courses. Finally the course assessment was done based on the case report evaluation and the presentation done in front of the clients and FTC committee at the FTC.

<u>What are the indications that these steps are having the desired effect?</u>

The effectiveness of the presentation assessment methods was commented by the client farmers and FTC committee. Students also appreciated the evaluation process even though the focus was limited to understanding the real life situation at the farm and food systems not basic theory. Students commented on the assessment method during the reflection session and in their report.

<u>What obstacles, if any, need to be addressed?</u>

The main obstacle in the student assessment was that the client farmers and FTC committee view point was not included in the student grading due to the university policy that doesn't allow farmers to evaluate students.

<u>What I/we in our team need to learn more about is:</u>

In the beginning it was planned to evaluate students' performance by all course instructors however other course instructors couldn't stay until the end of the educational activity due to other duties. The team started to ask how to make all instructors stay together with the students to evaluate student performance.

From lecturer to learning facilitator

The steps:

To see how the course instructors were learning facilitators or not, it is important to look at the major steps followed during the above shift description (under the shift from lecture hall to diversity of learning arenas). In this description the course instructors were becoming learners and facilitators of the process. To do this course guidelines were prepared to include orientation, visit at the FTC farms and demonstrations, transect walk at the farmlands, student stay with the farmers for 10 days to learn about all the farming and food system activities and finally prepare student presentation in the presence of their client farmers and FTC committee. In all these activities the course instructors were facilitating the learning process by providing guideline, asking questions, backing up students with additional reading materials and theoretical background in the orientation. In this process students learn from the present situation description of the individual farm systems and community food systems during the second and first cycle respectively.

What are the indications that these steps are having the desired effect?

The effectiveness of the processes taken in shifting instructors from being lecturer to learning facilitator was evaluated by the instructors during the reflection session and the students' self-assessment response indicated on the result section.

What obstacles, if any, need to be addressed?

The major obstacles we faced in the process were not all instructors were happy about being a facilitator due to the reasons that students learning from real farm or FTC demonstration requires more interdisciplinary knowledge and the tradition of lecturing was dominant. This created uncomfortable environment as observed from some instructors. In addition to covering few issues in the syllabus it requires long time stay in the field by both the students and instructors. This time shortage was an extra burden for instructors.

What I/we in our team need to learn more about is:

The process of transforming from lecturing experience to being learning facilitator experience brought some questions in the mind of the team facilitating the process. There is a need to measure how effective is learning among the students and other participants while following the facilitator role. The question of how to manage being a facilitator in a large class size such as greater than 15 MSc students per class was a concern. Finally the issue of being equitable during the evaluation of the students learning when we are facilitators were the concerns in the next cycle implementation.

3.3.3 Data analysis

First week (day) of the course

Student's understanding, contributions and expectations

Students' expectations from the course and the MSc program was collected one day before the students received the orientation about the Agroecological Innovations and Practices I and II courses. The expectation of these students was mapped and compared to what the students identified as learning outcomes from the course activities. The expectations of the first and second cycle of students were listed on Table 1. The issues raised by the students were qualitatively judged depending on whether they focus on technical skills related to the food system (second cycle students) or the farming system (second cycle students). Whereas some issues raised were generic.

Students' expectation prior to the start of the course work for the first and second cycle bathes seems to differ depending on the course nature (see Table 1). The idea from the two bathes had similarities in terms of the their desire to get knowledge and skill which are generic to both courses such as understanding current situation, providing solutions to tackle the gaps and linking theory to practice. However it must be noted that the first cycle of students were asked these questions after they completed other courses in the first and second semester course work but before the Agroecological Innovations and Practice II course. The second cycle students were asked in the beginning of the first semester before they started any course work in the program. The purpose of the course Agroecological Innovations and Practice I was to use farming system approach to deal with the current situation analysis of individual farms whereas the course Agroecological Innovations and Practice II was designed to help students use the food system approach to describe the current situation of the individual farms and community.

Table 1: Students expectation at the beginning of the courses

Questions	1st cycle (n=4 students)	2nd cycle (n=3 students)
What would I like to learn in this course?	What is agroecology? What would be the importance of this course for agriculture? How to compare the theory that I have learnt in close with the real world? How can I explore, analyse and synthesise the reality and the theory? How can I identify the key issue of the area with its solution? I want to learn the living and feeding system of the community in practice. Learning exploration & synthesis of theory & ground reality; Problem identification Community food system.	How to change theoretical knowledge to practice. How to identify problems and gaps and provide solutions at ground level to the local community How to assess farmers' local knowledge?

What are the questions I´d like to find answers to in this course?	What is the limitation of the current agriculture related to agroecology? What is the importance of learning agroecological innovation II for agricultural experts? Addressing the main problem of the area using different methodology of assessment with participatory approach. How do we communicate with the people? What is the significance of this field work? How can we develop modelling, rich picture of the area? What procedure do we follow to conduct the interview with different group of people? How can I achieve the work? How can I get farmers' idea, develop communication skills? Develop knowledge & skill of problem identification & assessment.	How to select best and sustainable solution in a given area or farming system? How to introduce or adapt new technologies? How to improve productivity by using organic fertilizer for sustainable soil fertility? How to improve the productivity and sustainability?

The first cycle students (n=4) had experiences with regard specific disciplines knowledge, previous work experience on discussion with farmers, farmer-to-farmer training facilitation, and real life experiences by working on local farms. Some of the questions they were asking at the beginning of the course Agroecological innovations and practices II showed they were wondering what the field work would add to their previous experience since they had been working in the field together with farmers for some years. On the other hand, they still had the interest to know how the problems of a given community can be identified in participatory manner, how they get into the farmers' idea which they didn't tell them yet and what the current limitation of the agriculture sector is. This implies that from their previous work experience they were worried about the community problems. This was a motivational force for the action learning activities.

The second cycle students (n=3) had disciplinary experience in natural resource management, agricultural extension and livestock production. These students had work experience with the farmers at least for two years. The questions they had in mind at the beginning of the course were related to sustainability of soil fertility, productivity and any solution forwarded to the community to solve their problems. They also raised the question of how to introduce or adapt new technologies. These challenges are persistent in the agrarian community in the area. These questions were also energy for the students to do the case work as given during the orientation. The answer to these questions required the core competencies described in the NF approach.

Self-assessment of competences

In addition to mapping the learning goals students did individual self-assessment scoring based on the six core competences developed by the NF team i.e. dialogue, observation, participation, reflection and visioning. It was found that the first cycle self-assessment mean score ranges from 3.08-3.67 for each competency and this has no difference in the mean value. For the second cycle students the mean score ranges from 3.17-4.56 (See Table 3).

Last week (day) of the course

Student's understanding, contributions and expectations

The students were asked to give their feedback individually after completing the field work, presentation and document submitting. When these Individual reposes were seen from what they have learnt, competences gained and what they are still asking themselves, it can be seen that most of their expectation raised during the beginning of the action learning process were answered for both the first and second cycle bathes. Despite the small number of participants in the action learning process, the tendency showed that they were transforming to a different kind of questions such as career development, sustainability, integration of actors and disciplines, systemic view, participation and learning issues. At the end of the educational activity the students started thinking about their research topic on action research on topics even out of their first degree disciplinary background. They also started asking how to implement and create conducive environment for participatory decision making as indicated on Table (2). It seems that they internalized the community problems and convinced with working together with the community is the solution. Particularly the first cycle students reported that they gained more skills such as observation, dialogue, reflection, participation and visioning skills.

The second cycle students reported they gained technical knowledge and skills related to farming system. These were the contribution of the agriculture sector to the environment and the impact of agricultural technologies to the environment. These students were convinced with systemic analysis as a useful tool while working at community problems in the agriculture sector. They still raised questions of improving productivity and sustainability which they raised in the beginning of the course. Comparing the first and second cycle of students, we couldn't see the motivation and passion in the second cycle of students. The students themselves said the group composition is too few which didn't encourage them to explore more in the process. The course instructors also reflected on the problem of language barrier was more prominent in the second cycle students than the first cycle. In addition the previous courses taken by the first batch of students were useful to aware students and derive them to a more focused target. These all were indicators how we should design the third cycle of action learning in the program.

Table 2: Students' feedback at the end of the courses

	1st cycle (n=4 students)	2nd cycle (n=3 students)
What did you learn during this course?	Food system and its pillars? The limitations in food system especially in food consumption. How to describe the problem situation and selecting the key issue and leverage point. Socio-economic factors influencing the interaction. Practice of soft system methodology How to develop rich picture of the area. During (after) I have taken the course I have learnt the living and feeding system of the community, work division and farming system. Problem description & key issue selection; Understanding of community food system & household division of labour.	How to analyse the problems and gaps of the study area. How to access the farmers' local knowledge. How to assess ecosystem services of a study area by using systematic analysis method.
Which skills and competences did you get the chance to train/improve during the course?	The overall food system activities in smallholder farmers The pillars of food system What farmers do from food production up to consumption Observation, dialogue and reflection by using the method of: interview with focus group, mapping, transect walk, and key informant interview. Practicing of PRA tools Mind mapping, and being divergent during dialogue; Vision the future food system of the area. I got approaches to get idea from the farmers that means how I can take their idea. Improved understanding of food systems; Better equipped with participatory approaches of qualitative data collection & analysis	I was aware of the agricultural services in the community I knew and shared the agricultural technology their impact through other natural resources.
What are the questions I'm now asking myself?	How can I change the course agroecological innovation II knowledge into my field work & my final thesis & even for the next office work? How can I create favourable condition for participatory learning process to solve the problems sustainably? By solving the challenges, how the food system of the area become sustainable? How the role of different disciplines integrated in regard to food system? How can I organize the work? Translating knowledge & skill gained into research (thesis) work & field works after completion; Promoting participatory learning for problem solving; Integration of professions to effectively deal with food systems Ensuring sustainability	How to improve productivity and sustainability? Systematic analysis method is the key for all decision of the solutions

Self-assessment of competences

Students' self-assessment data was collected at the end of the course. Students' self-assessment result was compared for each cycle of action learning activities as indicated on Table 3. The result showed both cycle students' undergone significant improvement in the overall development of the competences. This improvement was significant in all the criteria for the first cycle students but the second cycle student didn't show improvement in two the "participation" competence categories.

Table 3: self-assessment score for first and second cycle educational activities

Competence	First cycle				Second cycle			
	First day	Last day	change	Sign	First day	Last day	change	Sign
	Mean (n=4)	Mean (n=4)			Mean (n=3)	Mean (n=3)		
Dialogue	***3.67***	***7.33***	***3.67***	***	***4.83***	***7.00***	***2.44***	***
Distinguish between a debate and dialogue	3.50	7.25	3.75	*	4.00	7.33	3.33	**
Set formal roles and competencies aside when needed in a conversation	3.75	6.75	3.00	*	4.67	6.33	1.67	*
Understand and respect other people's views	3.75	8.00	4.25	**	5.00	7.33	2.33	*
Observation	***3.08***	***6.92***	***3.83***	***	***3.11***	***6.67***	***3.56***	***
Allow for examination of the whole situation before drawing conclusions	2.50	7.00	4.50	**	2.67	6.33	3.67	*
Carefully observe a situation in the field	3.50	7.00	3.50	**	3.33	6.33	3.00	*
Display such a situation as a rich picture	3.25	6.75	3.50	*	3.33	7.33	4.00	
Participation	***3.58***	***7.50***	***3.92***	***	***3.78***	***7.00***	***3.22***	***
Empathize with the goals and feelings of stakeholders in the field	3.50	7.75	4.25	**	3.33	6.67	3.33	ns
Participate in work "out in the field" with commitment and dedication	4.00	7.75	3.75	**	4.00	7.67	3.67	**
Recognize values and goal conflicts of different stakeholders in society	3.25	7.00	3.75	**	4.00	6.67	2.67	ns
Reflection	***3.40***	***8.00***	***4.60***	***	***3.60***	***6.87***	***3.27***	***

Awareness of the role of reflection in personal learning and development	3.50	8.00	4.50	**	3.67	7.00	3.33	**
Connect experiences and theory to own personal development	3.25	7.75	4.50	***	3.67	7.33	3.67	**
Connect situations in the field to theory in sustainable agriculture as well as to personal growth	3.00	8.25	5.25	***	3.00	6.33	3.33	**
Knowledge about sustainable agriculture	3.75	8.50	4.75	***	3.67	7.00	3.33	**
Self-guided learning	3.50	7.50	4.00	**	4.00	6.67	2.67	*
Visioning	***3.25***	***6.38***	***3.13***	***	***3.17***	***7.33***	***4.17***	***
Articulate innovative ways of approaching challenges met by stakeholders in society	3.50	6.25	2.75	**	3.33	7.33	4.00	
Envision situations that do not exist yet	3.00	6.50	3.50	**	3.00	7.33	4.33	**

significance: *= means $p < 0.05$; **= means $p < 0.01$ and *** =means $p < 0.001$; n.s.=means not significant.

Students' final documents

Three students from the first cycle and two students from the second cycle reflected on the processes taken during the action oriented learning activities. The evaluation considered the content, process and effect of the process. The responses are indicated on the Table 4. The second cycle students evaluation of the content, process and effect of learning during the Agroecological innovations and practices I course (n=3 students).

Table 4: Students reflection on the course delivery

Questions	Student response from the 2nd cycle
Looking back at the course, what have you found useful, inspiring, interesting?	The core competencies introduced during the learning process such as dialogue, participation, reflection, observation. The concept of sustainability encompassing economic, social and environmental dimensions The orientation day The visit and interview with farmers
What did you observe that made you want to look deeper into it, and why?	Observation and dialogue made with farmers house to house Exploring the indigenous knowledge of farmers about sustainability
In what ways did the visit inspire you to improve your group work project?	The observation, peer-learning, the visit and individual reflection The composition of the client farmers who were 50% model and 50% non-model and also male headed and female headed. The rich experience of the farmers helped greatly to do our task

What three things would you do differently in the pursuit of its key learning goals?	Increase the number of students for better group learning The time issue
What were the forces—by theme/key issue—supporting or hindering the implementation of the Nextfood approach?	The visit was done in the beginning which was difficult for us to focus on what is important for our courses We do not have sufficient technical report writing skill to summarize what we get from the field

The students also reflected on where the course delivery lies in the continuum from traditional to experiential action-oriented education.

Table 5: 2nd cycle students evaluation of the shifts during the Agroecological innovations and practices I course (n=2 students)

Current	1	2	3	4	5	6	7	8	9	10	**Future wanted**
Lecture hall										🟦	Diversity of learning arena
Lecturing										🟦	Group reflection/peer learning
Syllabus								🟦			Supporting literature
Textbook								🟦			Diversity of teaching aids
Written exam								🟦			Variety of assessment methods
Lecturer										🟦	Learning facilitator

These students were also asked to reflect together on the impact of the action oriented learning process in the case work. They reflected that the process helped them

- To relate theory to practice easily
- Innovate on the existing real-life problems
- To identify root causes for the problems
- To look for solutions for emerging issues such as gender aspect

Students were also asked to reflect on how they were using the core competencies during the course delivery time. Each student was asked to rank the importance of the core competencies to the case work from 1 to 5 Likert scale. They put the following remarks on the six core competencies.

Dialogue: The dialogue they did with the client farmers helped them to participate more in the situation analysis and do more careful observations. During this time they were exercising the facilitator role. The two students rated this competency between 1and 2 out of the five rank.

Observation: Students said observation was another crucial competency that helped them to even identify the feeling of the client farmers from their faces. They raised the issue of gender equality at the client farmers' home due to this observation. Some women were not able to talk to them in the absence of their husband.

Participation: The dialogue and observations made the students to be more genuine part of the discussion. However there were some cultural barriers that hindered their participation level.

Reflection: Students said the reflections session helped them to identify new problems again and ask good question for during the dialogue. This competency was rated between 3 and 4 by the two students.

Visioning: This competency was rated at 5th rank by both students. However during the reflection session itself, they came to conclude that the shared vision about “sustainability of the farms” that opened up the way for the discussion platform.

Comments from the main stakeholder in farm, food, or forestry about

The main stakeholders during the experiential action based learning process for both the first and second cycle students were client farmers selected from model farmers, non-model farmers, male headed farmers and female headed farmers, development agents (farmer advisors), FTC committee members and NGO representatives. These stakeholders contributed to the students’ learning during the case works for the two selected courses (Agroecological Innovations and Practices I & II). The stakeholders contributed from the beginning to the end of the 10 day case work that students accomplished. The results presented here were the feedbacks collected during the student presentation of the final results. The farmers didn’t get the reports but the presentation was prepared in local languages to be understood by all stakeholders.

Usefulness of the student work

Farmers from the second cycle explained the usefulness of the student work in terms of its mutual learning opportunity. One client farmer explained its importance as:

“*What is presented hereby the students is correct information. The gap identified is also true. I need to plant fruit trees instead of planting Eucalyptus only that I inherited from my parents. I learned this in this meeting*” (Mr. Seyoum, client farmer).

According to Mr Seyoum, farmers started to learn about the benefit of growing fruit trees in place of Eucalyptus tree at the irrigated farms. This was not the culture they inherited from their parents.

Another client farmer from the first cycle of implementation stated that the lessons that are being generated during the discussion with students, teachers, development agents and farmers might be useful to address the problem of farmers in Tigray regional state. He stated the importance of the lessons learnt as follows:

“*This lesson is very important. It should be continued to other part of Tigray. I expect to get this lesson organized into policy level for all Tigray region*.”

The farmer had huge enthusiasm on the way the students interacted with him and perhaps the dialogue they had with them. The expectation of the farmer was until he got the lesson as policy level. His expression indicated that the discussion has changed something in his life that might need continuous follow-up in the future.

Farmers’ response showed that the students approach as being facilitator was appreciated during both the first and second cycle activities.

"*The students approached as real learners. I appreciated their approach. They should continue the same way to other farmers as well*" (a man from second cycle feedback)

"*Attractive! If this lesson came early, we would have done very well. These blessed students come and wake me up. They comforted me. It's very good.*" (A woman from the second cycle)

The quality of the student work

Farmers also explained that students' grasped the points they discussed during their 10 days stay with farmers. Many of them were satisfied with the quality of the information presented. During their stay the process also satisfied farmers. A farmer from the second cycle explained his feeling like this "*These students who were training us also enriched my mind*." Farmers in this regard considered is a new way of learning together. A farmer from the first cycle said training for farmers need to be given for both the husband and wife together to sustainably contribute in their farm development.

"*For example, I plant Eucalyptus, so my wife should not take out the cow dung and manure. She had to help me with what I was planting. But we couldn't go together. The solution was that she had to be trained with me the day I was trained. So if we go with this, the government is doing well. A farmer is a king.*"

Teachers' final documents

Reflections were made with in each cycle to rethink about meeting the course objectives, student performance in the case work and other courses. The reflection session brought some changes in the subsequent cycles. During the first cycle reflection it was found that few number of instructors (only 3) were participated because of the time implementation of the case work was during scheduled during the final examination time where many instructors were occupied. In addition, students had high enthusiasm to work with the case but had short time to work more. As a result, the time of implementation for the second cycle was changed to the beginning of the semester before all other courses were started. Similarly, some drawbacks were observed in the second cycle where students' had poor technical background on report writing even though they got enough time to work. They needed the tools from other courses. In addition, reflection helped to take another option to compensate the low number of students which will affect the validity of the data. This was even discussed together with NMBU and SLU (the coordinator) which we finally decided to include 10 farmers from each of the five FTCs.

Institutional factors affecting higher education

The FGD data was collected from Department heads and quality assurance officers of the college of dryland agriculture and Natural Resources at Mekelle University. Before the discussion was started about 15 minute presentation of the NF approach with regard to the major intended shifts and core competencies were made by the facilitator to make the discussion easy. All participants were asked for consent and signed on the format of the NF project.

The checklist distributed to all case in the NF project was used to during the focus group discussion. The response of the discussants was targeted on evaluating the NF approach presented by the facilitator and comparing with the current university structure, political and financial interest, leadership, democratic process and innovative process. The results are presented according to these themes of the checklist presented as follows:

Structure and organization of the higher education

Under this section discussion was held to clarify whether the NF project implementation can face challenge or has good opportunity with regard to the current organizational structure at Mekelle University particularly the dominance of narrow disciplines, assessment of students and faculty member career risks.

Opportunities

The university itself is promoting shifting from being lecturer to learning facilitator which create good opportunity for NF project.

The shift indicated in the NF project with regard to student assessments will not be a problem at MU

MU has been training staffs on HDP (Higher Diploma for Pedagogy) to introduce the most of the NF approaches. This will be an opportunity for the NF due to the large number of staff trained on the pedagogy training.

Challenges

«The government is encouraging centre of excellence, which follows more specialized approach. This may pose challenge in my view.»

Our curriculum courses are mainly disciplinary in nature. It might require the university or academic unit to revise its curriculum to entertain the NF approach in may programs.

The diversity of assessment methods of the NF project may demand more time that makes it difficult for entertaining large class size.

With those opportunities and challenges mentioned during the discussion, the participants rated which aspect can tend to be opportunity or challenge based on the checklist points on Table 6.

Table 6: Structure and Organization of the higher education (n=9)

Factors	1	2	3	4	5	6	7	8	9	10
The dominance of narrow disciplines			5			4				
Student assessment	1	5	3							
Faculty member career risks			1	1	5		2			

1= towards this number means it is a challenge at MU; 10= towards this number means it is an opportunity

Political and financial interests

The theme of this section was explained according to the factors such as funding opportunities for interdisciplinary research & education, private or public funding, and collaboration with society and quality assessment of higher education.

Opportunities

The NF approach is in line with goal of the higher education quality assurance strategy in Ethiopia in terms of linking students with farmers. This is an opportunity for NF.

The political commitment in Ethiopia currently supported the strengthening of FTCs and program auditing of higher education for improvement that can take up some of the NF approaches further.

The university is encouraging interdisciplinary researches since the past 2-3 years which may be an opportunity for NF approach implementation.

The experience of the College of Dryland Agriculture and Natural Resources in the mid-career training can be an opportunity for NF since the approach has more similarity.

Challenges (score presented Table 7)

There might be some bureaucratic issues during the implementation phase.

The NF approach is more of interdisciplinary which demands more budget than the usual way of working since students will be working outside the campus for some time.

The lack of careful planning may double or triple the budget required for implementation.

Table 7: Political and financial interest rated (n=8)

Factors	1	2	3	4	5	6	7	8	9	10
Funding of interdisciplinary research and education				1	5		2			
Private and public funding		5	3							
Collaboration with society								2	6	
Quality assessment of higher education					2	5		1		

1= towards this number means it is a challenge at MU; 10= towards this number means it is an opportunity

Leadership of higher education

The specific factors raised for discussion under this section were the need for high-level administrative support, type of leadership shared/hierarchical, vision and goals of the university with regard to NF approach implementation.

One of the discussants said the NF approach can take us one step forward to meet our university goal in terms of what we aspire to achieve our student-oriented teaching learning process. The NF approach was appreciated for making desired changes in the agriculture sector. If implemented as planned, this approach can help the university bring impact in the farming households.

Opportunities

The NF approach will help the university to achieve its vision by 2025 due to the fact that it helps to bring impact in the community.

The NF will fill the current gap in the teaching and learning process

Challenges

Ownership of the implementation process may not be easily achieved with the current hierarchal approach.

Table 8: Leadership of higher education (n=7)

Factors	1	2	3	4	5	6	7	8	9	10
The need for high level administration administrative support					5	2				
Type of leadership shared/hierarchical							5	1	1	
Vision and goal of the university								2	5	

1= towards this number means it is a challenge at MU; 10= towards this number means it is an opportunity

Democratic processes

(Accessibility to education, gender equality, transparency of higher education)

The discussants suggested that the NF approach can promote gender equality and high degree of transparency but it will be difficult to convert the teachers from being lecturer to learning facilitator. However the good thing is that after long struggle in the university some external projects introduced even new education programs and courses in all the curriculums of the agriculture college.

Opportunity

Because the NF engages in practical skills where both men and women can be addressed in their daily activities.

The NF approach encourages evaluation based on participation of individuals. All outputs of students can be seen by many stakeholders. This imporves transparency

Challenge

Since the NF approach requires additional budge this might reduce the total number of student that will be admitted when there is high demand. As a result it might affect access to education.

Table: Democratic process rated (n=7)

Factors	1	2	3	4	5	6	7	8	9	10
Accessibility to education					7					
Gender equality							1	5	1	
Transparency of higher education				1	2	4				

1= towards this number means it is a challenge at MU; 10= towards this number means it is an opportunity

Innovative capacity (Process for the initiation of something new. Acceptance from university and the society to new approaches).

According to the discussants the NF approach has interesting ideas with its shift strategies in the education system that will create innovative capacity for both students and teachers. They also assured that these shifts are what the university has in its agenda. They suggested that during the interaction of farmers and students this approach will also help farmers to be innovative too. The callenges in this regard could be:,

Currently our students and teachers have poor motivation for education

The implementation requires extra effort to convince the university management for wider acceptance in the university programs.

Table 9: Innovative capacity rated (n=7)

Factors	1	2	3	4	5	6	7	8	9	10
Process for initiation of something new					1		3	3		
Acceptance from university						1		2	4	
Acceptance by the society							5	1	1	

1= towards this number means it is a challenge at MU; 10= towards this number means it is an opportunity

Demographics

Table 10: Demography of participants in the two action learning cycle

Demographics	**Gender**	**1st cycle**	**2nd cycle**
Number of students starting the educational activity	**Male**	**4**	**2**
	Female	**0**	**1**
Number of students passing the educational activity	**Male**	**4**	**2**
	Female	**0**	**1**
Number of students with more than three years of experience	**Male**	**4**	**1**
	Female	**0**	**1**

3.3.4 Cycle report

Cycle 1

Planning

The planning phase for the first cycle was started during the kick off workshop in March 2019. During this event instructors and experts from outside of the university described the present situation of the education system based on the continuum of the major shifts. The boundary of the system was set and the focus was mainly decided to be on students learning but with farmers and development agents as contributors in the learning process. The major obstacles during this phase were low female participation, institutional factors and lecture based tradition of teaching. However, frequent discussions on the merits and demerits of the traditional teaching method has been reduced on the participant instructors which implies that learning within the instructors has role to change their traditions. As a result, involving more course instructors under the MSc program of Agroecology and sustainable development was recommended.

Implementation

The implementation phase was started with mapping the learning goals, initial self-assessment scoring of students and orientation at Maymegelta FTC in the presence of the three course instructors. The present situation description was made with about one hour discussion together with the FTC committee, development agents, students and instructors. The process was documented for later reference. After ten days students presented their case report in local language in the presence of the client farmers, FTC committee, development agents and instructors at Maymegelta FTC. This event helped the facilitation of peer learning for farmers, development agents, students and instructors. However the small number of students short time allocated for the course and limited number of instructors joined the team during the visit were the major obstacles. As a result, the time to conduct the second cycle of action learning was suggested to be conducted in the beginning of the semester before students took other course. Finally, students were evaluated for the course and made self-assessment at the end. Despite the need for further triangulation, students seemed improved with in all competencies.

Reflection

Reflection was made with students as one group and instructors as separate group. Since the student completed the course work for the program, it was difficult to conduct joint reflection session with instructors. As an emergent outcome of the reflection session students and instructors decided the thesis topics to be related to the issues the students identified related to their case work topic done during the experiential based action learning event.

Cycle 2

Planning

No second workshop was organized to describe the present situation of the teaching learning process after the first cycle. It was assumed that most of the hindrance and supporting forces were not changed. However reflection was made on the process and student performance with course instructors. From the reflection sessions, it was identified that the students' performance during the second cycle was relatively lower than the first. Two main reasons were suggested by the instructors 1) the action oriented learning case work was done in the beginning of the first semester where students were new to teaching learning process; 2) The number of student was very low which hindered peer learning process. However it created good opportunity for students and teachers to use the experience gained in the case work to make students participate in other course works.

Implementation

Similar to the first cycle the implementation phase was started with mapping the learning goals, initial self-assessment scoring by students and orientation at MU campus in the presence of the five course instructors. Additional description about the NF project and the core competency definition was provided to this bath of the students by NMBU staff during the orientation. According to the course curriculum, the students were expected to use farming system approach to do their case work. The present situation of the farming system description was started at Arato FTC together with the FTC committee, development agents, students and instructors. Transect walk carried out by instructors and students together to supplement the information. After ten days students presented their case report in local language in the presence of the client farmers, FTC committee, development agents and instructors at Arato FTC. During this activity, students were evaluated for the course and other stakeholders were also evaluating how the students understood the farming system situation in the area. It was found that the learning process took place among farmers, development agents, students and instructors. There was good environment of learning platform for all stakeholders despite that the students report was not rich enough in content. This was explained during the reflection session that it was because of students were new to report writing. However the students improved this situation while they were asked to do other reports for other courses in program. This had created good case examples that can improve the participation of students during other course delivery.

Reflection

Student reflection was made individually for all courses and in group only for the Agroecological Innovations and Practices I course. Reflection was also done with course instructors. The major obstacles identified were small number of students, short time period allocated for the case course, language barrier (English at the university). Increasing the number of days for the case work in the next cycle and follow up of the farmers and development agents leaning process was decided to be part of the next cycle task.

3.4 Austria - ISEKI

3.4.1 ID card

Title: Case 4 Supply Chain Innovation Competition. **“**FoodFactory-4-Us: Sustainable Supply Chain 2019 – Cycle 1: Sustainable Aquaculture, Cycle 2: Sustainability in the Cereal Chain”

Type: Online student competition

Level of the course: Master Students

Course language: English

Host institution(s): ISEKI-Food Association

Course leader(s): Katherine Flynn, Line Lindner & Christoph Knöbl

Timeline of the activities covered in this report (June 2019-April 2020)

Initial planning
July 2019: a meeting internally and with our co-organiser ICC (International Association for Cereals Science and Technology) in Vienna.

September 2019: Creation of the competition advisory board made of HE, agrifood association representatives and industry representatives.

October 2019: Identification and selection of the topic in an online meeting with the Advisory Board members.

October 2019: Design and development of training material (learning outcomes, contents), definition and planning of the series of webinars. In parallel, development of final rules, procedures, timing of the competition as well as dissemination materials.

Implementation

October 2019: Opening of the call for student teams until end of October 2019.

31st October 2019: Acceptance of the teams

November 2019 – mid-February 2020: Complimentary online trainings:

7th November 2019: Webinar 1- Introduction to the Competition

20th November 2019: Webinar 2 – Student Presentation Webinar

3rd December 2019: Webinar 3 – “Virtual Visit” Webinar

17th January 2020: Webinar 4 – Student Suggestion Webinar

Week of 17th January 2020: Webinar 5 – Project Review

11th February 2020: Webinar 6 – Soft Skills Webinar

15 February 2020: Deadline for submission of project reports

15 February – 28 February 2020: Evaluation of the project reports by the advisory board

6 March 2020: Final virtual conference

Reflection and planning again

Cycle 1 online/F2F reflection workshop: 5 July 2019 with participation of the advisory board.

Cycle 2 Online reflection workshop: 8 May 2020 with participation of the advisory board.

Learner categories

Students completing the course: 42 (12 teams)

Students that did not complete the course: 9 (2 teams)

3.4.2 Status

From lecture hall to a diversity of learning arenas

We have taken several steps to make this shift. Although we never had a lecture hall as our case is an online competition, the online trainings resembled a lecture hall as all online trainings were a presentation from a single lecture with students listening and then a q&a session with, usually, very few questions.

Now we have more online trainings during the competition, from 2 per 4-month competition to 5, and among these we have incorporated a diversity of learning arenas. We have a

“Introduction and Assessment” in which NextFOOD is presented, ground rules are laid out and students do their initial self-assessment.

“Student Introduction” in which each student team gives a 5-minute presentation of a real-life experience they have had in the competition topic.

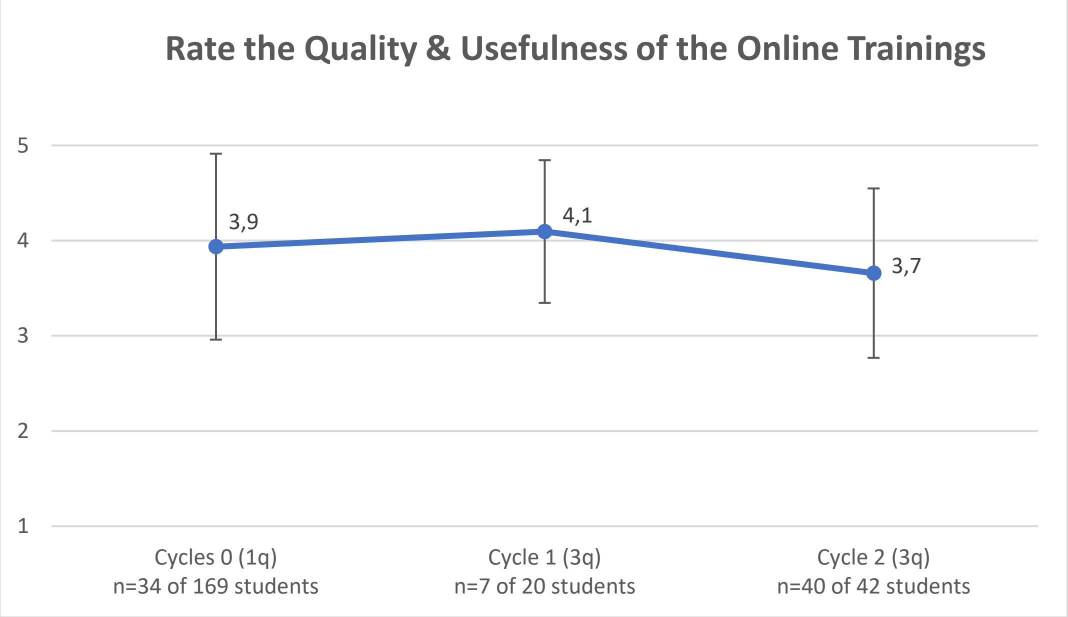
“Virtual Visit” in which someone at a company or institution related to the competition topic presents themselves and their place of work in a live video. We aim for 3 or 4 of these 10-minute visits.

“Project Review” in which each team meets individually with the competition organizers for personal mentoring.

“Soft Skills Workshop” in which teams define and practice oral presentation skills.

These steps seem to be having one desired effect which is to reach more students by lowering the drop-out rate. In cycle 1, 6 teams registered and all 6 finished the competition. In cycle 2, 14 teams registered and 12 finished the competition (86%). In the last competition before using the NextFOOD model, 16 teams registered and 5 finished the competition (31%). If finishing the competition indicates student satisfaction with its teaching/learning style, and that is the desired effect, then students are clearly more satisfied with the diversity of learning arenas now present in the competition.

We have noted that student responses to the usefulness of the learning arena, that is the usefulness of the webinars has not increased much, from 3.6 +/- 1.1 before NextFOOD (cycle 0) to 3.7 +/- 0.9. However it is interesting to note that in Cycles 0 and Cycle 1 the response rate was quite low, 10.1 and 33.5%, respectively. In contrast, in cycle 2, when completing the evaluation was required to receive a certificate, 95.2% of students responded. We hypothesize that when students were not required to complete the evaluation, only those students who were most satisfied did so.



3)Two primary obstacles need to be addressed. These are i) the institutional pressure to have typical lectures and ii) invited presenters who are unaware of our aim to create an action learning environment and therefore give typical lectures.

4)Our team needs to learn several things. We would like to know how to use online resources in more innovative ways. We also need material with practical tips/models on how to implement the NextFOOD model for external teachers (those giving invited presentations) so that we can quickly instruct them on how to avoid a lecture. They are also learners and could benefit from learning about and implementing (parts of) the NextFOOD Model.

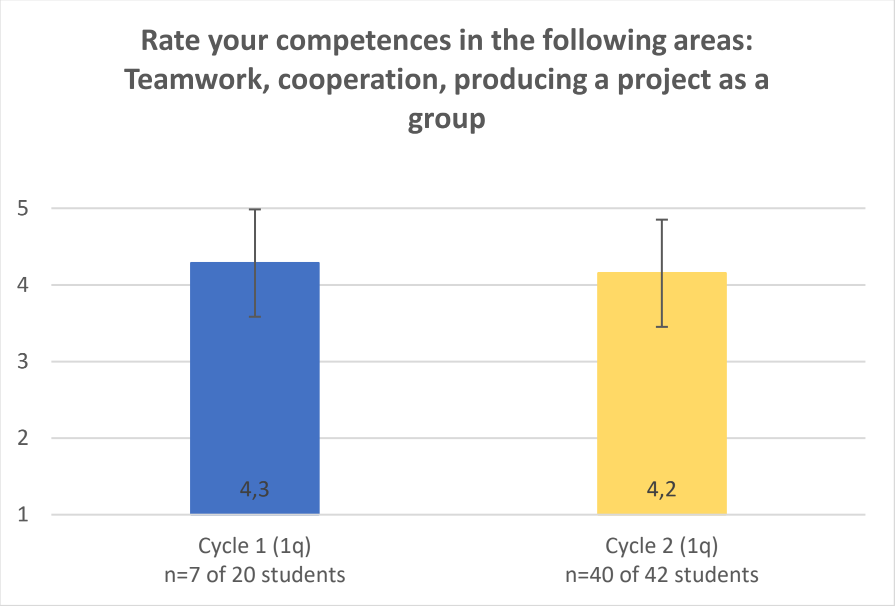
From lecturing to co- and peer learning

1) We have taken several steps to make this shift. We always had the requirement that teams of 3-5 students register for the competition but, both before NextFOOD and in cycle 1, found that the team leader was usually the only one involved. At the Vienna workshop, we discussed this challenge in a group and followed (some of) the output of that discussion. In cycle 2,

part of the project evaluation was “Teamwork” which we defined as number of students per team participating in the online trainings and completing the evaluations final presentations required at least 2 presenters

2)These steps seem to be having one desired effect which is to improve skills in teamwork. In our pre-NextFOOD competitions and in cycle 1, presentations at the Final Virtual Conference were all given by one person, the team leader. In cycle 2, all final presentations were given by at least 2 team members most of the 12 presentations (including the winning presentation) were given by 3+ team members.

An analysis of student responses to rate their competence (at the end of the competition) in “Teamwork, cooperation, producing a project as a group” shows the following:



We also know that many students mentioned teamwork in their final reflections but we have not analyzed this yet.

3)There are two primary obstacles to address: Students only physically meet the students on their own team. The software for online trainings does not allow groupwork.

4)We need to learn more about how to have group work among the different teams during online sessions and, a way to do this without sacrificing the secretive nature of a competition.

From syllabus to supporting literature/a diversity of learning sources

1)We have not made a change here as we never had a syllabus. This is not a required course for students, rather it is a voluntary activity for which students get no university credit. We are considering giving some suggested readings / online links to the 5 desired competences (dialogue, observation, visioning, participation, reflection). It would be ideal if the NextFOOD dissemination team could produce some short videos about the NextFOOD model and the 5 desired competences.

2)Once we give suggested readings (cycle 3) we will be able to see if there is any effect.

3)An obstacle or challenge here is to provide students with information and links to information without adding requirements.

4)We need to learn more about the simplest introductory materials for the NextFOOD model.

From textbook to a diversity of teaching aids

1)We have not made a change here as we never had a textbook, we didn't use one in competitions before NextFOOD, nor in cycles 1 and 2 and we don't plan on using one in the future! In fact, this case is an example of relying on a diversity of teaching aids. We have students give short presentations about a practical experience, they follow instructions as a team to define and address a problem of their choosing, they suggest topics for short lecture-like expert presentations and they prepare a finished project. Instead of a textbook, they look for answers in multiple places to questions that they themselves have posed.

2)This approach seems to have the desired effect of interesting students to participate. Remembering that this activity is not required and that students earn no credit, it is a joy to us every cycle to see students participating.

3)We don't see any obstacles in using a diversity of teaching aids.

4)We need to learn more about, as said earlier, how to present the NextFOOD model (and to have material to do so) to invited experts who give a single topic presentation to the students in the competition.

From written exam to a diversity of assessment methods

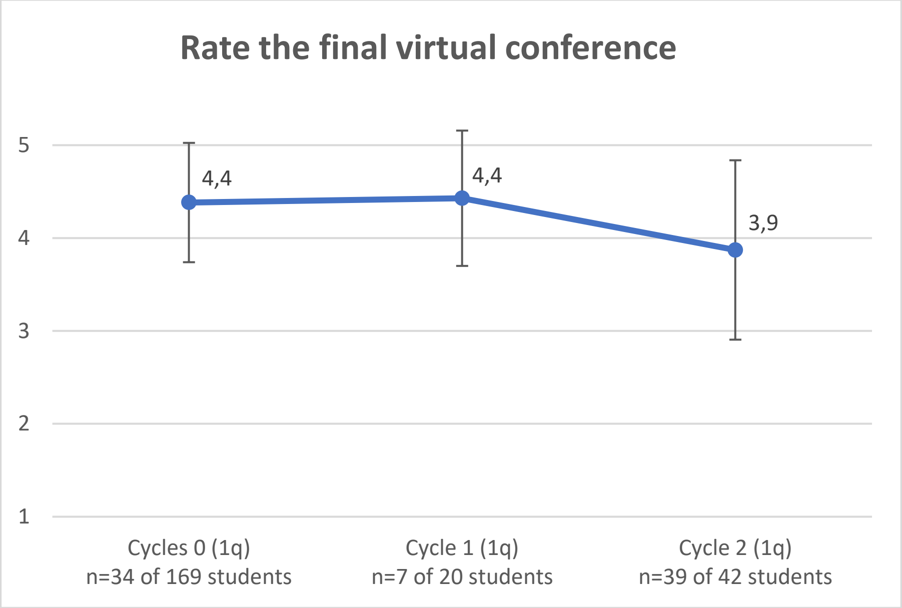
1)We have taken some steps to diversity assessment although we have never had any written exams. Before NextFOOD, teams were evaluated based on i) project concept, ii) a (max) 4-page written report, and iii) (max) 20 powerpoint slides. Items ii) and iii) were submitted to a Board of academics and industry representatives who scored them on a scale of 1 to 5. Item i) was inferred by the Board based on items ii) and iii) and on the team's written application for the competition and also scored as 1 to 5. This was not a 'written exam', yet the winning team was determined based primarily on written work (pp slides may be considered also as graphical work).

In cycle 1, we expanded the evaluation to include iv) presentation of the pp slides and response to questions at the final virtual conference and we expanded the Board to include competition organizers. In cycle 2, we further expanded the evaluation to include Group Interaction & Teamwork as a part of i) project concept.

2)What are the indications that these steps are having the desired effect? We have included as a prize for the winning team a guaranteed presentation of their project at a professional conference. The first one, at Aquaculture Europe, was well received.

Would be interesting to note here how many and what stakeholders attended the Final Virtual Conference. Unfortunately we did not have time to look that up. We will do so for the next report!

The graph below shows the student rating of the Final Virtual Conference. Here we see the same trend as in the rating of the online trainings, when students were required to complete the evaluation, the average went down and the standard deviation went up. Again we hypothesize that in earlier cycles, only the most satisfied students completed the evaluation.



3) What obstacles, if any, need to be addressed? It's stressful to collect and organize the evaluations of the Advisory Board during the Final Virtual Conference! But it is manageable.

4)Of course there is always more to learn but we think we are doing really well here.

From lecturer to learning facilitator

1)Describe the steps you have taken and their purpose . We have decreased the number of lecture-style online trainings and included a 'virtual visit', a project review, a soft skills workshop and a realistic professional conference. We, as NextFOOD facilitators now have more say in who gives the content-based online trainings and we are making it clear that we don't want lectures. We give detailed instructions to the presenter not, as in the past, when an expert was simply asked to give a 1-hour presentation on a certain topic. Instead of a single presenter, we have a facilitator who organizes content-based trainings and that facilitator is on the Advisory Board of the competition and has been briefed by us about the NextFOOD model.

2)What are the indications that these steps are having the desired effect? In our first cycle we had good reviews from the students for each of our online trainings. Our introductory meeting with the Advisory Board of cycle 2 went well and the members are willing to work in the new NextFOOD way, using their networks to find experts to participate in short and realistic online sessions rather than giving a 1-hour lecture themselves as in the past. We have qualitative data on facilitator evaluations which we are putting in NVIVO and have not yet analysed.

3) What obstacles, if any, need to be addressed? It's hard for us to train/explain to the Advisory Board what the NextFOOD model is. We would love a 1-minute video that shows the shift we are aiming for. We'd like to get the Advisory Board and other facilitators interested in NextFOOD so that they go to the Platform or Website and find out about participatory learning.

4)What I/we in our team need to learn more about is: We have become the trainers and we would like more training ourselves! We don't feel confident in leading the workshops with our Advisory Board and other facilitators in our institution. We'd like to become more like Geir in leading a workshop and explaining what we need from our colleagues.

3.4.3 Data analysis

First week (day) of the course

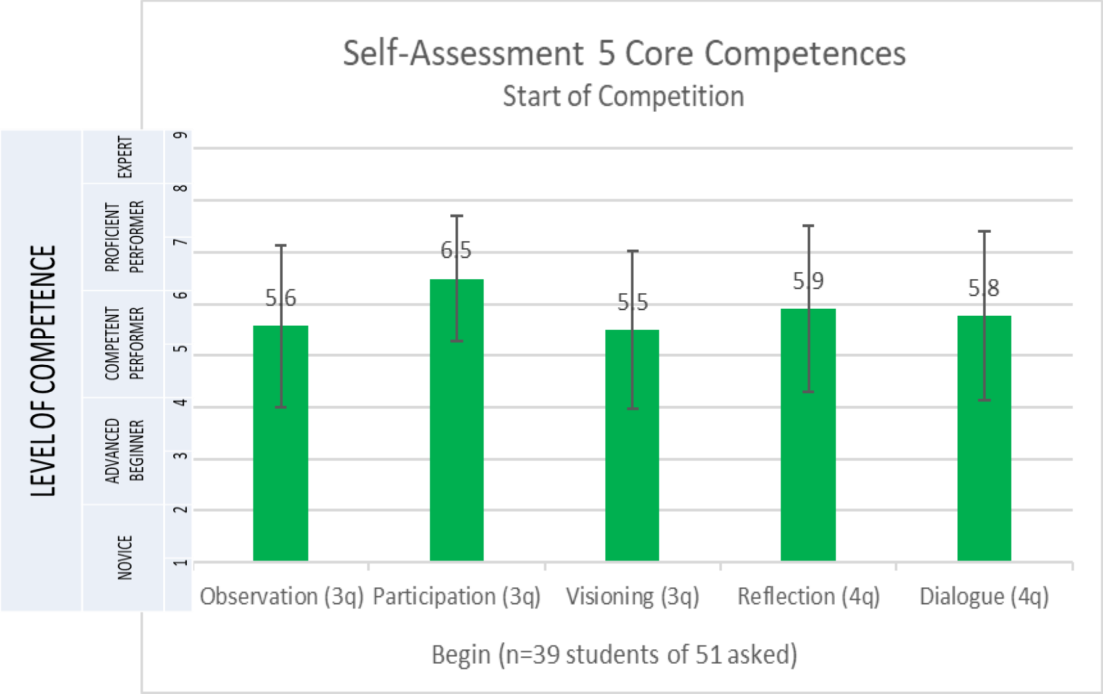
Student's understanding, contributions and expectations

We did not collect this for cycles 1 and 2. We plan to collect it for cycle 3.

Self-assessment of competences

We did not collect this for cycle 1. In cycle 2, during the Introductory Webinar we took time at the end of the webinar for students to open and complete an excel file that we had sent to them by email earlier that week. This file contained the Self-Assessment table from the Research Protocol (appendix 6). This table asks students to choose their level of competence on a 9-point scale from novice to expert in several aspects of each of the 5 key competences (participation, observation, reflection, dialogue, visioning). Students completed the table and returned it by email during the session and asked their team members not at the session to also complete the Self-Assessment. We received 39 responses from 51 students. Data was anonymised by student number, which includes digits for cycle, team, student, gender, country and educational level and clustered and analysed by team.

The data suggests that the student teams are most confident in their ability to participate and least confident in their ability at visioning. The graph below shows the overall averages and standard deviations for each of the 5 competences.



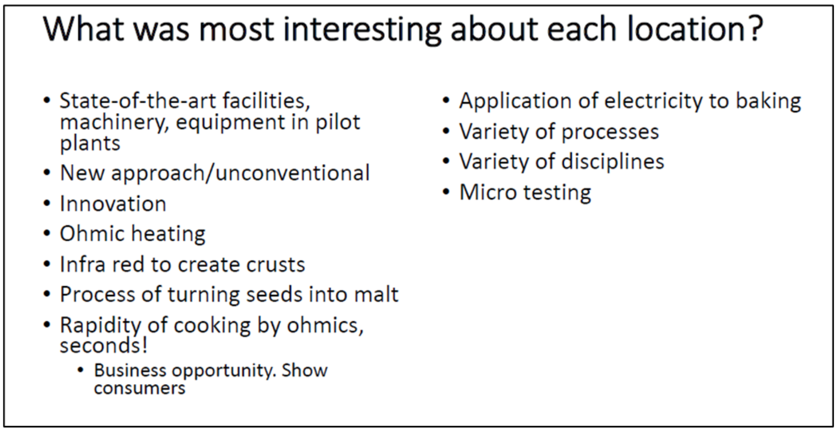
The range of responses confirms the data on averages, on the self-assessment scale of 1 to 9, team averages for Participation ranged from 6.0 to 8.0 and for Visioning from 3.7 to 7.3.

The data might be affected by the students who choose to respond. Completing the self-assessment was not mandatory and in fact almost 25% of students did not complete it. Perhaps those who choose to complete the self-assessment are those who view themselves more favourably.

Mid-course

Student's understanding, contributions and expectations

We did an online reflection session after the webinar on Virtual Visit. Following a brief introduction to the concept of reflection as core competence, students were asked to reflect silently on the 3 virtual visits and to note the 3 most interesting points about each location. In the plenary that followed the following was volunteered by the students:



What was most interesting about each location?

- State-of-the-art facilities, machinery, equipment in pilot plants
- New approach/unconventional
- Innovation
- Ohmic heating
- Infra red to create crusts
- Process of turning seeds into malt
- Rapidity of cooking by ohmics, seconds!
  - Business opportunity. Show consumers
- Application of electricity to baking
- Variety of processes
- Variety of disciplines
- Micro testing

Self-assessment of competences and mid-term course evaluation

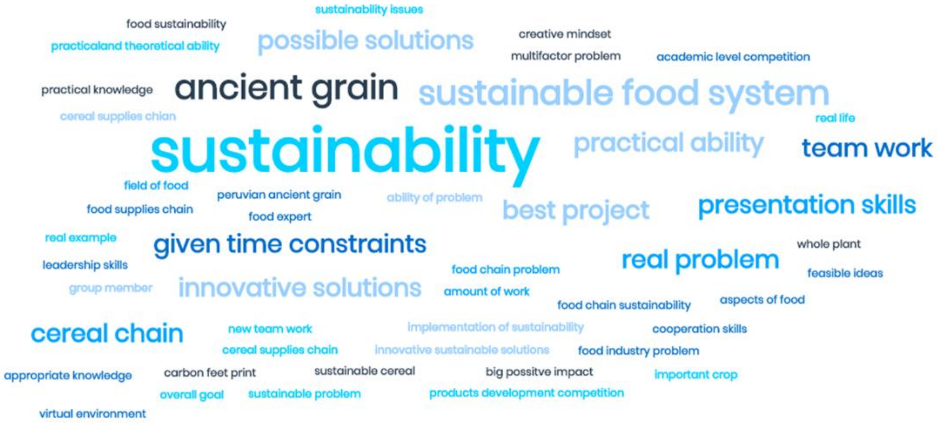
We did not do a mid-course self-assessment nor course evaluation in cycle 1 nor in cycle 2. Due to the nature of our course, a voluntary online competition, we do not plan to do any mid-course evaluations in future cycles.

Last week (day) of the course

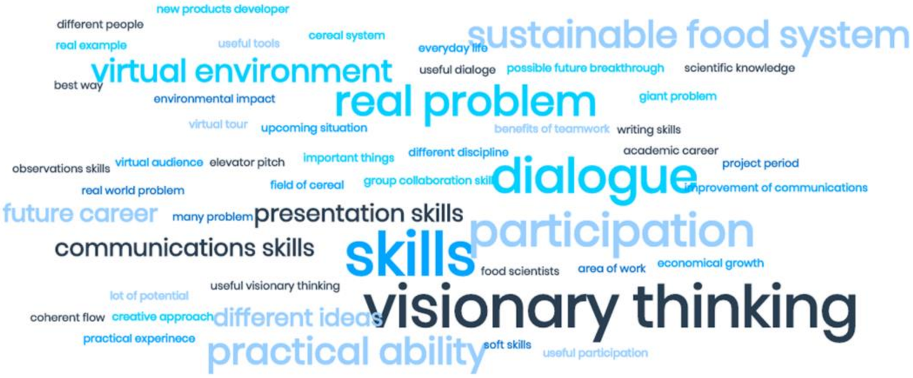
Student's understanding, contributions and expectations

After the Final Virtual Conference and announcement of the winning team, we sent a thank you email to all students who had completed the course (42) which contained an excel file with the questions on understanding, contributions and expectations (appendices 2,3,4 and 5) and reflections (appendix 7) of the Research Protocol) and the same self-assessment that students did at the start of the course. Student teams would not receive certificates of participation in the competition until all team members had returned the evaluation! We received 40 replies. We may try in future cycles to integrate the assessments in to course rather than making them a requirement. However, from experience before NextFOOD, the rate of return of final evaluations was very low. Data on student understanding, contributions and expectations was combined with data from reflections as student answers were all very short – likely a result of students completing a document rather than participating in an interview or in-class exercise. The data were anonymised as per the start of the course and coded with NVivo by the a case leader. We don't have full analyses of these data yet, but we did make word clouds for each question and find these very informative.

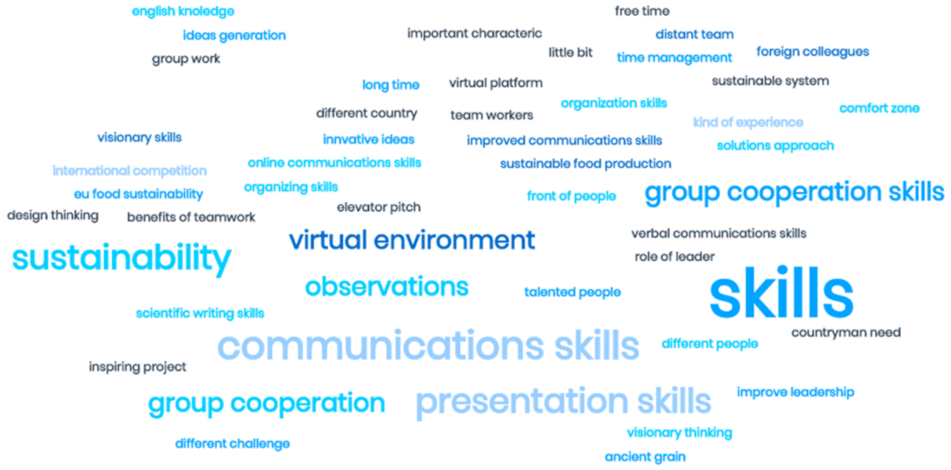
Reflections 1. State your overall and main goal.



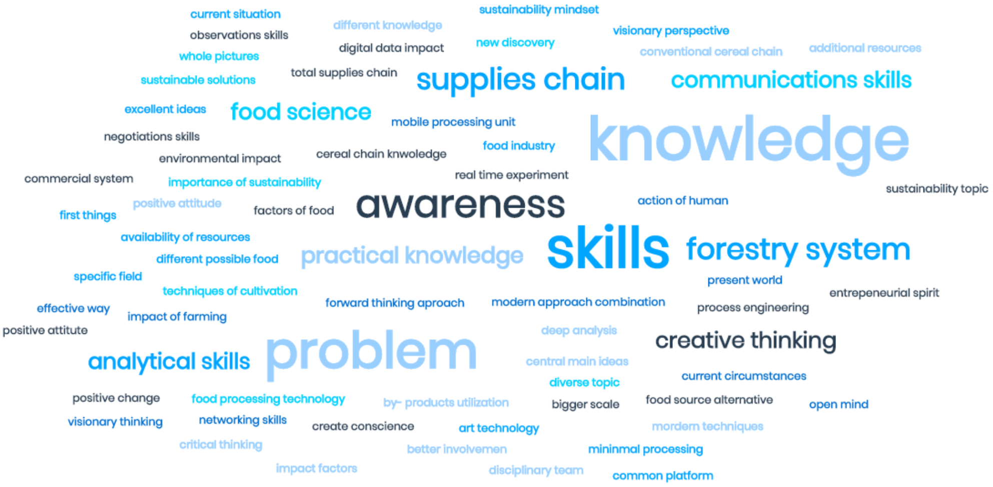
Reflections 2. Which competences and learning goals did you find particularly useful?



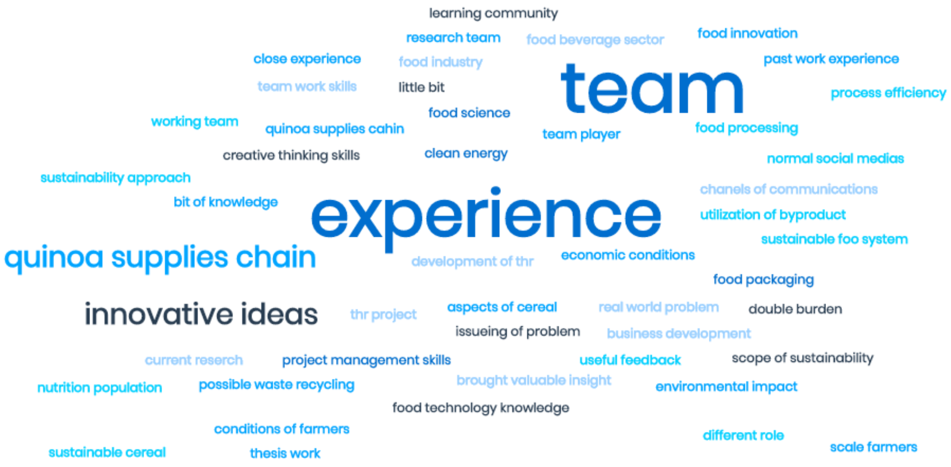
Reflections 3. What additional goals did you accomplish in this competition?



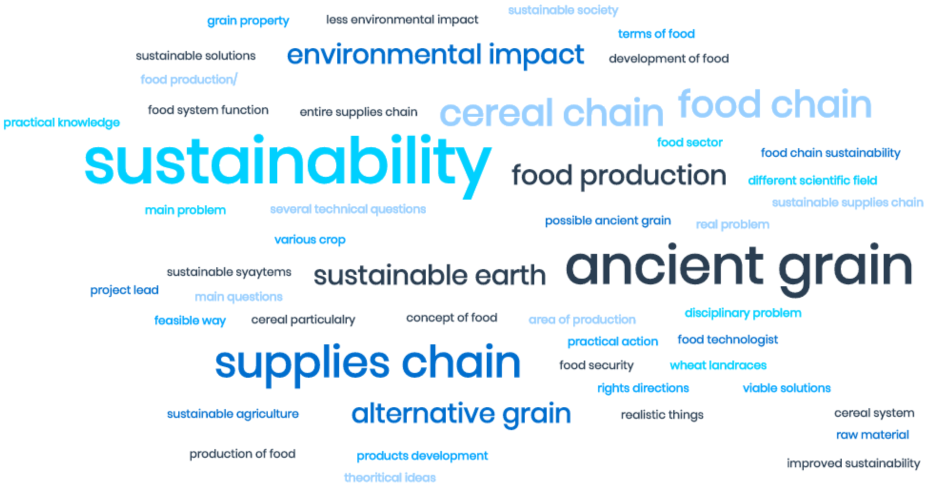
Goals 1. What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agrifood and forestry systems?



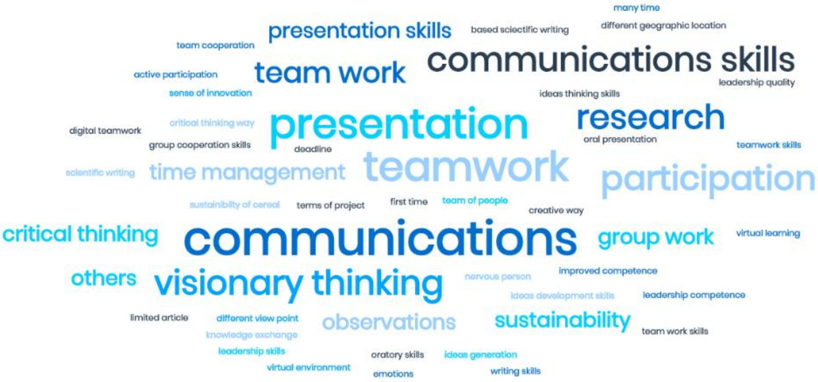
Goals 2. Which of the experiences and competences that I brought to the competition contributed the most to the learning community?



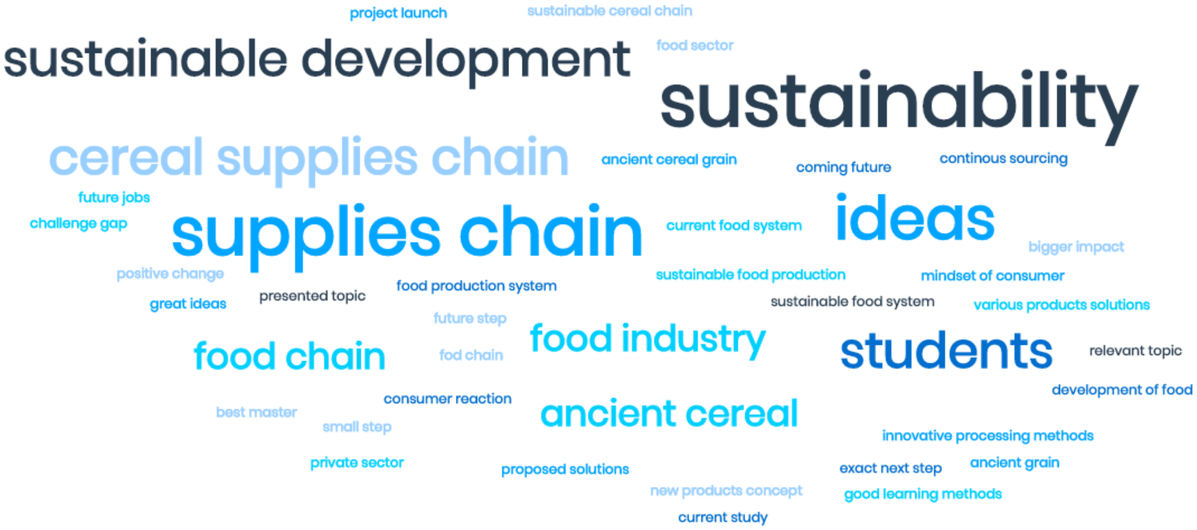
Goals 3. What questions did this competition help me find answer to?



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



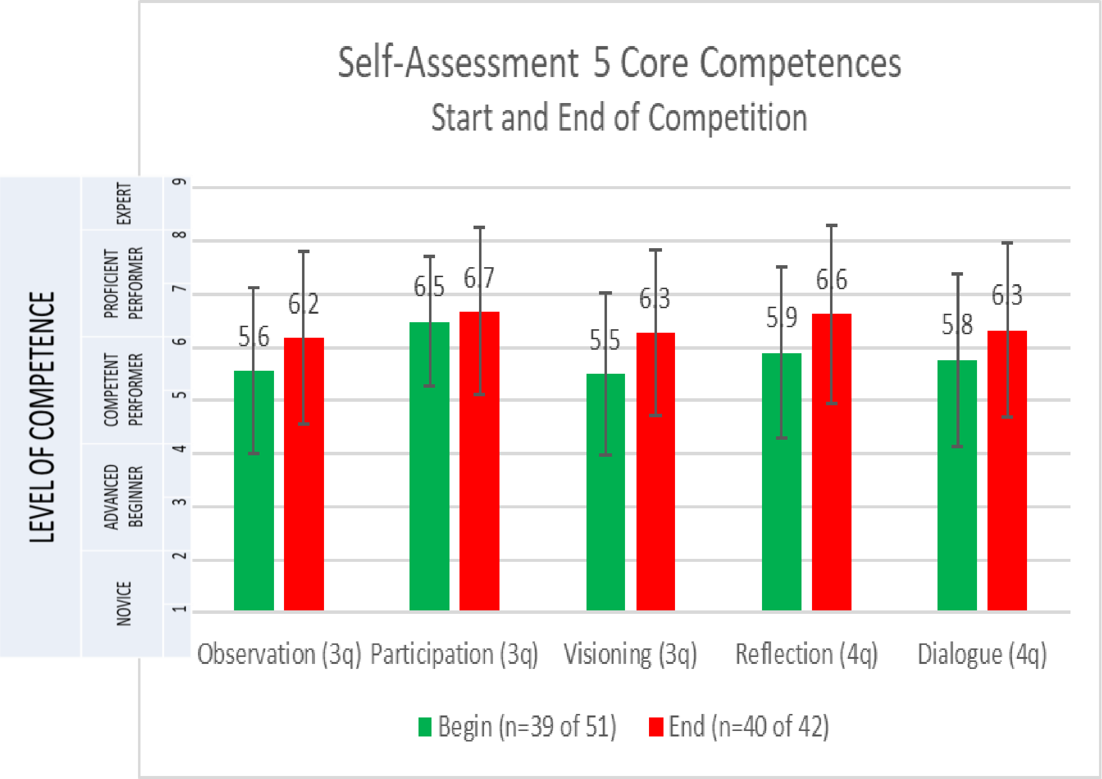
Goals 5. What are the questions I am now asking myself?



Self-assessment of competences

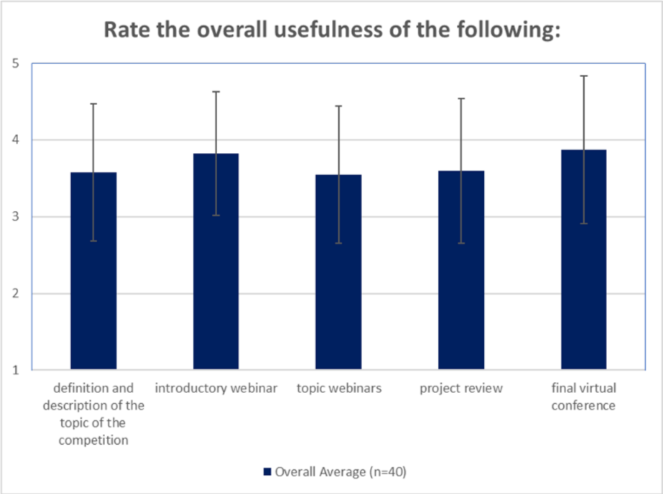
The excel file described above contained a page for the self-assessment of competences (appendix 6). Data was anonymised, coded, clustered and analysed as per the start of the course.

The data suggests that student confidence improved for all 5 core competences. The improvement was most striking for Visionary Thinking where students rated themselves at 5.5, a competent performer at the start of the competition, and at 6.3, a proficient performer at the end of the competition. It is important to note that students were ‘forced’ to complete the end evaluation and requested to complete the start evaluation.



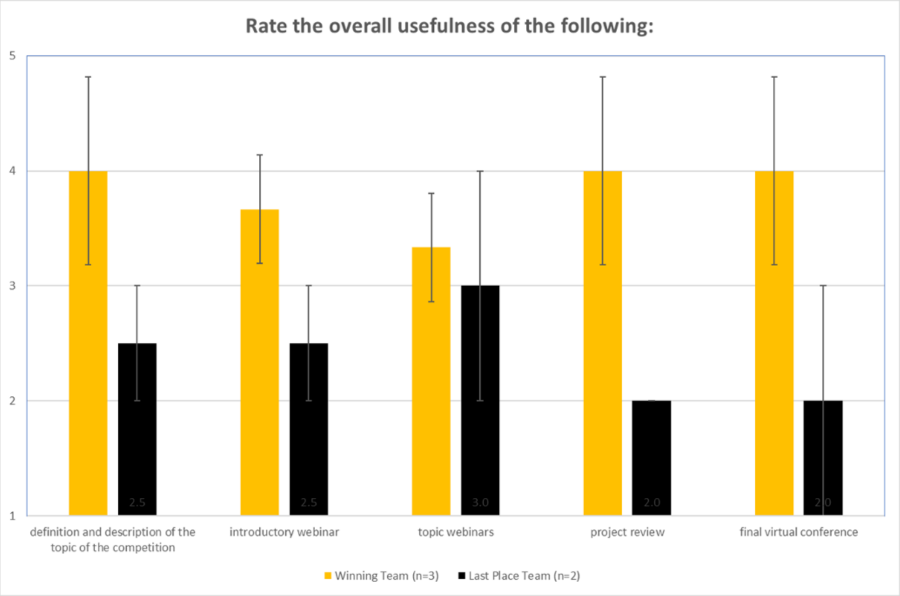
Final course evaluation

Here we used questions about the competition and the webinars that were very similar to those we had used in pre-NextFOOD versions of the student competition. Students rated 'quality and usefulness' on a scale of 1 to 5 for the following 5 points: i) the definition and description of the topic of the competition, ii) the introductory webinar, iii) the topic webinars, iv) the project review and v) the final virtual conference. These questions were a part of the final evaluation file sent to students as described in part A. Data was anonymised, coded, clustered and analysed as per the start of the course.



The data suggests a good level of satisfaction with the course, from 3.6 to 3.9. Large standard deviations, from 1.7 to 1.9 suggest a wide range in the student responses.

Analysis by team shows that the winning team gave a better overall evaluation to the course than the lowest rated team.



Comments from the main stakeholder in farm, food, or forestry about

We identified participants form industry at the Final Virtual Conference, but unfortunately none of them filled in the evaluation survey.

Teachers' final documents

<u>Reflection document</u>

We received 2 out of 14 evaluation forms from faculty advisors, a disappointingly low number. We asked teachers the same 8 open-ended questions on their experience that we asked facilitators. The word cloud from their answers shows the importance they placed on working with students on a project as well as suggestions to include project management in the course.

final results
company
future participants
technological readiness level
students
nature
action
opportunities
work
instructions
platform
mini test
leader
independent project manager
participation of industry
understanding
project management course
procedural part
students learning activitis
session
necessity
competitors
messenger
competition goal
ideas
techno- economic study
project
facilitation skills
evaluation of results
crystal
time
brief webinars
level
beneficial effects description
direct contact
experimental data
familiarity
previous competition
final project
new technology
problem
whole process
questions
viber
students development
overall effort
similar experience
attention
collaborative work

Demographics

Cycle	Number of students starting the educational activity (m/f/unknown)	Number of students passing the educational activity (m/f/unknown)	Educational background of students	Number of students with more than three years of experience in the field/business
1	**20 (8/12/0)**	**20 (8/12/0)**	**All master's**	Don't know
2	**51 (23/28/0)**	**42 (19/23/0)**	**All master's**	Don't know

3.4.4 Cycle report

1) Describe what the most useful and inspiring aspects of the phase/activities

We have now been running the FoodFactory-4-Us competition since 2017 and within the framework of the NextFood project since 2018 and over this timespan we have gained a lot of experience as facilitators so that we are now at a point where we are curious and have the will to take the competition to a next level, where we can focus more on interactive online training with the students, to explore other online tools and settings that foster to a larger extent active participation of the students. It is a personal milestone to have come to this point and rewarding to feel curious of trying out other facilitating methods.

Another inspiring aspect is the enthusiasm for the topic of the competition that the students bring along with them. It is every time fascinating to listen to their innovative ideas and to feel their passion about them.

2) What were the main obstacles/challenges you encountered?

This second cycle broke a record of the number of student teams and students participating in the competition. It was, on the one hand, more time-consuming to deal with more students, but it forced us to develop very clear instructions, to avoid too much bilateral communication between us as facilitators and the students. That was time-consuming but we are confident that the time spent of writing clear instructions and setting up the website in a structured way, will be beneficial for the upcoming cycles.

3) What are the lessons learned from dealing with the challenges?

That we can deal with so many students, we have a stable background, we are more experienced in what we are doing, and can better deal with such challenges than earlier.

4) What are your plans for how to move forward into the next cycle?

One of the main ideas that were brought up at the reflection workshop was to take the competition to a new level – namely to think about more in the line of trainings, rather than webinars, with the student teams with more direct assignments and less about «lectures» as they are provided in webinars. We would like to test another online tool with the possibility to work in smaller groups, in so-called breakout rooms to enable more interaction among the teams, give them space to share ideas. Perhaps we should think about more live trainings with the student teams with more direct assignments and less about «lectures» - they are all master students have have anyway most classes behind them, they need not so much knowledge but rather skill development...I like the idea of breakout rooms which some webconferencing tools offer (Zoom and Adobe) – that would enable live training «on site» perhaps even team work among students from different teams?

Cycle 1

Planning

The planning of our first Nextfood Cycle in Sustainable Aquaculture already began at the Kick-Off Meeting in May 2018 in Malmö, Sweden, when UNIBO expressed their interest in organising the competition as co-organiser. We knew each other from previous projects and it was nice to see that they were interested in being part of implementing the Nextfood Model in our student competition. After the first WP2-meeting in Pollenzo, Italy, we learned a lot about the Nextfood Model and we were happy that Geir Lieblein from NMBU, Norway, came to UNIBO late October to support us in conducting the planning workshop on site. Especially, it was useful to see and experience in practice the use of the planning workshop protocol. We were very impressed with the willingness and interest on the part of the participants of the planning workshop in the competition. That was very inspiring and we felt motivated and that we had set up a good team.

Implementation

The implementation of the case began when we opened the call for student team registrations 1st January 2019. We had 6 teams registered which was a little less than expected. Overall, the communication with the teams during the competition went well, but we found that the team leader is often the only one involved and that some team members were more or less invisible. For cycle 2, we took measures to insist that all team members (3 to 5 students) are visible at the project review workshop; and that 2 team members present an experience in the field; and that during the final conference at least 2 team members must give the team presentation.

Reflection

We were impressed with the efforts of our co-organisers from UNIBO to organise the competition. We felt they were sincerely involved, both as facilitators implementing the model during the competition, but also as learners of the model for themselves to implement the model, or aspects of it, into their own teaching. That was positive and rewarding. We had this impression throughout the planning, implementation and reflection phases. This in turn, perhaps, led us to have high expectations of our co-organiser of the second cycle.

Cycle 2

Planning

The planning of cycle 2 already began in spring 2019 when we conducted the focus group on skills in the agri-food sector as part of the work in WP1. The focus group discussion took place in Vienna at the 19th ICC Conference held at BOKU in April 2019. The conference, which was organised by ICC, had representatives from the cereal sector and the focus group discussion too. This was the starting point for interest in the sustainability challenges facing the cereal sector and our close contact with ICC which acted as the co-organiser of cycle 2.

Within ISEKI Food-Association, it was decided to merge the Sustainable Supply Chain (cycle 1) and the ongoing FoodFactory-4-Us competition, which was the forerunner of our Nextfood case. This meant that those members of the advisory board, that had been involved in the FoodFactory-4-Us competition, stayed on the Advisory Board and we invited also representatives and experts on cereal science through ICC and ended up with 11 members of the Advisory Board. The level of engagement has varied greatly among the members and it has proven difficult, on the one hand, to organise the planning workshop and the reflection workshop with so many people, and on the other hand, to make them feel “part” of the competition and have a “stake” in it. Even with so many members, it was difficult to organise the “Student Suggestion Webinar” and to collect teacher evaluation forms. We will revise the number of members of the Advisory Board for cycle 3.

Implementation

The implementation of cycle 2 began with the opening of the call for student teams 1st October 2019. We were very happy to be able to use ICC’s large network for dissemination of the call which eventually contributed to the large number of student team registrations. Because the level of submitted project proposals was so high, it was decided to admit all 14 student teams. This meant in turn that all online trainings took longer than anticipated due to the large number of participants and that the time spent on communicating with the teams was more time-intensive. Furthermore, we had decided not to have a team-leader which meant that we did not have a specific contact person within each team, but were communicating with many different students. Nevertheless, this also forced us to streamline the instructions for each of the online trainings and for the instructions on the final report which will be valuable for the next cycles.

Reflection

In comparison to cycle 1, the level of engagement of our co-organiser and the other members of the Advisory Board was much less intensive and it meant that we, as facilitators, felt challenged to “bring about” the NextFood Model to the other members of the Advisory Board more than we had had to during cycle 1. It will be helpful, as explained earlier, to have more materials available for such facilitation activities.

Perhaps because of this apparent less involvement of the other members of the Advisory Board, we might focus less on typical lectures (given by members of the Advisory Board) and more on training of the students and thereby skill development, perhaps in a different format of online training.

3.5 Greece – AFS/IHU

3.5.1 ID card

Activity 1

Title: Farm Animal Reproduction

Level of the course: Undergraduate, 8th semester

Course language: Greek

Host institution: International Hellenic University ATEITH (former TEI)

Course leader: Dr Aristotelis Lymberopoulos

Timeline of the activities covered in this report

Below a table containing a weekly timetable with the subjects taught and the action-learning techniques used is presented.

WEEK	Subject	Action learning techniques
1st week: **10 October 2019**	Male and female reproductive system	Description of course structure Determining students' learning style • **Action learning technique: Learning Styles Identification.** Presentation of a written group project • **Action learning technique: Group Project using the PubMed and Scopus databases**
2nd week: **17 October 2019**	Practical training on female reproductive tract	Web page evaluation • **Action learning technique: Web pages' evaluation.** Put theory into practice • **Action learning technique: PiCowSo**
3rd week : **24 October 2019**	Oestrous cycle-oestrous – signs of oestrus- Practical training on female reproductive tract	Graphical depiction of oestrous symptoms • **Action learning technique: PiCowSo** Discussion between the group of students and the teacher on students' artworks - Group reflection.
4th week: **31 October 2019**	Practical training on oestrous synchronization of small ruminants under field conditions–Case study	Visiting the stable • **Action learning technique: Sense-making through senses** Reflection on the experience gained through students' contact with the animals (small ruminants). Put theory into practice – practical implementation of theoretical insights. Thorough understanding of oestrous symptoms. • **Action learning technique: Hotspot**
5th week: **7 November 2019**	Practical training on oestrous synchronization of cows under field conditions	Visiting the stable • **Action learning technique: Sense-making through senses** Reflection on the experience gained through students' contact with the animals (cows) • **Action learning technique: Meet the cow**
6th week: **14 November 2019**	Practical training in setting the artificial vagina in different animal species	Peer review process • **Action learning technique: Peer Review.** Activity combined with group projects. Exchange of views among students on the first version of the projects. Visiting the stable • **Action learning technique: The lamporatory; You goat it!** Reflection* • **Action learning technique: Reflection.** Brief presentation on how to write a scientific essay.

		Video watching • **Action learning technique: Unboxing.**
7th week: **21 November 2019**	Evaluation-process-preservation of semen	Understanding theory – Putting theory into practice through problem-solving activities. • **Action learning technique: Unboxing.** Microscope and the photometer • **Action learning technique: Familiarize students with laboratory equipment**
8th week: **28 November 2019**	Evaluation-process-preservation of semen-Case study	Understanding theory – Putting theory into practice through problem-solving activities. Thorough understanding of techniques on assessment semen's quality, semen processing, semen maintenance • **Action learning technique:** Case study.
9th week: **5 December 2019**	Implementation of artificial insemination in cows under field conditions	Video watching • **Action learning technique: Unboxing.** Learning by doing. Students are involved in the learning process by practicing artificial insemination in cows. The activity is practiced by all the students individually.
10th week: **12 December 2019**	Implementation of artificial insemination in small ruminants under field conditions	Learning by doing. Students are involved in the learning process by practicing artificial insemination in cows. The activity is practiced by all the students individually.
11th week: **19 December 2019**	Pregnancy Diagnosis Methods-Case study	Thorough understanding of methods of pregnancy diagnosis. • **Action learning technique:** Case study Involving students with pregnancy diagnosis techniques. • **Action learning technique:** Construct-Deconstruct-Reconstruct. Students develop their communication skills and competencies by playing. • **Action learning technique: Roleplay between agronomist and farmer** Students involved in a reflection process. After a brainstorming session, they prepare and write down a series of questions per topic before visiting the farm.
12th week: **9 January 2020**	Developing communication skills and competencies – focus on student-farmer interaction	Students are split into groups based on a first week's separation. • **Action learning technique: Meet the farmer** Presentation of the group projects.
13th week: **16 January 2020**	Summing up	The concepts, terms, and definitions related to animal reproduction are summarized. • **Action learning technique: Baby shower.** Students are looking back at the beginning of the semester, trying to find out the levels of knowledge they gained through the semester. • **Action learning technique: Re-visiting the art exhibition.** Presentation of the group projects.

Table 1: A weekly timetable for the action-learning techniques used in "Farm Animal Reproduction" course

A more detailed presentation of the timetable of the course along with the subjects taught, the skills/competencies aimed to be developed and a brief description of the action-learning techniques used for each subject area taught can be found in Appendix 1.

Learner categories: Undergraduates, 2 groups

Total number of students: 43

Activity 2

Title: Special Entomology

Level of the course: Undergraduate

Course language: Greek

Host institution: International Hellenic University ATEITH (former TEI)

Course leader: Dr Manolis Navrozides

Number of students: 90

Timeline of the activities covered in this report

The module started in March and was partially disrrupted due to the COVID-19 outbreak. It continues on-line. It is expected to end in June so the activities described below will not have been completed by the deadline of the DRAFT report. These activities will be marked as «pending».

a) Learning by teaching methodology:

All students were allocated 2-3 insects on which they would work on. Students prepare a presentation about these insects. Each lesson of the module consists of the student presentations. The goal is to cover a total of 50 insects with information on the lifespan and morphology of the insect, symptoms of infestation and treatment and damage control using traditional and precision technology methodologies.

Due to the COVID-19 outbreak students are presenting using an on-line environment. This has given them the opportunity to explore and train themselves in using these on-line environments to the benefit of their later professional skills.

b) Peer review methodology:

Fellow students are asked to review the presentations and give a summative mark, which will count 10% towards the assessment of the student. Students were given a list of factors that shoul influence their marking.

c) Portfolio (pending)

Each student will put together an infestation portfolio containing a variety of plants that were infected by insects. The plants will be photographed using digital imaging technology and will contribute to the image gallery of the NEXT FOOD platform.

d) Training in the use of alternative learning sources and precision technologies (pending)

Students are encouraged to use the NEXT FOOD platform for gaining insight into up to date, cross-sector and international scientific information about their field of study.

They are also guided in the use of the Youtube channel created by the American Farm School SPMO department which contains a variety of up to date educational material.

https://www.youtube.com/channel/UCoqXXIBbnxrKD3C9QBh642Q/videos

e) Focus Group / Reflection workshop (pending)

Students will be asked to complete an end-of-term reflection questionnaire and to participate in a focus group to reflect on their experience.

Activity 3

Title of activity: Installation of Precision Technology Infrastructures

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

Activity leader: Dr. Philippos Papadopoulos

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

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

Activity 4

Title of activity: Interviews with academics, agronomists and student practicioners

Host Institution: American Farm School

Activity leaders: Chysanthy Charatsari, Georgia Zafeiriou, Elisavet Papadopoulou

Number of Interviews: 5

3.5.2 Status

The course "Farm Animals Reproduction" consisted of lectures, classroom activities and laboratory exercises. During the lectures several topics and issues related to animal reproduction developed and analyzed. Students involved in action learning activities aiming at their active involvement and engagement in the educational processes. Finally, in the workshops the students applied the theoretical knowledge gained in the lectures to practice and thereby became familiar with the application of the laboratory object.

The structure of the course involved the following sections:

- anatomy of the male and female animal reproductive system,
- hormones involved in reproduction,
- selection of suitable animals (male and female) for reproduction,
- parameters to assess reproductive capacity,
- stages of the estrous cycle of farm animals,

- phases of the estrous cycle,
- control of estrus,
- methods used to synchronize estrus in productive animals,
- methods of collecting, processing and maintaining sperm,
- methods of applying artificial insemination to productive animals ,
- methods of diagnosing pregnancy in productive animals,
- pregnancy and treatment of newborns

For the purpose of brevity and clarity, in this section we will refer to our activities only very briefly. For further details on the activities please visit Appendix 1.

From lecture hall to a diversity of learning arenas

a) The **"**Farm Animal Reproduction" module was enriched with a variety of innovative active techniques that required active students' participation aiming to mark the transition from the lecture hall to a diversity of learning arenas. Among these techniques were:
   - Sense-making through senses. Students visited the ATEITH stables and were encouraged to develop and frame their experience of the stable through their senses.
   - Meet the cow: Students, under the supervision of the teacher(s), visit the stall to see cows in various stages of their reproductive life.
   - "The lamporatory," "You goat it!": The activity includes visits to the sheep stable and the goat stable during different stages of the reproductive cycle and animal behaviour observation.
   - Professional Farm visit: Students visited a goat milk production facility together with their professor. There they had the chance to observe, ask questions and interact with a young professional farmer who was a graduate of TEI himself.
   - Familiarize students with laboratory equipment. Students used the microscope and the photometer and individually observed the preparations, depicting in parallel what they see.
   - practice in artificial insemination in cows and sheeps. The activity was practiced by all the students individually.

b) The "Special Entomology" module requires students to go outside in their own time to collect samples of infestations in order to compile an infestation portfolio by the end of the course.(pending)

All the above activities, except for the composition of the infestation portfolio, were novel both to students and to their professors. Also we anticipated that teachers might have limited sense-translating literacy and that students may react to the self and group reflection activities as something unnecessary, time consuming and boring. We tried to overcome these difficulties by being actively present throughout the activities and offered our support and guidance whenever needed.

However, we were pleasantly surprised by the embracement of all activities by all parties. This was also reflected in their reflection documents.

From this we have learnt to raise our expectations and not to impose our own perceptions on our participants.

From lecturing to co- and peer learning

a) In the Animal Farm Reproduction module we designed the below activities**:**

- Hotspot**:** An activity based on group reflection processes and presentation of group ideas.
- Peer Review**:** In this activity, students provide their peers with feedback on their literature review assignment (Group project-week 1).
- Group Project using the PubMed and Scopus databases**:** The aim of this activity is the production of a group project by the students based on a literature review. The activity ended with a presentation of an essay to the class.
- Construct-Deconstruct-Reconstruct. A group activity that deepens understanding of a topic –in this case pregnancy diagnosis in farm animals.

b) In the Special Entomology module we incorporated a peer review and peer assessment element to the presentations that students are required to make in each lesson.

The potential obstacles that we anticipated was the students' limited experience in using participatory knowledge construction techniques and also time limitations, since participatory techniques usually have a very high time demand.

These obstacles were overcome by careful planning and structured implementation of the activities. We also took care to give very clear instructions and to support our students along the way by breaking the group project into smaller pieces. Finally, the students had to address issues and difficulties in group dynamics and this was initially thought of as an obstacle to the successful completion of the activities. Again, we learnt to place more trust in our participants and the process.

The take-away lesson from these techniques was that the development of group sensibilities and competences are key to the development of our case. Also, that group processes may be difficult at times but given enough time, structure and support, the end results are almost inevitably significant and positive, as was evident in our focus group results.

From syllabus to supporting literature/a diversity of learning sources

a) In the **Farm Animal Reproduction** module, a variety of learning sources including both internal (cognitive) and external were used to enhance students' learning. The techniques we implemented included the following:

- Training in the use of **scientific databases** such as **PubMed and Scopus.**

- **Web pages' evaluation**. Students were asked to use websites for handling their assignments. Websites were evaluated based on a set of evaluation criteria that have been discussed with the students.
- **Unboxing:** This is a video related activity that aims at reflective and knowledge reconstruction abilities of the students.
- **Re-visiting the art exhibition**: Students review their own (and their classmates) artworks produced at the beginning of the semester with the use of PiCowSso technique.

b) In the **Special Entomology** module:

- Students are encouraged to use the **NEXT FOOD platform** for gaining insight into up to date, cross-sector and international scientific information about their field of study.

- They are also guided in the use of the Youtube channel created by the American Farm School SPMO department which contains a variety of up to date educational material.

- Students are heavily encouraged to reasearch, mainly through the internet and refer to precision technologies that help with insect infestation detection and control.

Both teachers and students responded positively to the above although it may be difficult to leave the security of the text book. So, the feelings of insecurity and uncertainty about the quality of their work and knowledge may be the most prevalent challenges of these activities. It is highly important to our students' future development and the development of our case that we emphasise on this and continue to train our students to use alternative and diverse methods of learning.

From textbook to a diversity of teaching aids

The students were introduced, trained and used a variety of action learning and teaching techniques. In the following paragraphs a summary of the teaching techniques used aiming to mark the transition from textbook to a diversity of teaching techniques.

- **PiCowSo**: Students produce and exhibit drawings of the cow's reproductive system.
- **"Baby shower":** This is an activity that is based on student's ability to project existing knowledge into imaginative and visionary thinking.
- **Learning Styles Identification.** The aim of this activity was to identify the student's learning styles. Determining students' learning style through filling a special questionnaire (Learning Styles Questionnaire- Honey and Mumford
- **Self and group Reflection sessions.** Most activities were accompanied at the end of the class by reflection. Either the tudents were be provided with one question for a brief reflection or they took part in group discussion and reflection.

- **Case studies.** Students read related case studies in relation to various topics that were discussed in the classroom.
- **Role Play:** An activity that may take place either between the professor and students or between students themselves.

These activities required a lot of support from our part, due to their novelty both for the professors and the students. Now we understand that by making a good selection of a few activities, the results may be more positive and have a greater impact since there is no sense of overwhelming change. From the above activities, the role play, the case studies activity and the formal reflection sessions might be enough for a next module.

From written exam to a diversity of assessment methods

a) The **«Farm Animal Reproduction»** course 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 for the specific course. 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. Overall, the assessment was done by examining the theory, and participation in classroom activities and laboratory activities. The final grade of the course was shaped by the contribution of the following marks:

- theory (50%) of the overall grade
- laboratory activities (30%) of the overall grade and
- classroom activities, group essay (20%) of the overall grade

A 50% prerequisite performance in each of the above was obligatory.

b) For the Special Entomology module we have given students the chance to participate in their assessment by doing a peer-assessment that counts 50% toward the presentation mark. Students are also assessed for their infestation portfolio collection and for the use of the digital imaging technology.

Overall their mark is divided as follows:

Presentation 30% (15% peer review and 15% professor)

Portfolio and digital imaging 30%

Written exam 30%

In addition, the written exam will be personalized and will include the insects that the student had to present plus another two insects.

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 check points 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.

The course **"Farm Animals Reproduction"** consisted of lectures, classroom activities and laboratory exercises in which the professor acted as facilitator. In the **"Special Entomology"** module, the role of the professor is equally facilitative since the lesson is essentially taken over by the students.

Throughout these modules, the professors made great effort to accommodate the needs of the shift from lecture to action-based learning. At the same time students were asked to develop a variety of action learning skills namely:

- Information seeking skills,
- Essay writing skills,
- Presentation skills,
- Group working skills,
- Holistic thinking competencies,
- Negotiation skills,
- Systemic thinking competencies,
- Contextualization skills,
- Argumentation skills,
- Reviewing competencies,
- Externalization of individual knowledge,
- Peer communication competencies,
- Observations skills,
- Tutoring skills,
- Reflection skills,
- Critical skills,
- Knowledge extraction skills,
- Deductive and Inductive reasoning skills,
- Problem-solving skills,
- Active observation skills.

The acquisition of such skills 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.

Reflections and interviews with the course leader Dr. Aristotelis Lymberopoulos and his assistant Mr. Vasilialeidis will provide us with feedback on how they took the role of the facilitator.

Dr. Manolis Navrozides will provide us with his reflections when his course is over.

3.5.3 Data analysis

Methodology

Data collection

Following the structure suggested by D 2.1 (Action Research Protocol) the data collection procedures followed four stages (Stage 1, 2, 3, 4).

Stage 1 took place during the first week of the course. 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. Students completed the following four questions aiming to identified their knowledge of sustainable development in agrifood and forestry systems and their personal experiences and competences (the ones they anticipated they brought to the educational activity and they ones they wanted to improve).

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

2. What experiences and competences do I bring to the educational activity to make it a success?

3. What are the questions I would like this educational activity to help me find an answer to?

4. What are the competences I´d like to train/improve in this educational activity?

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. The questionnaire adopted the five-stage model of adult skill acquisition namely novice, advanced beginner, competent, proficient, and expert (Dreyfus, S. & Dreyfus, H. 1980; Dreyfus, 2004)

All 43 students completed the open-ended competences questions and the "Self assessment of competences" questionnaire.

Stage 2 took place during the 7th week of the course. Since middle educational activity was optional according to D 2.1 (Action Research Protocol) we did not included the Student's understanding, contributions and expectations**,** Self-assessment of competences**,** Mid-term course evaluation. Instead we used a mid- term reflection that aimed to identify the students views on the supporting and hindering forces for the transition to the Nextfood approach. Reflection was designed around the following questions.

1) What are the supporting forces for making the transition to the NEXTFOOD approach?

2) What are the hindering forces for making the transition to the NEXTFOOD approach?

3) What strategies should be used to benefit from the supporting forces?

4) What strategies should be used to reduce the impact of the hindering forces?

All 43 students participated in the mid-term reflection.

Stage 3 took place during the last week of the course. The students' understanding and expectations of the course were the main aim of the Stage 3. 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. Students completed the following five questions aiming to identified their knowledge of sustainable development in agrifood and forestry systems and their personal experiences and competences. The following five questions were asked.

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

2) Which of the experiences and competences I brought to the educational activity contributed the most to the learning community?

3) What questions did this educational activity help me find an answer to?

4) Which competences did I train/improve significantly in this educational activity?

5) What are the questions I am now asking myself?

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

Dr. Aristotelis Lymberopoulos prepared a reflection document providing feedback and a description of his involvement, the perceived development of students' competences, main themes and issues and a plan for further improvement of the course “Farm Animal Reproduction”.

Finally, a group interview with academic leaders and faculty members was expected to take place at the end of March 2020. However, since government closed all universities to mitigate the effects of the COVID-19 pandemic up to 10th of May, the group interview with academic leaders and faculty members was rearranged and was done online via Skype.

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 arose from the interviews (Boyatzis, 1998; Braun and Clarke, 2006).

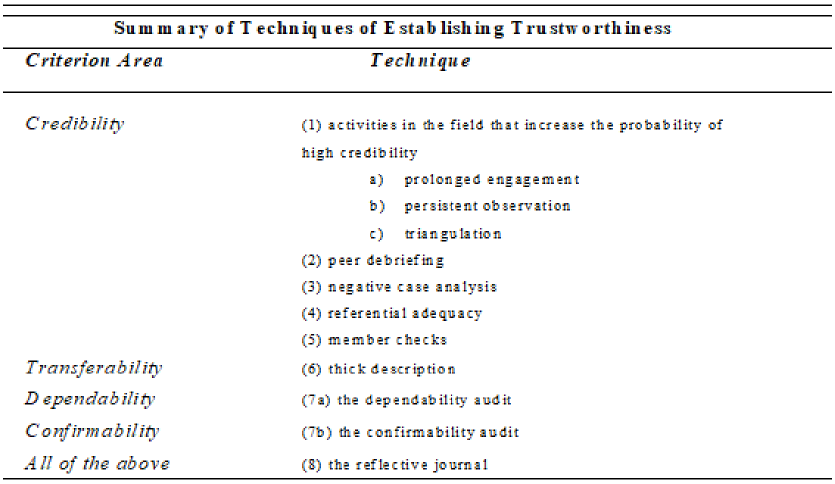
However, qualtative data analysis of the interview data mainly itilised the Grounded theory approach. The Grounded Theory approach, inductive in nature, uses a set of techniques to try to discover and capture human behaviour with the purpose of developing theory about a phenomenon (Strauss & Corbin, 1990: 24). Grounded Theory is nothing else but a qualitative research method that uses a systematic set of procedures to develop a theory about a phenomenon that has been under study. The style of Grounded Theory is based on a number of features such as theoretical sampling, the making of constant comparisons and the use of a coding programme. There are three types of coding in Grounded Theory: 1) open, 2) axial, and 3) selective coding. Open coding is the first examination of the data in order to categorise and name the phenomena deriving from the data. Axial coding refers to the process of coding around a single category. As in open coding data is broken down in order to produce categories with properties and dimensions, axial coding "puts data back together in new ways by making connections between a category and its subcategories…in axial coding our focus is on specifying a category in terms of its conditions that give rise to it; the context in which it is embedded; the action/interaction strategies by which it is handled, managed, carried out; and the consequences of those categories" (Strauss & Corbin, 1990: 97). Finally, Selective coding is the process of selecting a core category that is the central phenomenon that arises from the data. All the other categories are integrated and related around the core category (Strauss & Corbin, 1990: 116).

Additionally, software specially designed for qualitative research also facilitated the coding procedures as a "coding scheme can be developed and recorder as an electronic dictionary, thesaurus or authority file of key words, phrases, categories and definitions" (Richards & Richards, 1994: 152). 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. The software also helped the researchers to build networks of hirerchcal pepresentations of the main codes and subcodes enabling to construct concepts and theories and identify the relations arising from your data (ATLAS.ti software, 2020).

Quantitiative data analysis of the data of the “Self-assessment of competences” questionnaire was assisted by the Statistical Package for the Social Sciences (SPSS).

Issues of validity and reliability

As described above the essence of qualitative research is to make sense of the phenomena and identify patterns and themes within the data. In assessing the question of “true value”, in other words the establishment of confidence in the truth of the findings of qualitative research Lincoln and Guba (1985) proposed a set of criteria to establish validity or "trustworthiness" in qualitative research namely credibility, transferability, dependability and confirmability. The criteria identified by Lincoln and Guba's (1985) were utilized to tackle the issues of validity and reliability. A summary of the techniques for establishing trustworthiness of the qualitative research can be found below in Table 2.



Summary of Techniques of Establishing Trustworthiness

Criterion Area	*Technique*
Credibility	(1) activities in the field that increase the probability of high credibility a) prolonged engagement b) persistent observation c) triangulation (2) peer debriefing (3) negative case analysis (4) referential adequacy (5) member checks
Transferability	(6) thick description
Dependability	(7a) the dependability audit
Confirmability	(7b) the confirmability audit
All of the above	(8) the reflective journal

Table 2. Summary of Techniques of Establishing Trustworthiness: Lincoln & Guba, 1985: 328

The following techniques were practiced to encounter the issues of validity and reliability of the data.

Activities increasing the probability of credible findings. This technique consists of three activities: prolonged engagement, persistent observation and triangulation. Prolonged engagement “is the “investment of sufficient time to achieve certain purposes: learning the culture, testing for misinformation introduced by distortions either of the self or of the respondents and building trust” (Lincoln & Guba, 1985: 301). The researchers participated in the course “Farm animal reproduction” since its initial stages but also throughout its duration. Therefore, we managed to familiarise ourselves with the field and also develop some sort of more personal contact with the interviewees and eventually build their trust in us.

Prolonged engagement also requires the researcher to take into account distortions in the data. Distortions might be personal (dealing with the researcher) or could be introduced by the respondents. To avoid misconstruction of the questions we tried to rephrase questions when they were not understood by the respondents and to make clear at the beginning of each group interview or any data gathering that there were no right or wrong questions and that we were concerned about their personal views.

Finally, prolonged engagement is intended to provide the investigator with an opportunity to build trust. At the beginning of the interviews it was made clear to the respondents that their anonymity would be honored and that their responses could offer a very valuable input to the research topic.

The criterion of persistent observation was met as the researchers were engaged with the prject since its beginning. It has also to be noted that the use of the ATLAS.ti software assisted in identifying the most important themes and making them central thereby seeking further exploration of them.

Finally, Lincoln and Guba (1985) suggest triangulation as another technique for increasing the probability of credible findings. Triangulation refers to the application of multiple sources of data collection and multiple researchers to increase research credibility. The technique of the triangulation has been applied in the research since 3 researchers were involved in the data collection and data analysis of the research.

The peer debriefing technique was also applied during the data analysis phase. The peer debriefing technique is a process of exposing ideas and hypothesis during data analysis to a peer that plays the role of the devil’s advocate helping the researcher to “test a working hypothesis” or “test the next steps in the emerging methodological design”. The role of the devil’s advocate was played by fellow researchers and also among the two researchers of the project who analyzed the data separately and then discussed and challenged each other’s views on the coding procedures and personal interpretations of the data.

Furthermore, referential adequacy was applied to increase the probability of credible finding. Referential adequacy refers to the raw data archiving so different analysts can “reach similar conclusions” or “test the validity of the conclusions” (Lincoln & Guba, 1985: 313). In our case all the data from the reflections, open –ended questions and group interviews was imported in the ATLAS.ti software which assisted the data analysis. Therefore, data exists in electronic form and can be easily accessed.

Finally, as has been suggested by Lincoln and Guba (1985) that all the techniques for establishing trustworthiness can also be assisted by the creation of a reflective journal to record a variety of information such as daily scheduling, personal diary events for reflection, methodological issues and decisions. The reflective journal was kept by the researchers throughout the process of the research. Additionally, notes and memos related to the data analysis have been archived in the ATLAS.ti software.

First week (day) of the course/ Last week (day) of the course

Student’s understanding, contributions and expectations

During the first week of the course students were provided with a set of open-ended questions that were completed individually by all course participants. Students reflected on the following four questions aiming to identified their knowledge of sustainable development in agrifood and forestry systems and their personal experiences and competences (the ones they anticipated they brought to the educational activity and they ones they wanted to improve):

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

2. What experiences and competences do I bring to the educational activity to make it a success?

3. What are the questions I would like this educational activity to help me find an answer to?

4. What are the competences I´d like to train/improve in this educational activity?

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

Feedback from the students on the 1 activity-question named Knowledge and skills for sustainable development was coded around the following codes: *Environment*, *Management Enterprise*, *Animal*, *Product/market*, *Knowledge*, *Learning Skills*, *Agriculture-environment.*

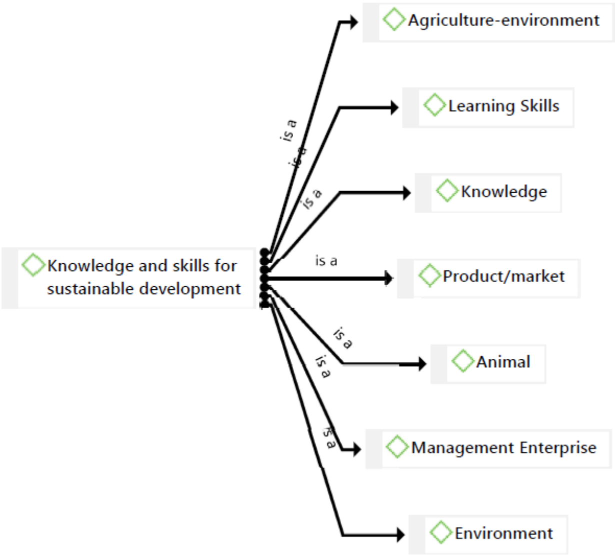


Diagram 1 : Knowledge and skills for sustainable development

The *Environment* main code was linked to a number of sub-codes such as resources exploitation, rational resource management, recycling, respect to the environment, compliance with environment protection rules, climate change**,** ecosystem**,** effects of pesticides.

The Management Enterprise main code was linked to a number of sub-codes such as intensive livestock operation, pesticide application methods**,** manure as organic fertilizer**,** reduction of production cost**,** stable hygiene conditions**,** disease management**,** appropriate machinery, appropriate establishment**,** economic growth**,** reducing pesticide use and economic issues.

The *Animal* main code was linked to a number of sub-codes such as, animal welfare, animal health, animal's life cycle, animals' physiology, animals' reproduction and animal nutrition.

The Product/market main code was linked to a number of sub-codes such as organic products, improve product quality, value chain, balance between environment and the market

The Knowledge main code was linked to a number of sub-codes such as experiential knowledge, practical knowledge, understanding concept of sustainability.

The Learning main code was linked to a number of sub-codes such as interactive learning, learning in real farm settings and continuous learning about environmental issues.

Students identified a number of *Skills* to support sustainable development. The code was linked to a number of sub-codes such as communication skills, persuasion skills, action-learning skills, consciousness, professionalism, ability to provide or recommend solutions, ability to conduct experiments.

The Agriculture-environment main code was linked to a number of sub-codes such as changes and current status of agriculture, organic agriculture/organic livestock farming.

2. What experiences and competences do I bring to the educational activity to make it success?

Feedback from the students on the 2 activity-question named *Experiences and competences* was coded around the following codes*: Individual skills*, *Team skills, Knowledge-related skills*, *Personality traits*, *Self-improvement skills.*

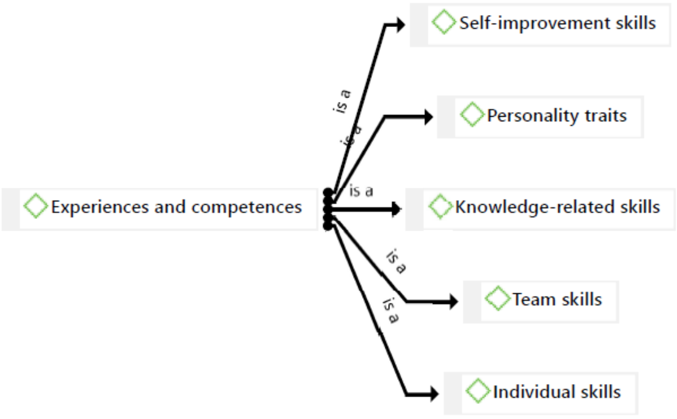


Diagram 2: *Experiences and competences*

The main code *Individual skills* was linked to a number of sub-codes such as organizational skills, critical skills, structured thinking, taking initiatives, information-processing skills, knowledge application skills, discussion skills, project-learning skills, taking action skills.

The main code *Team skills* was linked to a number of sub-codes such as team spirit, solidarity, group participation skills, classroom participation skills, teamwork skills, cooperation skills, communication skills, transfer of personal experiences in the classroom, sharing of experiences, active participation.

The main code *Knowledge-related skills* was linked to a number of sub-codes such as practical knowledge on livestock farming, knowledge delivery skills and knowledge acquisition skills.

The main code *Personality traits* was linked to a number of sub-codes such as personal thoughts, personal beliefs and being open-minded.

The main code *Self-improvement* was linked to a number of sub-codes such as problem-identification skills, learning by mistakes, willingness to learn, willingness to work, personal experiences, query expression and information seeking skills.

3. What are the questions I would like this educational activity to help me find an answer to?

Feedback from the students on the 3 activity-question named Educational activity expectations was coded around the following codes: how to write a scientific essay, Knowledge opportunities, Future_aftercourse.

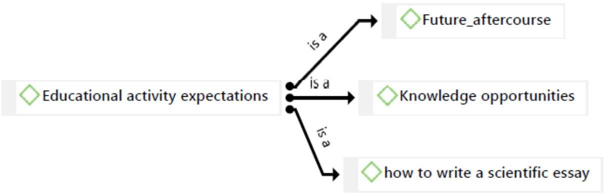

Future_aftercourse
is a
is a
Educational activity expectations
Knowledge opportunities
is a
how to write a scientific essay

Diagram 3: Educational activity expectations

The main code how to write a scientific essay was linked to a number of sub-codes such as how can I choose a scientific area, how to choose key-words, how can I write the references, what is the appropriate structure of an essay.

The main code Knowledge opportunities was linked to a number of sub-codes such as how to put my knowledge into practice, sufficient knowledge for the labor market, how can I understand better the knowledge I obtain, how can I understand my gaps in knowledge, how can I help others with the knowledge acquired, how could the knowledge be more understandable, how can I put theory into practice, how can I learn more.

The main code Future_aftercourse was linked to a number of sub-codes-question such as how can I understand that my decision is a good fit for me, in which fields can I work after my graduation, how can I be sure that I have chosen the right direction, what are the competences I will get from this lesson, how is this important to my future career, how can I make it interesting to someone that doesn't find it so interesting, how can I work methodically, how to seek for information, what are the working conditions abroad.

4. What are the competences I'd like to train and improve significantly in this educational activity?

Feedback from the students on the 4 activity-question named *The desired competences* was coded around the following codes*: Language excellence, Instrumental competencies, Generic competencies and Research skills.*

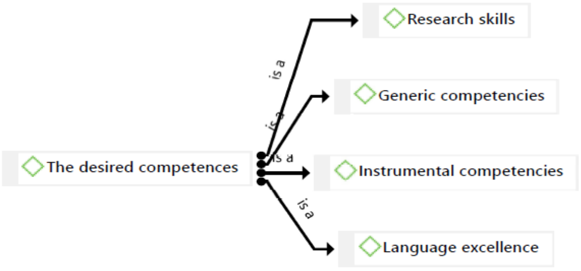


Diagram 4: Educational activity expectations

The main code *Language excellence* was linked to a number of sub-codes such as foreign languages and improving my competence in foreign languages.

The main code *Instrumental competencies* was linked to a number of sub-codes such as knowledge application, problem solving skills, thinking skills, group working skills and digital skills.

The main code *Generic competencies* was linked to a number of sub-codes such as self-confidence, critical skills, motivation, argumentation skills, debating skills, experiential learning skills, action-learning skills, putting-theory-into-practice skills, creativity, motivating group members skills, learning skills and participation skills.

The main code *Research skills* was linked to a number of sub-codes such as information- seeking skills, data collection skills, information evaluation skills, research skills and scientific writing skills.

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). All 43 students who participated in the course completed the questionnaire.

Table 3, presents a comparison of the means from the first and the final week of the course. Comparisons of the means and standard deviation 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, the one completed during the first day of the course and the second completed by the students at the final day of the course.

There were no significant differences in the scores as indicated in the results of the t-test (df=42, p-value < .05) (see bellow Table … Paired samples Test).

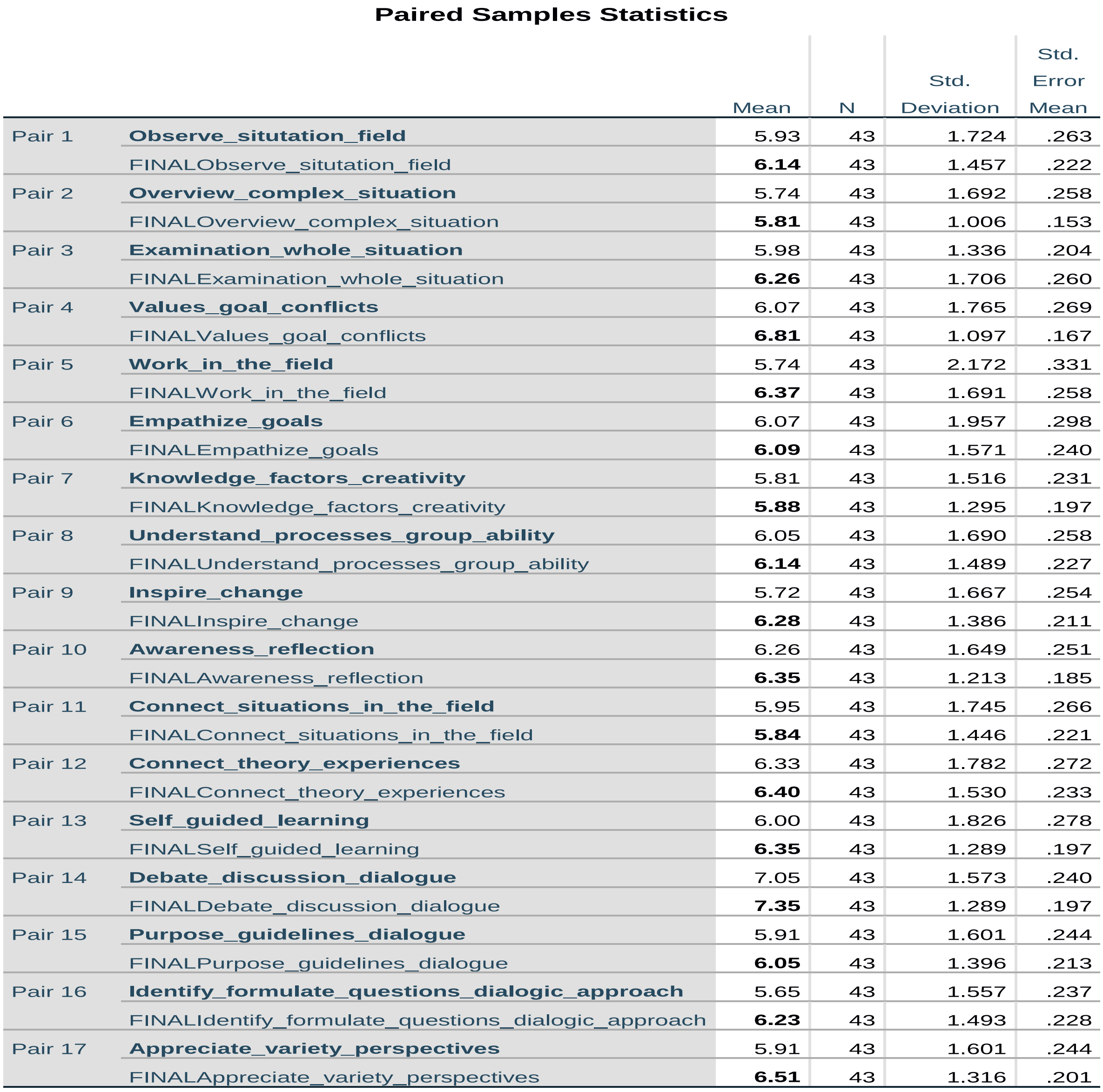
In an attempt to explain the results we could make the following remarks:

1. there is an increase in all means

2. the highest increase was observed in items *“values_goals_conflicts”* *“identify_formulate_questions_dialogic_ approach”* and *“appreciate_variety_perspectives”* .

3. higher increase was observed in items related mainly to the *discussion* factor

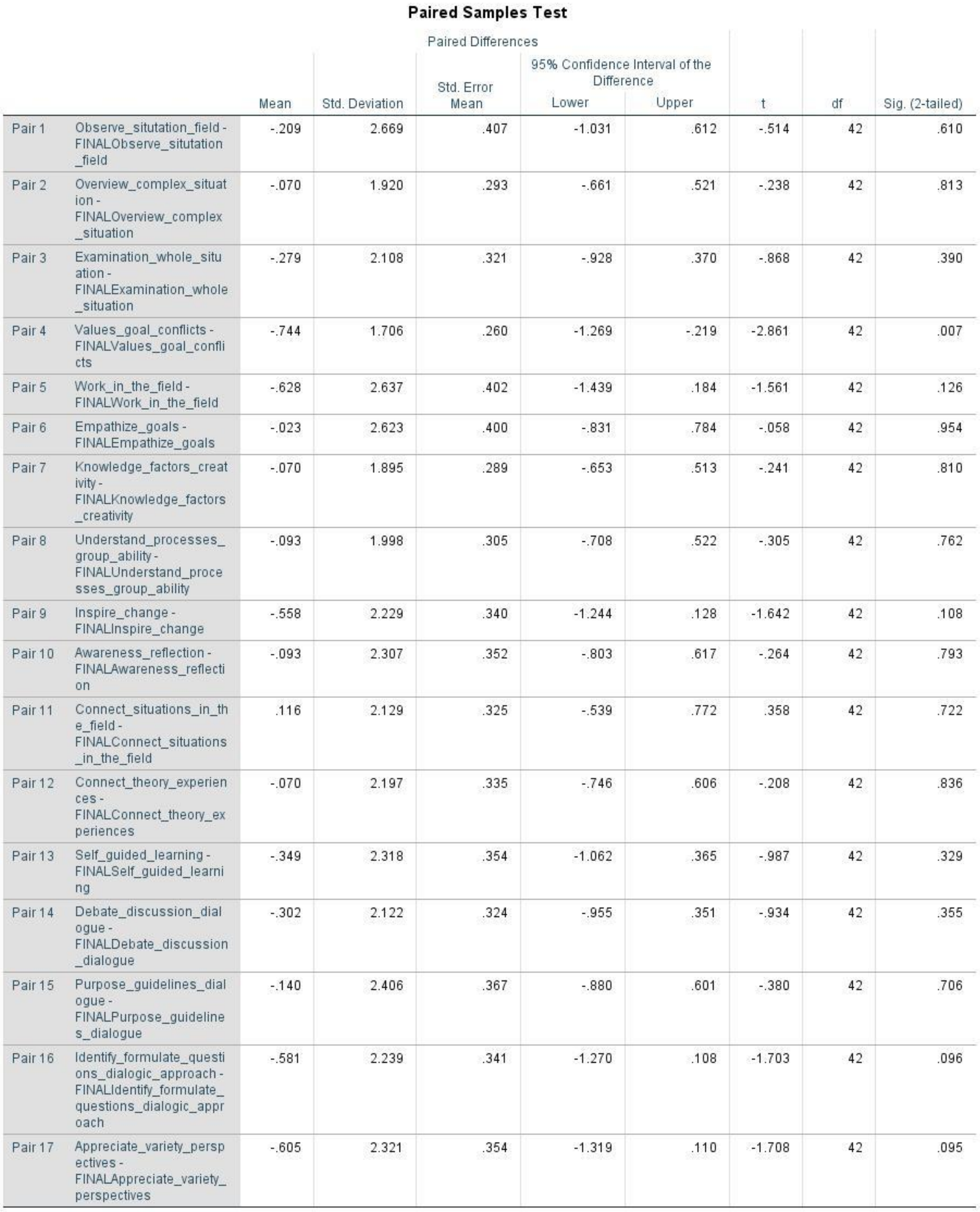
4. the means from the first week appear to be quite high (5,72-6,33) (this should be kept in mind for the cycle 3 of the data collection. Are these high means relate to the students’ enthusiasm and willingness to participation in the course? Is there a cultural issue?



Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	**Observe_situtation_field**	5.93	43	1.724	.263
	FINALObserve_situtation_field	**6.14**	43	1.457	.222
Pair 2	**Overview_complex_situation**	5.74	43	1.692	.258
	FINALOverview_complex_situation	**5.81**	43	1.006	.153
Pair 3	**Examination_whole_situation**	5.98	43	1.336	.204
	FINALExamination_whole_situation	**6.26**	43	1.706	.260
Pair 4	**Values_goal_conflicts**	6.07	43	1.765	.269
	FINALValues_goal_conflicts	**6.81**	43	1.097	.167
Pair 5	**Work_in_the_field**	5.74	43	2.172	.331
	FINALWork_in_the_field	**6.37**	43	1.691	.258
Pair 6	**Empathize_goals**	6.07	43	1.957	.298
	FINALEmpathize_goals	**6.09**	43	1.571	.240
Pair 7	**Knowledge_factors_creativity**	5.81	43	1.516	.231
	FINALKnowledge_factors_creativity	**5.88**	43	1.295	.197
Pair 8	**Understand_processes_group_ability**	6.05	43	1.690	.258
	FINALUnderstand_processes_group_ability	**6.14**	43	1.489	.227
Pair 9	**Inspire_change**	5.72	43	1.667	.254
	FINALInspire_change	**6.28**	43	1.386	.211
Pair 10	**Awareness_reflection**	6.26	43	1.649	.251
	FINALAwareness_reflection	**6.35**	43	1.213	.185
Pair 11	**Connect_situations_in_the_field**	5.95	43	1.745	.266
	FINALConnect_situations_in_the_field	**5.84**	43	1.446	.221
Pair 12	**Connect_theory_experiences**	6.33	43	1.782	.272
	FINALConnect_theory_experiences	**6.40**	43	1.530	.233
Pair 13	**Self_guided_learning**	6.00	43	1.826	.278
	FINALSelf_guided_learning	**6.35**	43	1.289	.197
Pair 14	**Debate_discussion_dialogue**	7.05	43	1.573	.240
	FINALDebate_discussion_dialogue	**7.35**	43	1.289	.197
Pair 15	**Purpose_guidelines_dialogue**	5.91	43	1.601	.244
	FINALPurpose_guidelines_dialogue	**6.05**	43	1.396	.213
Pair 16	**Identify_formulate_questions_dialogic_approach**	5.65	43	1.557	.237
	FINALIdentify_formulate_questions_dialogic_approach	**6.23**	43	1.493	.228
Pair 17	**Appreciate_variety_perspectives**	5.91	43	1.601	.244
	FINALAppreciate_variety_perspectives	**6.51**	43	1.316	.201

Table 3. Self-assessment of competences Questionnaire – Overall Means (First week and final week)



Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Observe_situtation_field - FINALObserve_situtation_field	-.209	2.669	.407	-1.031	.612	-.514	42	.610
Pair 2	Overview_complex_situation - FINALOverview_complex_situation	-.070	1.920	.293	-.661	.521	-.238	42	.813
Pair 3	Examination_whole_situation - FINALExamination_whole_situation	-.279	2.108	.321	-.928	.370	-.868	42	.390
Pair 4	Values_goal_conflicts - FINALValues_goal_conflicts	-.744	1.706	.260	-1.269	-.219	-2.861	42	.007
Pair 5	Work_in_the_field - FINALWork_in_the_field	-.628	2.637	.402	-1.439	.184	-1.561	42	.126
Pair 6	Empathize_goals - FINALEmpathize_goals	-.023	2.623	.400	-.831	.784	-.058	42	.954
Pair 7	Knowledge_factors_creativity - FINALKnowledge_factors_creativity	-.070	1.895	.289	-.653	.513	-.241	42	.810
Pair 8	Understand_processes_group_ability - FINALUnderstand_processes_group_ability	-.093	1.998	.305	-.708	.522	-.305	42	.762
Pair 9	Inspire_change - FINALInspire_change	-.558	2.229	.340	-1.244	.128	-1.642	42	.108
Pair 10	Awareness_reflection - FINALAwareness_reflection	-.093	2.307	.352	-.803	.617	-.264	42	.793
Pair 11	Connect_situations_in_the_field - FINALConnect_situations_in_the_field	.116	2.129	.325	-.539	.772	.358	42	.722
Pair 12	Connect_theory_experiences - FINALConnect_theory_experiences	-.070	2.197	.335	-.746	.606	-.208	42	.836
Pair 13	Self_guided_learning - FINALSelf_guided_learning	-.349	2.318	.354	-1.062	.365	-.987	42	.329
Pair 14	Debate_discussion_dialogue - FINALDebate_discussion_dialogue	-.302	2.122	.324	-.955	.351	-.934	42	.355
Pair 15	Purpose_guidelines_dialogue - FINALPurpose_guidelines_dialogue	-.140	2.406	.367	-.880	.601	-.380	42	.706
Pair 16	Identify_formulate_questions_dialogic_approach - FINALIdentify_formulate_questions_dialogic_approach	-.581	2.239	.341	-1.270	.108	-1.703	42	.096
Pair 17	Appreciate_variety_perspectives - FINALAppreciate_variety_perspectives	-.605	2.321	.354	-1.319	.110	-1.708	42	.095

Table 4. Paired samples Test

Mid-course

During the mid-term evaluation through discussion and reflection students have identified a number of supporting and hindering forces through the experience gained from the course. The diagram below presents the main findings.

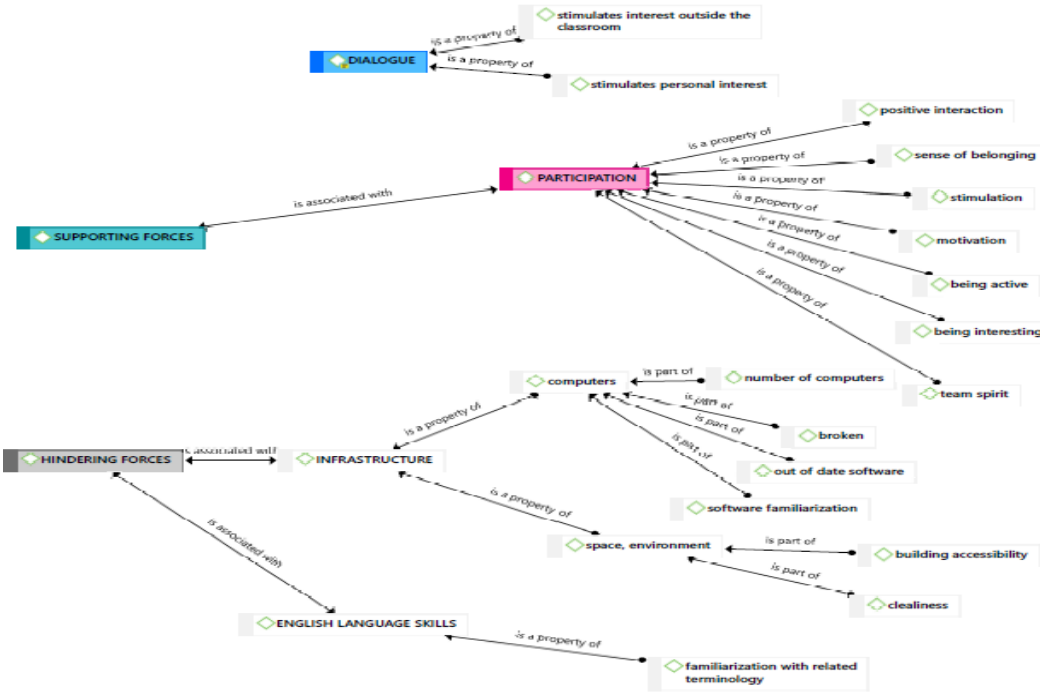


Diagram 5: Supporting and Hindering Forces identified by the students

Final course evaluation

Teachers' final documents

A reflection document, prepared by Dr Aristotelis Lymberopoulos, provided feedback and a description of his involvement, the perceived development of students' competences, main themes and issues and a plan for further improvement of the course “Farm Animal Reproduction”.

Dr Lymberopoulos commented very positively on his experience of the course and pointed out that during the winter semester 2019-20 through his involvement with the Nextfood project, he had the chance to enhance his course “Farm Animal Reproduction” with more action-based learning activities and to form groups among the course participants.

According to Dr Lymberopoulos, the students hat were involved in more action-based learning activities gained practical experience and were provided with the opportunity to get “a flavour of the outside world” since the farmers' industry needs to hire people that are prepared for the field conditions”.

Therefore, the course “Farm Animal Reproduction” was redesigned to allow more time to practice. Practical sessions were increased from 2 hour per week to 3 hours per week whereas theory sessions were decreased from 3 hour per week to 2 hours per week. During practical sessions students were given the opportunity to “pass most of the teaching time in the field by working and getting work experience on the items which they have been taught”.

As it was pointed out by Dr Lymberopoulos:

> *"In this case they have the opportunity to get the appropriate experience on how they have to work and keep records when they enter a farm. In this way 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".*

Above all, the course's underlying objectives were

a) to adequately prepare and train students to meet the diverse needs of various stakeholders

b) to provide training and education on identified problems and keep them abreast with current developments in the sector through the contact with the farmers

Dr Lymberopoulos also commented on the formation of groups within the students. Students were divided in groups of 3-4 persons having to produce a literature review on a topic dealing with the subjects taught for the "Farm Animal Reproduction" course, and then present their work in front of the other groups. According to Dr Lymberopoulos "the team working approach really added to the learning experience".

Finally, Dr Lymberopoulos commented that there was a 40% improvement in students' marks in comparison to previous years' marks.

Institutional factors affecting higher education

A written report of the focus group interview on institutional factors

A group interview with academic leaders and faculty members was expected to take place at the end of March 2020. However, since government closed all universities to mitigate the effects of the COVID-19 pandemic up to 10th of May, the group interview with academic leaders and faculty members was rescheduled and finally it took place on the 15th of May 2020. The focus group interview was conducted online via Skype. Four teachers from School of Geoscience, Department of Agriculture and Department of Food Science and Technology participated in the focus group discussion. The discussion lasted approximately 1 hour and 30 minutes.

The teachers were engaged in a very meaningful and fruitful discussion about the adoption of action-learning methodologies. The results of the focus group discussion were grouped around 4 main categories, namely *the current situation*, *the departmental needs* and *the factors affecting the adoption of action-learning techniques*. They also provided a number of helpful *recommendations to assist in the adoption of action learning*.

One of the main themes that arose during the focus group discussion was the fact that the Department goes through a *transition period* from a *technological orientation to a University orientation*. Teachers commended on the *increased teaching hours* and on the need to find *time to adjust in this new situation*. They discussed numerous action-based learning techniques they utilize in their courses and they mainly commented on the *lack of management* for the adoption of action-based learning. As it was pointed out by one of the teachers:

> *"In the phase of creating the new Institution, I still think we are looking to find our pace and see what opportunities we have"* (Focus group Teachers, 35071:35811).

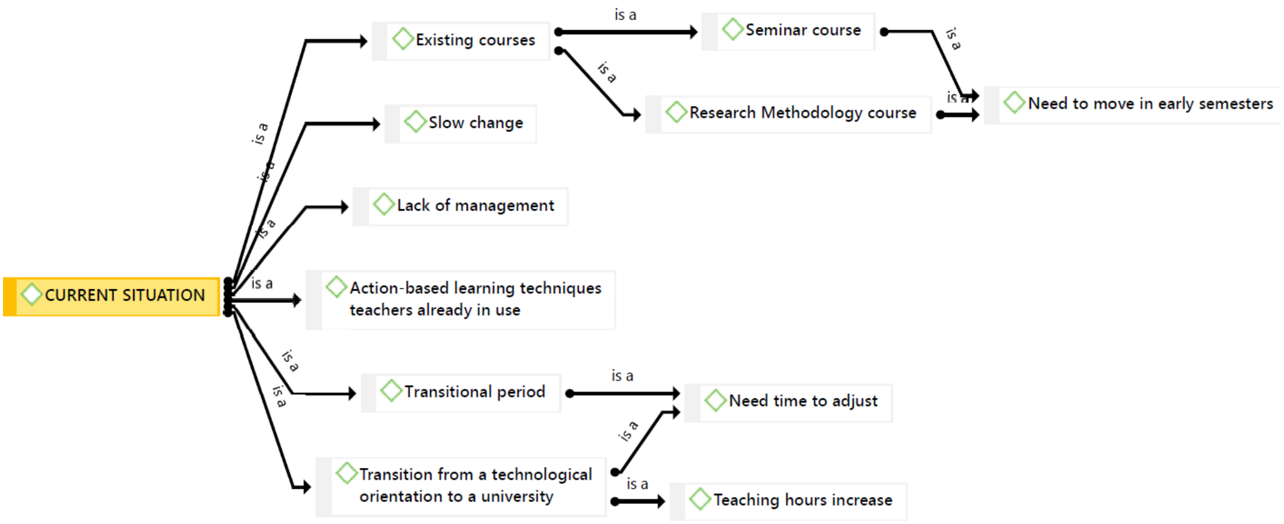


Diagram 6. The current situation

Teachers also identified a number of departmental needs for the adoption of action-based learning **techniques. According to the teachers one of the first things the department needs to do is to *set a*** *vision* for the adoption of action-based learning, to *identify the faculty needs* , to set the *aim* and the *objectives for the adoption of action-learning*, to decide on its *orientation*, to provide *training for the teachers*, to *identify the students' needs*, to *seek students'* meaningful *feedback*, to find ways to *actively engage students* to action-based learning techniques and to solve more practical problems such as *lab modernization* and more effective *use the institutional farm*.

> *"Because you can't impose it, we can see the outlines of the lessons, but that also has to do with what the teacher thinks about his/her lesson. But all this could be evaluated through a departmental meeting aiming at what the Department wants to do, where the Department wants to go"* (Focus group Teachers, 25384:25966).
>
> *"Alexandra said before that it has to do with the direction the Department wants to go, a more practical direction or a more theoretical one. This*

universityization (university orientation), I think, limits us to giving this practical, the laboratory direction, to our curricula. That is my view. It is practically impossible with the new teaching hours to handle the laboratory ones. So, in fact we are forced to limit the lab hours so that we can respond to the teaching hours with the existing staff. So, it is very important, there is an urgent need to hire new staff, so that we can meet and serve the laboratory needs: teachers but also technical staff for technical assistance provision. This is very important……. These are issues that we are experiencing and should be addressed, I think. I want to say that there are practical problems on the one hand, the number of students and the lack of staff on the other, but also the universityization, which alters the character of the department, as a technological institution we had a more practical direction" (Focus group Teachers, 30070:31573).

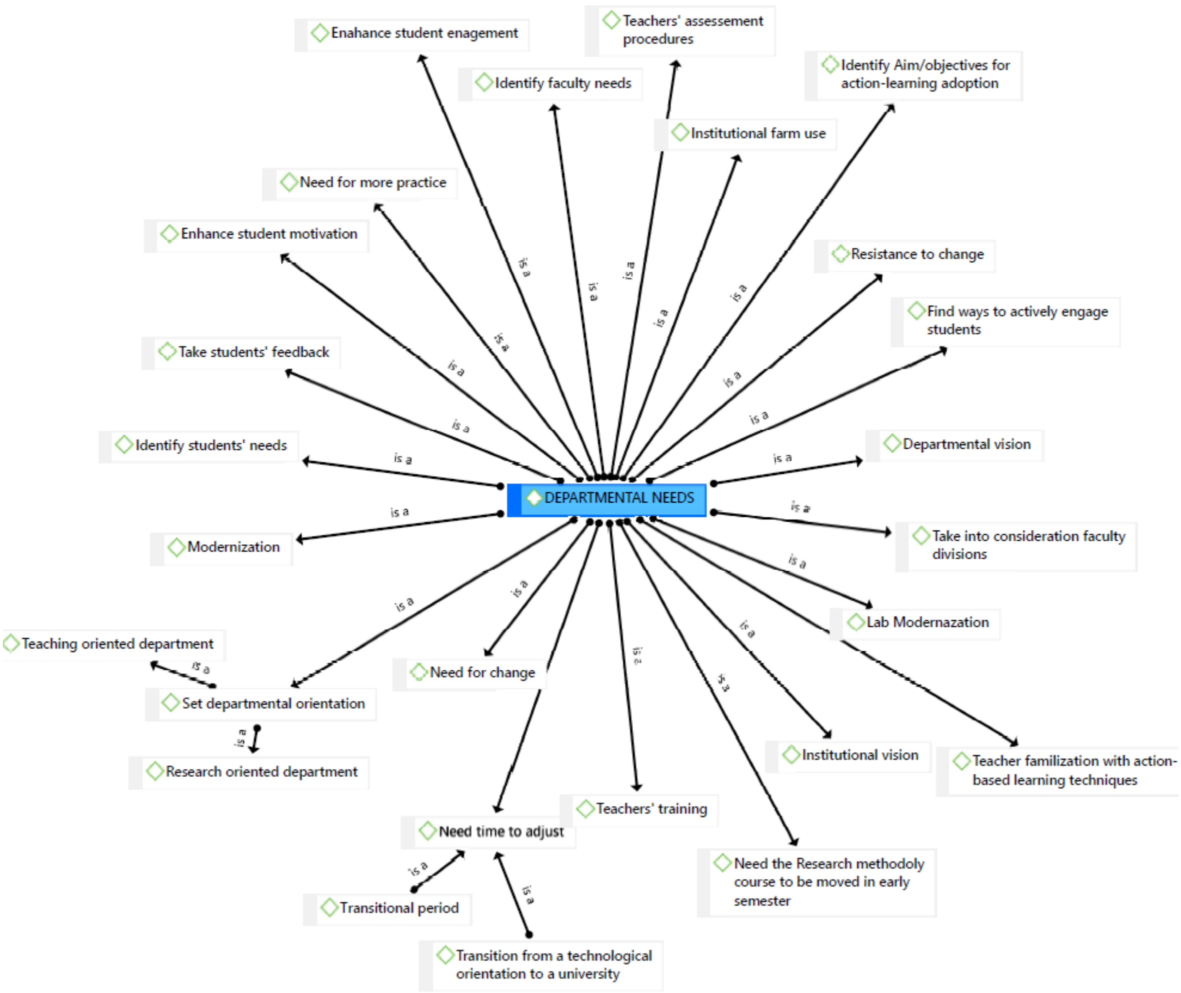

Enahance student enagement
Teachers' assessement procedures
Identify faculty needs
Identify Aim/objectives for action-learning adoption
Institutional farm use
Need for more practice
Enhance student motivation
Resistance to change
Find ways to actively engage students
Take students' feedback
Identify students' needs
Departmental vision
DEPARTMENTAL NEEDS
Modernization
Take into consideration faculty divisions
Lab Modernazation
Teaching oriented department
Need for change
Set departmental orientation
Research oriented department
Institutional vision
Teacher familization with action-based learning techniques
Teachers' training
Need time to adjust
Need the Research methodoly course to be moved in early semester
Transitional period
Transition from a technological orientation to a university
is a

Diagram 7. Departmental needs

Teachers also managed to identify a number of factors affecting the successful employment of action-learning techniques. They mainly mentioned the *large student numbers*, issues of *bureaucracy*, the *lack of established assessment procedures* for teaching, the issue of *personnel shortage* either in lab personnel or academic personnel and the *reduced budget* that hinders the adoption of action-learning.

The teachers commented on the teachers' assessment process:

> *"Teacher 1: You've got the results of the teachers' assessment.*
>
> *Teacher 2: You've got the results of the teachers' assessment. The thing is what we do with that.*
>
> *Teacher 1: I do not think there has been an improvement.*
>
> *Teacher 3: The issue is the process, we have this professor who has bad evaluation results to help him improve. That's where the problem lies.*
>
> *Teacher 4: Problems were identified based on the students' observations but there was simply no willingness on the part of colleagues to see this. Because that's exactly what we're saying, it's a matter of character.*
>
> *Teacher 3: For me there is no established process to follow up when you have a bad result. That could be set up"* (Focus group Teachers, 23094:24043).

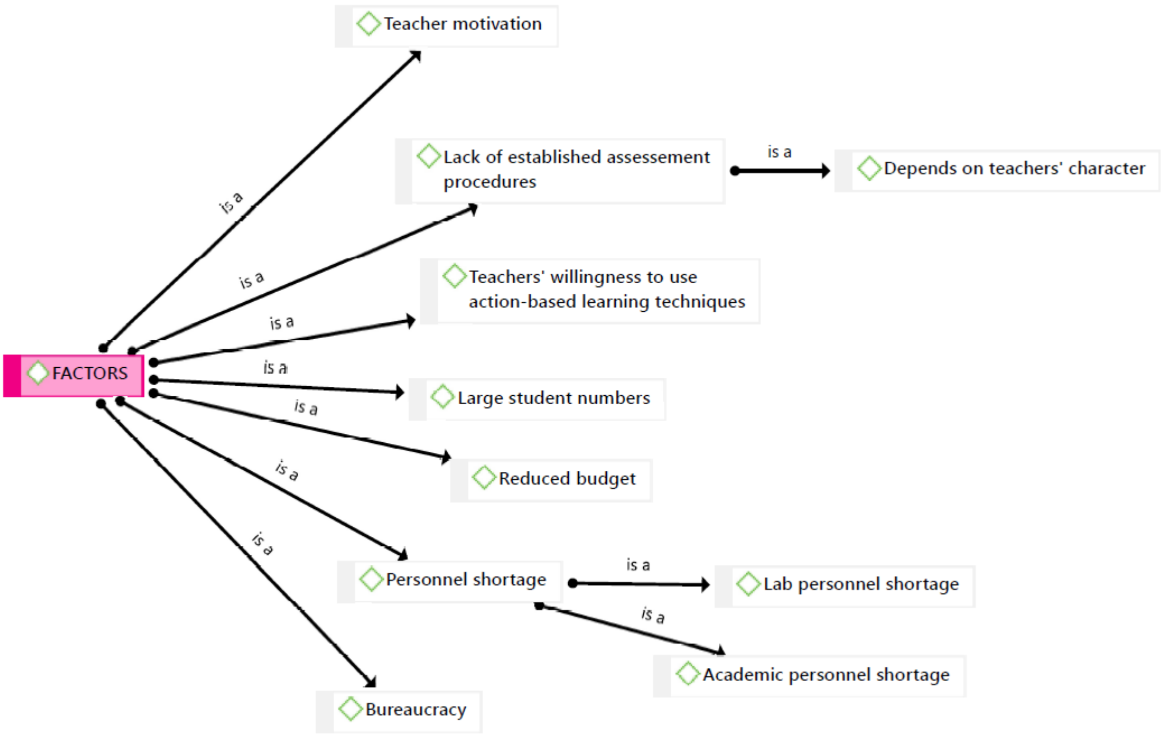

Teacher motivation
Lack of established assessement procedures
is a
Depends on teachers' character
Teachers' willingness to use action-based learning techniques
FACTORS
Large student numbers
Reduced budget
Personnel shortage
Lab personnel shortage
Academic personnel shortage
Bureaucracy
is a

Diagram 8. Factors affecting action-learning adoption

Finally, teachers made a number of recommendations for the future adoption of action learning techniques by their Department. In order to successfully employ action-learning techniques they recommended that first of all the department needs to *set a vision*, then proceed with *teacher training* in relation to action-based learning techniques, *engage in discussions in departmental meetings*, *utilize NextFood results* and *organize workshops* to disseminate these results, organize more *field trips*, evaluate and *update course syllabi*. Their recommendations also included the *departmental use of the institutional farm* that has been neglected for some years included more *utilization of the institutional farm*, the *employment of farm personnel* and suggestions for the *institutional farm management*.

> *“I would suggest that you could do a workshop with the results of the program, invite colleagues and present what has been done”* (Focus group Teachers, *49673:51108*).
>
> *“Little by little, the discussions that take place during departmental meetings, we have to get these results and finally tell the Institutional Administration that this way, the participatory way is working”* (Focus group Teachers, *20856:21434*).
>
> *“Let me say something about it, suggestions on how this can be done. It is a given fact that the teachers and each of us have their usual tactics of doing a lesson and no one wants to change the slightest thing, not to change his/her routine, not to change anything. And that's bad for the education system. So, changing teachers and getting others is not the easiest solution. We have them; we will go on with them. But the point is that from a programmatic point of view, from an administrative point of view, let's say if there is a discussion in the departmental meetings that the courses cannot only be based on lectures but we have to put in some work, to get the students involved in the process”.* (Focus group Teachers, 18816:19636).

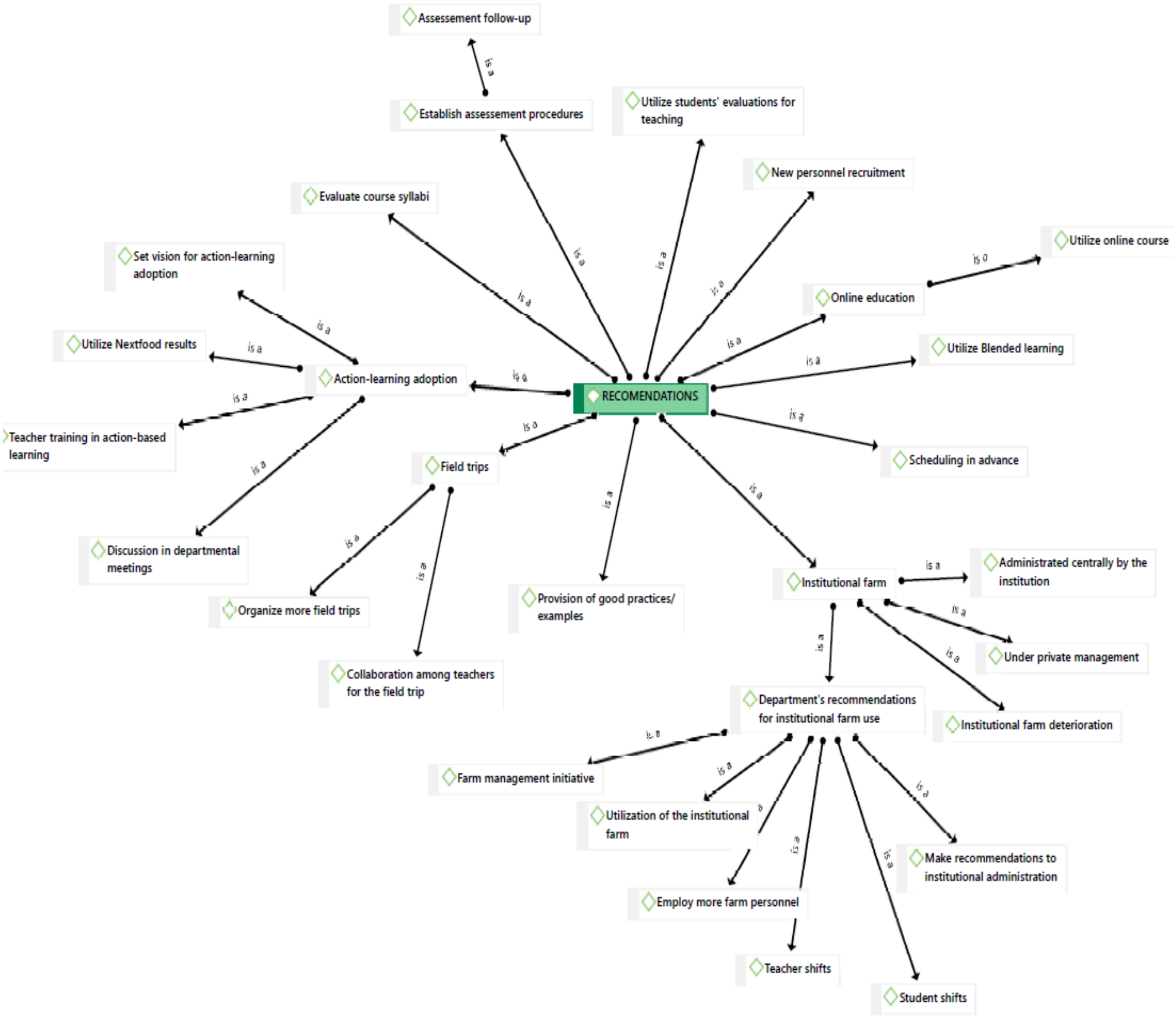

Assessement follow-up
is a
Establish assessement procedures
Utilize students' evaluations for teaching
New personnel recruitment
Evaluate course syllabi
is a
is a
is a
Utilize online course
is a
Set vision for action-learning adoption
is a
Online education
is a
Utilize Nextfood results
is a
Action-learning adoption
is a
RECOMENDATIONS
is a
Utilize Blended learning
is a
Teacher training in action-based learning
is a
Field trips
is a
Scheduling in advance
is a
Discussion in departmental meetings
is a
is a
is a
Organize more field trips
Provision of good practices/ examples
is a
Institutional farm
is a
Administrated centrally by the institution
Collaboration among teachers for the field trip
is a
is a
Under private management
is a
Department's recommendations for institutional farm use
Institutional farm deterioration
is a
Farm management initiative
is a
Utilization of the institutional farm
is a
is a
Make recommendations to institutional administration
is a
Employ more farm personnel
Teacher shifts
Student shifts

Diagram 9. Recommendations for the adoption of action-based learning methodologies.

DemographicsNumber of students starting the educational activity

A total number of 43 students started the course of “Farm Animal Reproduction”, 27 were female and 16 were male.

STUDENTS		Frequency	Percent
	Male	16	37,3
	Female	27	62,7
	Total	43	100,0

Number of students passing the educational activity

A total number of 33 students participated to the final exams. 10 students did not participate at the final exams by choice as they have the opportunity to sit for exams at the September exam period. From the total number of students participated to the exams 21 passed the educational activity and 12 did not. According the course leader Professor Lymberopoulos students' the performance in the exams was improved by 30-40 %.

Educational background of students

All students participated to the educational activities were undergraduate students.

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

All students participated to the educational activities were undergraduate students. Therefore, none of them had experience in the field/business.

Student FOCUS GROUPS evaluation

By the end of the course we organized 5 focus groups during which we were able to have an in-depth discussion with the students about their experience of the action-based learning methodology.

During the course of the module the research team had identified a number of problems which were related to the level of academic competence of the students. The students confirmed our observations and identified a number of skills that they needed to acquire in order to enhance their competences as students and as future professionals. It is our understanding that supporting the acquisition of these skills will also enhance the competences as described by the NMBU team and the D3.1 and D2.1 documents. Below you can see Diagram 10 with the identified skills that the students felt they needed in order take advantage of the methodology more fully.

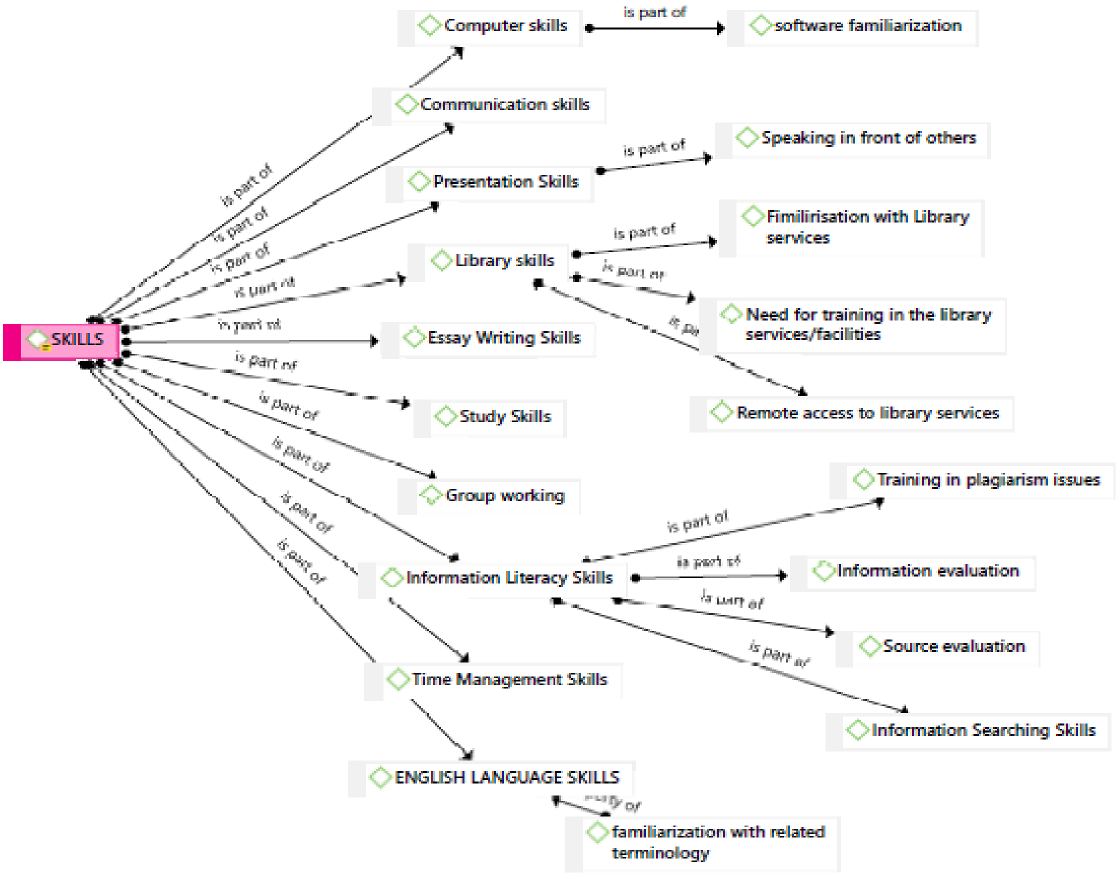


Diagram 10. Skills needed by students in order to develop academic and professional competences.

The coding of the focus groups was based on the coding tree recommended by the D3.1 and D2.1 documents. There were six main categories of competences described and aimed to develop through the action-based model, namely *participation*, *visionary thinking*, *observation*, *reflection*, *dialogue* and *facilitation*. Based on the definitions of these competences we created sub-categories that were also used in our coding. The diagram below presents the six main categories with their subcategories.

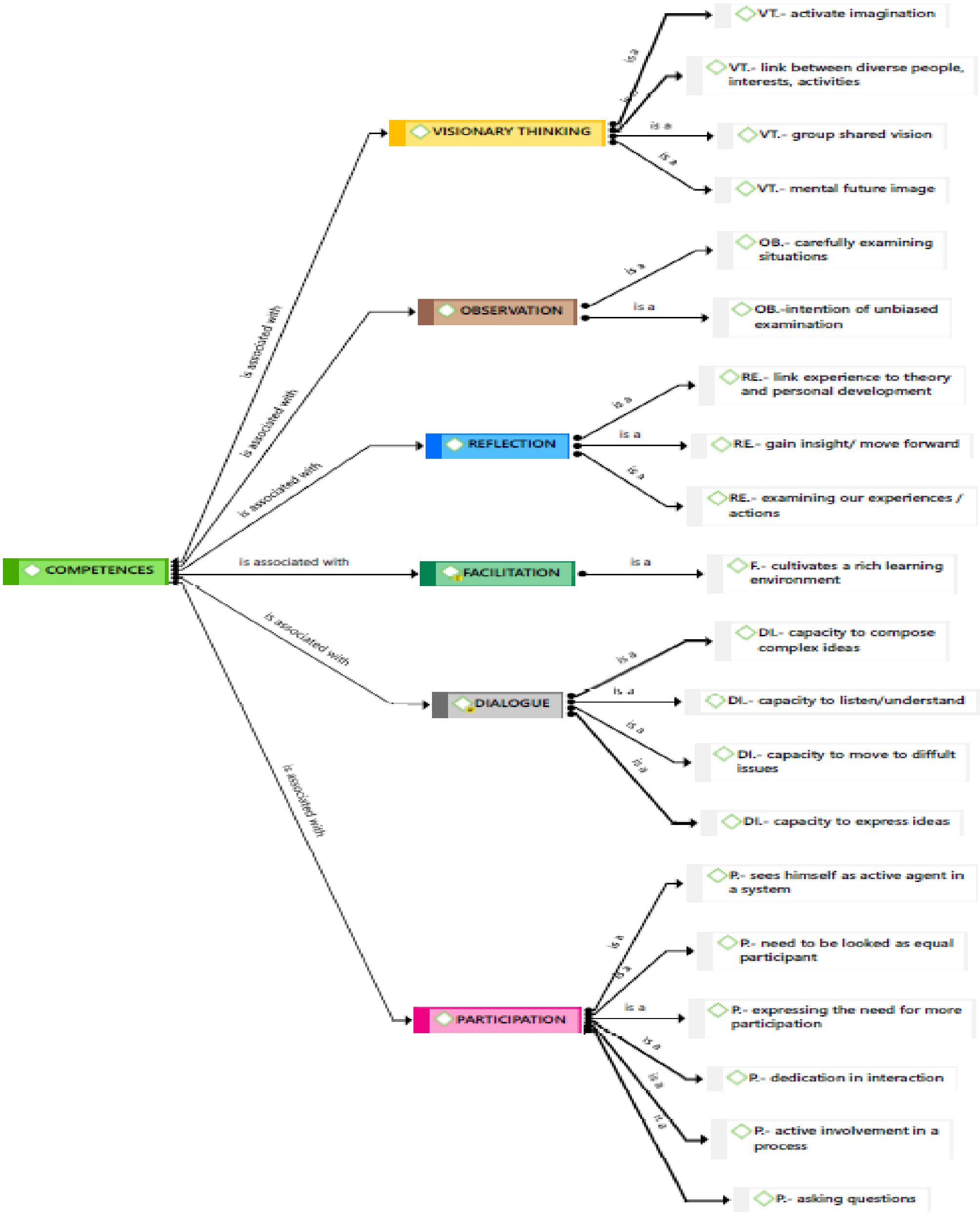

VT.- activate imagination
VT.- link between diverse people, interests, activities
VT.- group shared vision
VT.- mental future image
VISIONARY THINKING
is a
OB.- carefully examining situations
OB.-intention of unbiased examination
OBSERVATION
RE.- link experience to theory and personal development
RE.- gain insight/ move forward
RE.- examining our experiences / actions
REFLECTION
COMPETENCES
is associated with
FACILITATION
F.- cultivates a rich learning environment
DI.- capacity to compose complex ideas
DI.- capacity to listen/understand
DI.- capacity to move to diffult issues
DI.- capacity to express ideas
DIALOGUE
P.- sees himself as active agent in a system
P.- need to be looked as equal participant
P.- expressing the need for more participation
P.- dedication in interaction
P.- active involvement in a process
P.- asking questions
PARTICIPATION

Diagram 11. Competences as described in D3.1 and D2.1 of the action-based learning model

Up to the development of the D3.1 and D2.1 documents we were using the Grounded Theory, open coding methodology as described above, which helped us in an in-depth understanding of different factors that were influencing the learning and the competences of our students.

At this moment we have the task of enriching our perception of our case and of our data by combining the two coding methodologies (open coding and also applying the “competence” coding tree). The goal of such a combination is to enhance our understanding of how to reach the goals for our case. Namely, to enhance learning, build the competences of our students and achieve the multi-stakeholder approach to education and learning, though the action-based model.

Starting with the analysis of our focus group data from the **Farm Animal Reproduction** module, students collectively showed a heightened ability to reflect mostly on "how"(meaning practical ways in which the experience changed them) rather than on "why" action learning was a transformative experience for them.

The **TRANSFORMATIVE LEARNING** component was exhibited mostly by new skills they gained that helped them overcome problematic modes of academic conduct. They also tended to concentrate on skills that they would like to acquire rather than competences as described in the action-based model. The question "why" the experience was transformative was answered briefly by some students in terms of overcoming psychological barriers like performance anxiety, assuming responsibility for team work and changing their mindset from passive learner to active participator in the production of knowledge.

In questions of **VISIONARY THINKING** students tended to concentrate on practical changes, like improvements of infrastructure and professional conduct on the part of their professors. They found it difficult to see themselves as active agents of the system **(PARTICIPATION)**. When questioned about how they envisioned themselves as professionals they answered based on their knowledge of the status quo. That is, how they would manage the status quo based on their experience rather than how they might be able to change the status quo. However, students have shown to be very dedicated to the concept of interaction and relish the opportunities to do so.

The **OBSERVATION** capacity of the students was present but not prevalent. Students showed a lot of willingness to examine their experiences but many of them seemed to lack the ability to frame their experience in a personal way and assume personal responsibility for it. During the field trip that was organized in the end of the module, students seemed to make detailed observations of the facilities but only a few of them referred to their technical observations during the focus groups.

With regards to **REFLECTION**, many students showed a heightened ability to examine their experience based on our questions. We heard some significant insights by some of them and some of them were able to link their experience to theory when we went on the field trip. There were also many instances when they mentioned how action-based learning would enhance their self-development.

The whole focus group session was a good example of **DIALOGUE** as an active process. They built on each other's views and experiences and showed the ability to listen and reflect on the collective understanding of their academic experience. Some of them also exhibited a heightened ability to compose complex ideas and a heightened awareness of the complexity of the systems involved.

Below, we are presenting a detailed account of examples regarding the six competences and their sub-categories. We will also present a sample of other attributes/codes that we find significant for the development of our case in relation to the student population.

PARTICIPATION

As one of our students mentions, visiting a working animal farming facility helped her because she had the chance to ask questions about things she knew in theory:

> "I liked it because we went on a trip, which is the only thing we did for the first time and we haven't gone on a trip with another lab course before. In general, we asked questions about things we did in the laboratory and there we had the opportunity to ask questions to the owner of the unit we went to" (Focus Group 2, 527:966)

On the whole, our students showed significant evidence that they were **dedicated to interacting** with each other, their professors and the professionals they met during the farm visit. Regarding their group project one of the students says:

> "*Student*: Power is in numbers.
> *Student*: We learned how to work as a team… to successfully work. Each of us did their part, we took the responsibility and then we put all the pieces together, identified each other's mistakes, how we can put the pieces together, how we can complete each other's work. It was the first time someone took a look at our work before we presented it and explained to us what mistakes we had made. And in order to correct them, making comments such as "I think this piece is enough", "I think the above should be included" etc." (Focus Group 2, 1560:2477)

And also,

> "*Student*: We started to have some ideas and then we asked the opinion of some colleagues from other teams.
> *Researcher*: Nice, so there was cooperation between the teams ...
> *Student*: Yes, we did that because we wanted to ask their opinions and thoughts, to see how we thought about it. At the end we managed to have a good result" (Focus Group 1, 13227:13544)

We find it interesting and significant that by enhancing participation there was also a heightened sense of **responsibility** towards the work and toward each other. It also helped students become **actively involved in a process**.

> "We learned how it is for everyone to take responsibility, for instance that you must hand in your work contribution on a specific date. In general everyone had the responsibility to contribute something to the project and generally we learned how to work better as a team" (Focus Group 1, 14555:14820)

By enhancing participation and interaction we also find that students begin to see themselves as **active agents in a system or process**. Here a student expresses the desire that professors

> "see us as colleagues and not as inferiors. I believe that some professors have to go beyond this stage that they see you there and you are inferior to them. I think the professors who see us as colleagues are much more decent with us

> and much more effective in knowledge transfer than others because they are trying to teach you the things that you will need" (Focus Group 2, 29981:30339)

During the focus groups, students repeatedly expressed the need for more participation. There were countless instances where students emphasize on the need for more practice and participation:

"*Student 1*: If you take a job and you need more specialized knowledge you will search on your own and find it in order to keep up.

Researcher: So, the key is practice

Student 1: Practice

Student 2: Practice

Student 3: And motivation" (focus group 1, 39996:40241)

FACILITATION

Regarding the **cultivation of a rich learning environment**, students rarely referred to it explicitly. Rather, we have multiple examples of passages like the following were they show their appreciation for professors who try to cultivate such learning environments:

> "It was nice to do things in the stable. We had the opportunity to see things in practice, it wasn't just theory. The fact that they tried (the teachers) to show to us another farm during the trip and gain some knowledge was very nice because it was more relaxed than being in the classroom during a lecture where you just have to sit down and listen". (Focus Group 2, 203:1026)

The component of fascilitating a rich learning environment and also fascilitating personal relationships was linked to higher motivation and better participation in terms of personal involvement and commitment:

> "It was something different that we hadn't been used to. That is, all the subject lessons we had until now had no interest. This (way of teaching) gave us motivation to participate and interact and to prepare better to come to class. It was something good that was done for the first time by this professor who is very much involved with us and he is always there when we need him, with emails, by phone and in person". **(Focus group 5, 161:680)**

OBSERVATION

For the purposes of this report we treat this code it as per the definition given, which is to **carefully examine situations**, with the intention of **unbiased examination** and without judgement. For example:

> "*Student*: It has to do with what everyone will choose to do. If we are talking about breeding and someone chooses to do traditional breeding they will not need scientific information. But, if someone wants to modernize and wants to go one step further they will need to research for such (scientific) information and knowledge.
> *Researcher*: But, doesn't a farmer really need to have access to the right

> information?
> *Student*: Usually, most people have someone to give them advice.
> *Researcher*: Who is this person?
>
> *Student*: I don't know. Usually it is a person that they pay. In my village I know of a man, a man of trust, who has his own office so he consults and gives advice to the farmers. In general, older people find it more difficult to keep up with the Internet and find information there.
>
> *Researcher*: We're talking about you, when you will go into production.
>
> *Student*: For us, it depends on we want to do. If you want to have something modern you have to look for it and then follow it. There are different ways.
> *Researcher*: How?
> *Student*: You might get advice from someone who knows. Because, the experience that an old person has will help you in the future. So, it is not only searching the internet to find some things.
>
> *Researcher*: So it has to do with experience, you said ... or is it a combination?
> Student: Both are needed". (Focus Group 2, 24657:27164)

and

> "*Student 1:* (...) All of us that went on the field trip to the farm facility... - I have never been in a facility that was so well organized and the way it was made… I have been in a simple facility, sort of a shed… Except for the ration building, I had never been inside…. It is different to see it in photographs and different when someone takes you in the corridors and tells you what they do, when… It is very different.
>
> *Student 2*: To sense the smell
> Researcher: So, from this…
> *Student 1*: Yes, when some people come for the first time and they go in and see, they don't know what to expect. (Focus Group 1, 24257:25025)

However, from our re-evaluation of first-cycle data from the learning sets, we saw that student-participants showed a heightened capacity for technical observations during those sessions. We may have to reserve defining this code as the **ability to make accurate technical observations in a farm**.

REFLECTION

The code reflection was defined as the competence to **examine our experiences and actions**. As we mentioned above, students showed significant evidence of this competence, mostly in terms of their acquired skills. Here, students reflect on how the group project helped them acquire team working skills, work load management, time management, presentation skills, writing skills.

> "*Researcher*: So, what did you develop? What did you gain through this process in terms of collaboration and work?
>
> *Student*: We learned what it is like for everyone to take responsibility, that on that day you must have given your contribution to the coursework. For example in general everyone had the responsibility to do something for the coursework. Generally we learned how to work better as a team because we split-up the

> tasks, the work was divided so everyone undertook a certain task. If someone hadn't been so involved with word processing, he (she) could do another piece more in the power point for instance. The same goes for the presentation. That is, we looked to divide the work so that everyone would present equal numbers of slides. So we managed to divide the work equally making sure that everyone will present the same amount of time". (Focus Group 1, 24257:25025)

And

> "*Researcher*: What you are describing now is very is important. It is the ability to compose work?
> *Student*: It is the most difficult task of all. Basically because if you do not have the reasoning and you have not thought about how it will start and how the work will end you cannot start it. You must have a plan and go with it step by step, keeping an order, without getting confused or getting lost in detail". (Focus Group 1, 12609:13033)

However, students also gained insights of the process by reflecting:

> "The way there is always the most difficult…". (Focus Group 1, 12009:12044).

Here the student is referring to the process of experiencing the difficulties of the new methods of learning.

And another student is saying:

> "(…) experiences, yes….and more and more experiences bring competence" (Focus Group 1, 22613:22698)

These are also examples of how they may be **linking theory to personal development**. For example:

> "I think it helped us practically for when we go out as professional agronomists, to be able to deal with various situations". (Focus Group 2, 1122:1268).

Or,

> "Regardless of whether it helps you or not, I believe that it gives you a first look at what you are going to face when you go out to work, from the simplest thing to the most complicated one. Because listening and not seeing it is something that happens all the time. .... You hear a lot of things, but to see it, is something very useful". (Focus Group 2, 1689:2042)

DIALOGUE

As mentioned before, the focus group sessions were excellent examples of dialogue and the **capacity to composite complex ideas, to listen and understand, to express their ideas and to move to difficult issues.**

Here are some good examples of the insights that the process of dialogue produced:

> ***"****Student 1*: A young person without the relevant experience who will have graduated this department and will try to convince an already well-read animal

> farmer… it will be very difficult for him. The farmer will look at him in a very different way than he would look at a more experienced person. He (the more experienced person) would be able to give him something that he needs and he would also be able to convince him to use it.
>
> *Researcher:* So, what is it that you have to build with the farmer?
>
> *Student 1*: We need to have more experience than the farmer. Because the farmer not only has knowledge but also experience and has tried different things and the man has paid. So when I go and approach him and talk to him I must already have the experience to encourage him to do what I have in my head, to do what I am telling him, to trust me." (Focus group 1, 31450:32230)

> "*Student 1*: Our job as animal technologists is not to go and tell them (the farmer) to do this and this… It is to advise them, not to tell them that they have to do something because…
>
> *Student 2*: It depends on the farmer. You have to "psyche them out", how to tout something because not all of them have…
>
> *Researcher*: So, there is another thing that we need to possess as animal technologists. Do you have to become psychologists as well? Is this another thing that you need to gain?
>
> *Student 1*: Isn't trading having to psyche the other one out?
>
> *Student 2*: We are not tradesmen. We help them understand some things on how to work with their animals, how to get the products. (Focus group 1, 32850:33562)

> "*Student 1*: (Talking about the group essay) For me it was not the same. With the group I was in, with this girl we worked OK but the rest of the group didn;t appear for the presentation and we were left "hanging".
>
> *Student 2*: They helped with the writing…
>
> *Student1*: Yes, but the project ends with the presentation, if we want to finish something in general.
>
> *Student 2*: Not everybody is for everything. When there is a group project everyone has their role in it. If someone isn't good with talking or with writing an essay there is someone else who is good with presenting or writing. For example, -not how to structure the paragraphs -, what to make bold and how it should look. Everybody takes their role from what they are good at and something very nice is created. Because 4 is better than 1 in this case." (Focus group 1, 9831:10693)

And finally,

> **"***Student 1*: Our job as animal technologists is not to go and tell them (the farmer) to do this and this… It is to advise them, not to tell them that they have to do something because…

> *Student 2*: It depends on the farmer. You have to “psyche them out”, how to tout something because not all of them have…
>
> *Researcher:* So, there is another thing that we need to possess as animal technologists. Do you have to become psychologists as well? Is this another thing that you need to gain?
>
> *Student 1*: Isn’t trading having to psyche the other one out?
>
> *Student 2*: We are not tradesmen. We help them understand some things on how to work with their animals, how to get the products.” (Focus group 1, 32850:33562)

The competence of dialogue was also enhances and developed greatly between them during the process of group work:

> “*Student:* (…) that you have to listen to another person’s views… I couldn’t begin to write the essay alone and then say to my partner “now you have to explain this to the others”. You have to learn how to function in a team. It is something that we haven’t learned anywhere…. Neither from elementary or anywhere. Because, in this country we haven’t learned to cultivate this element." (Focus group 4, 14281:14654)

VISIONARY THINKING

In terms of visionary thinking, we found that students were able to think of many **breakthrough solutions** to the problems of their institution and many **images of how they would like things in the future**. Some examples are:

A student was asked if she would use her experience from the research group project in the future and she says:

> «*Student:* Definately! In every essay in my studies. But also in the future, in a job that this will be needed. This is why I said that this is something you need to know how to do (do reliable research and work in a group). You have to learn how to function with others, you are not alone!» (Focus group 4, 16382:16705)

And another student is talking about the visit to the farm facility:

> **“** *Student1*: (I would like it) If we could have more visits. I mean, we talked about the sperm, about collecting it, diluting it ect., if we could go to a lab to see all those things.
>
> *Student2*: So, the best thing would be if we could do it in practice. I mean, do it 2-3 times in practice and it certainly stays with you, you understand it. There will be more questions that you can talk with your professor about.” (Focus group 1, 20726:21139**)**

Another student is talking about how their institution’s ability to provide practice for their students should be independent from extra-institutional factors:

> “Student 1: ATEITH should have animals of its own, it should have an autonomous farm that will be sustained on its own (autonomously), to provide all the possibilities that it can, not to be rented by employers or other private professionals (contractors) etc. In this way it will not depend on what the contractor does and whether there was a contract or whatever. It (the farm) would depend solely on ATEITH and it should be autonomous. It wouldn’t depend on finding a contractor in order to stay here and not move to Florina (for example).” (Focus group 1, 9829:1069)

Or, another student about modules that he feels they need to incorporate in the curriculum:

> “There is a module for business management and organization generally but it might be that it has to specialize and become organization and management of animal-farming exploitations.” (Focus group 2, 21414:21577)

A very nice example of reflecting on his future profession and the future of his field is the following:

> “For sure, if you work in a company as an animal technologist - as a technologist, agronomist of animal production- you will work as an animal food or food balancer salesman etc. In order to work in this field you certainly need excellent knowledge in the field of nutrition, how to make a ration, analysis of animal food, to know how to analyze animal food.
>
> From there on, I believe that we come out as freelance professionals. I believe you need something that will help you communicate with the farmer. Because farmers are basically people over 55 years old and they are lacking the foundations or they are lacking the education on this part and this leads to a slow growth rate for agribusiness. I believe that we need a way to be taught how to convince a farmer to modernize and how to make good use of his profits or of the substitutions in order to modernize his facility -Not only for him but for the generations to come. I mean, what he does and what he is gaining now is very different from what he will be passing on to the next generation because the primary sector will never cease to exist.” (Focus group 2, 18862:20072)

Regarding the **link between diverse people, interests and activities**, students express the need for it very often. They repeatedly express the desire to have people from other fields come to ATEITH and provide them with insights from them their part of the system. They have also repeatedly expressed the desire for more visits in farms and communication with professionals.

> **“***Student 1*: We could also -like we went to a facility- have a farmer come to us and talk to us during a lesson. They could also come to us.
>
> *Researcher*: Good, so you can ask questions, good observation. So, you would be interested in having professionals come to your classes -not academics or professors.
>
> (...)

> *Student 2*: Graduates from our department. Like the one we visited. They will have a view like our own but only from inside the profession.” (Focus group 1, 26951:27823)

Or, while talking about the value of mentoring by a professional, experienced person:

> **“***Student 1*: You might get advice from someone who knows. Because the experience that an old person has will help you in the future. So, it is not only searching the internet to find some things.” **(**Focus group 1, 25860:26057)

And again,

> **“***Student 1*: (someone external to ATEITH, professional) could inform us on the financial facts that exist in the market now so that we know.” (Focus Group 1, 28900:29012)

TRANSFORMATIVE LEARNING

The experience of the action-based methodology has shown to have transformative effects on the students both in terms of **frames of reference** and in terms of **changes in their habits of mind**.

For example, the visit to the farm was an eye opening experience for this student:

> “*Student 1:* (...) All of us that went on the field trip to the farm facility... - I have never been in a facility that was so well organized and the way it was made… I have been in a simple facility, sort of a shed… Except for the ration building, I had never been inside…. It is different to see it in photographs and different when someone takes you in the corridors and tells you what they do, when… It is very different.
>
> *Student 2:* To sense the smell
>
> *Researcher:* So, from this…
>
> *Student 1:* Yes, when some people go for the first time and they go inside and see... they don’t know what to expect.
>
> *Student 2*: It is also a test that everybody takes with themselves...if they can handle it. So, if someone can’t stand the smell and all this, they might say “it was a mistake to come and study this”. (Focus group 1, 24257:25025)

Or, while talking about the group project another student says:

> “*Student 1*: I didn’t like the group project either but the truth is that, relative to other modules, we deepened a little. I mean, we researched in a different way, in other sites with other pages, you showed us when a site is reliable. So, it was a little different than the rest of them. Not that I liked it but we searched in a different way and more correctly in this project.” (Focus group 2, 3756:5206)

There were also very interesting general insights and how the experience transformed them:

> “Generally, I believe we matured within this module and we gained a lot of experiential knowledge, for sure.” (Focus group 4, 3633:3734)

And, referring to the group project a student says:

> “You learn to manage both yourself and others with this process. Because, under other circumstances you might have gone for a fight. But, you understand that the job cannot be done in this way. So, you learn a lot from this (having to work in a group) about yourself and about others. And, in the end, this is the aim of the course.” (Focus group 4, 5002:5318)

Another student referred to the high importance of structure and organization in a module and how this was both challenging, rewarding and transformative for students:

> “*Researcher*: So, you are asking for more organization?
>
> *Student*: Yes, which is what pressed me of course. But, in the end it was effective. Even if I didn’t like it, it was effective which means that it was good. Even more for someone who wants to follow genetic improvement (…). Now that the module finished, I believe we understood that it was useful. Because, during the semester we were pressed and it was difficult.” (focus group 4, 12045:12427)

But, perhaps most importantly for a student population was the fact that through practical experience they were able to transform their thinking about different directions in their interests and studies as well as to discover new capabilities:

> “At some point during the module, I personally saw that I had a great interest in microscopes and that I would like to get involved with that. And also, new experimental design and genetics. In the beginning, I thought “I am in animal farming, no way…etc.” During this module I found out that I am interested and that I have a good hand in this. (focus group 4, 19272:19653)

And,

> “coming here you may change your mind because you see that something else suits you better, you like something else, you have this choice” (focus group 4, 31486:31592)

And they also showed in numerous instances that they were **emotionally able and ready to change.** For example:

> “*Student*: In the presentation, with the power points, we had to gather our courage a little. We knew each other, of course, but to take the lead and speak up alone in front of people... in my case it is difficult.” (Focus group 1, 2668:2881)

And

> *“Researcher*: Were there times during the semester, with the project, when you said “Oh, no...I’d rather not do anything, I wish I didn’t have to do this…”?

> *Student 1*: Yes!
>
> *Student 2*: Yes…(laughs) during the whole semester! There were problems. We managed them but there were problems within the group. So, in those instances you said: “Why am I doing this?”. Afterwards we managed.” (Focus group 1, 15265:15643).

We find it interesting that even though we had designed a very big variety of hands-on, action based activities, students rarely referred to them during the focus groups. The primary focus was on the team project, on the research skills they developed and on the farm visit.

Other codes that we believe are significant for our case are the following:

Awareness of the complexity of the system: This code refers to the ability of a student or other actor, to frame their experience in relation to a whole system. Some examples of this ability have already been shown above. Or, as another student mentions:

> “Here in ATEITH everything is presented as sustainable. But, someone with no contact with the situation outside, cannot know if something is indeed sustainable and what they need to do to make it sustainable” (Focus group 2, 32071:32245)

And another student attempts a definition of sustainability as

> “Any economic modification of the environment without it having an impact on future generations. I mean, when you take part in any activity in order to have financial profit, you should take care that it doesn’t affect the environment so that you are leaving something behind for next generations – so that they have something to live on” (Focus group 2, 33003:33315)

We were also interested in documenting the student’s **awareness and perception of the status quo** within their professional field and their perception of **professor** and **farmer mentalities**.

There is still a need to test whether these modules have made a difference when it comes to real life interactions with professionals, since the field trip could not offer very good insight into this due to the very large number of students involved.

The most prevalent demands and needs of all parties involved were the need for more action-based, practical learning and the need for better communication between the University, farmers and the market. Students in particular repeatedly and in every occasion express the need to become more aware of the different stakeholders in their field and to become more actively involved in the real life experience of their future profession. Farmers and in some instances professors, on the other hand, observe that students lack on the competence of participation due to lack of practical experience.

Interviews with stakeholders in the agrifood system

Our second cycle activities also included a number of interviews with representatives of different stakeholders in the system of agriculture and who also represent different levels of experience and expertise. Namely, we have interviewed two students who are completing their placement and are about to complete their degree in ATEITH, a newly appointed agronomist of the AFS who has recently completed his degree and two agronomists with many years of experience in the field and who also work for the AFS.

Through the interviews we tried to identify and open-code different factors that contribute to the present situation as analyzed in the initial case report. The common factors that were identified between all parties involve:

- Issues of trust
- Highly antagonistic environments
- Lack of personal, social and economic motivation for change
- Lack of common visions
- Stagnant mentalities
- Unwillingness to listen and to understand each other's needs and experiences (lack of constructive communication between stake-holders)
- Lack of infrastructures and government support
- Questionable sources of educating and informing themselves (mainly the internet and the media) which leads to fragmented and superficial knowledge.
- Given opportunities and safe environments of educational activities, all parties gain insight, motivation, emotional readiness for transformation and relish communication between actors.

Apart from the focus groups and interviews, we would like to briefly report on the **learning sets** that took place during the first cycle of the NEXT FOOD PROJECT. These are also important here because the **new competence coding tree** gave us insight into the learning sets as an educational methodology and has shown some very encouraging results. The learning sets were educational visits of professors with one or two students to a farm (animal and plant). Present were also a representative of the AFS and an observer. During the visit, students had the opportunity to interact with the farmers and to be part of conversations between the farmer and their professors. They were given the opportunity to observe the settings, ask questions, make comments, discuss problems and make suggestions. The data collected consists of reflection questionnaires from all the actors involved (professors, students, farmers) plus the notes of the person observing the interaction.

The data collected was initially open coded and recently re-coded based on the competence coding tree. Through the analysis of the data from the learning sets, we observed significant development and proof of all competencies described in the action-based learning model (participation, observation, reflection, dialogue, facilitation, transformative learning and visionary thinking). The factors that we believe led to this success are that by design Learning Sets:

- Promote collaboration/communication, which has been identified as a crucial need in all interviews and questionnaires by all actors of the system.
- Promote and enhance participation in a very prevalent way and also commitment between actors because of the small number of people involved. They simulate small trusting social groups that can interact peacefully and productively. Here, the issues of mistrust are easily overcome since the interaction has no financial implications and is purely educational in nature. So, it concentrates on developing social capital and social relationships that are based on trust and open communication of information and ideas.
- Provide valuable practical experience for the student and the chance to observe real life situations and professionals. This is the most prevalent need expressed by students and also a demand of the market.
- Promote self-reflection in all parties, since it is a small, emotionally dense and positive interaction. It was noted in all the questionnaires that the level of competence in reflection was considerably high. Participants were able to elaborate on why their experience was valuable, to connect their experience with self-development and to commit to the continuation of the relationship.

3.5.4 Cycle report

Cycle 1

The Planning and implementation of our second year activities were based on the reflections and lessons of our first year activities. There, the methodology of action learning was employed by creating groups of heterogeneous actors (learning sets) who engaged in collective, discovery-based learning activities, so as to collaboratively construct new knowledge.

Through a process of discovering problems, proposing and implementing solutions, and reflecting on the procedure of identifying-solving problems, each learning set intended to develop a common understanding of the ways farming is practiced as well as to discover different meanings of farming and agricultural sustainability.

Both, observational data and qualitative data collected through questionnaires, focus groups and reflection sessions were analyzed using the principles of thematic analysis.

By combining different data, we also aimed at uncovering the processes through which these three groups construct sustainability-related knowledge. Our work indicated that, for Greek farmers and agronomists/advisors, the interest on sustainability emerged as a result of the observation that conventional farm practices cannot ensure the viability of farm enterprises. The analysis revealed that farmers express serious concerns about the future of farm production in Greece. The climate change has serious implications for the productive capacity of farms and generates the need to effectively manage new plant diseases and other environmental challenges.

As mentioned in the reflections of the first year activities, most farmers agree that transition to sustainability is heavily dependent on agronomic science, but there is a considerable speculation about both the competencies and the intentions of agronomists and advisors, which was also evident in the interviews that we conducted.

During this cycle we gave more heavy enphasis on the student population as the new generation of scientist that will be entering the field and be part of the emerging agribussiness system. Our aim was to employ action-based methodology to enhance their competences when they entered the system. Our aim was also to enhance the population of professors that become active in connecting the different systems involved (scientific community – farmers – the market) and who became more flexible in their teaching methodologies and gave more room for soft-skills and competence development. We also remained loyal to the notion that there is a need to develop a common «language» between the actors involved and to enhance the bonds between them.

Our implementation was characterized by rigorous methodology and a very active presence.

As mentioned above, our second year activities consisted of designing two modules for the ATEITH, in collaboration with their facilitators that were rich with action-based learning methodologies. The modules were class-room based and we tried to address the shift from lecturing to co- and peer learning, from syllabus to supporting literature/a diversity of learning sources, from textbook to a diversity of teaching aids, from written exam to a diversity of assessment methods and from lecturer to learning facilitator, in a classroom environment.

In line with the multi-actor, action-based learning model, through our second year activities and documentation we identified that at all three of the actors involved (professors, students and farmers) place very high value on the effective communication between systems.

The qualities that were documented regarding our students and that are very promising for future development were:

- Good awareness (self, social and system) capabilities.
- Visionary thinking capacities, although not highly developed.
- Very good motivation levels when given opportunities for rich learning environments.
- Placing high value on the action-based learning model.
- Clearly expressing the need for multi-stakeholder awareness and education.
- Emotional and mental flexibility and readiness for change.
- Ability to overcome difficulties.
- Expressing the need for change, modernization and holistic approaches to education.
- There is big emphasis placed on hard skills but the importance of soft skills is equally referred to, mostly subjectively.

On the whole, we feel that the population we have worked with has gained very useful insights into the importnace of agency and responsibility toward their education and toward the system they are entering. For the professors involved we feel that they may have played an imortant role in starting a culture of active involvement, modernization of teaching methodologies and closer ties with the student population.

The obstacles that we faced were mainly that the methodologies used were considered alien to both students and professors. One of the observations made was that the novelty of the action-based methodology may have created feelings of being overwhelmed by the changes or that there is an absolute need for an external supervisor in order to make shifts. Of course this is normal for a first attempt. However, it is important that this feeling does not continue into the future. So, one of our intended shifts would be to enhance feelings of empowerment and promote self-motivation and initiative taking.

This is also related to the second and most important obstacle in this and future activities. There is a strong tendency to fall into a passive stance toward both education and the status quo in the professional domain. It seems that all parties involved avoid framing their experience in personal ways and easily abandon their agency and responsibility to change. This requires an important shift in mentality in all parties involved.

Finally, as with the first cycle observations, differences in “languages” and “knowledges” still remain, as could be seen in actors’ understanding of sustainability. As the findings revealed, agronomists and farmers associate sustainable agriculture mainly with the issue of economic viability, underemphasizing the environmental dimension of sustainability and paying limited attention to the social aspects of sustainable agrifood systems. On the contrary, students underline the link between sustainability and the environment, without however paying special attention to the overlap between the three dimensions of sustainability. Data derived from both students and advisors suggest that a possible source of this stance is the prominence given by agronomic education to technical issues and the lack of focus on interpersonal, communication, and guidance skills. Indeed, some recent studies suggest that agronomic education in Greece is not oriented towards supplying students with such skills, whereas it puts limited emphasis on sustainability issues (Charatsari et al., 2018; Charatsari and Lioutas, 2019).

To come out of this Babel-like situation, more efforts are needed in the direction of cultivating trust among stakeholders, by creating effective learning loops between scientists, farmers, and students, and by supplying current and future agronomists with soft skills to facilitate the transition towards sustainable agriculture.

Cycle 2

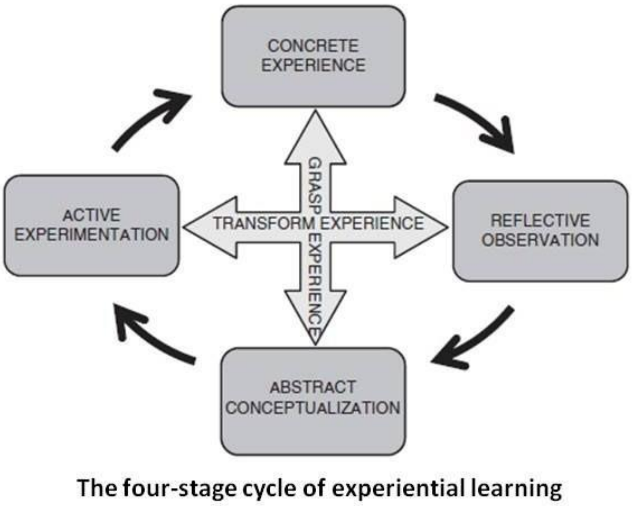


Figure 1. The four-stage cycle of experiential learning (Kolb, 1984)

1. We will continue to use the **four stage cycle of experiential learning** as reference for our future activities.
   During the previous and present cycles we gave all the actors of the system opportunities for concrete experience and opportunities to reflect and conceptualize.
   We need to design opportunities/activities that will give all actors the chance to become active experimenters within their own environments and thus to close the cycle of the "four-stage" model.

2. In order to enhance motivation, resilience and agency for positive change we will be looking at implementing an evidence-based **Goal Setting Program** that was developed by the **Erasmus University of Rotterdam**. We are working towards adjusting this program to the specific requirements of our case and to the populations we are working with.
   This step also enhances our aim to create a common language between actors.

3. We will organize a **workshop** that will include representatives of all the actors involved in the present cycle where they will be given opportunity to interact with each other, reflect on their experience and pitch their ideas on what they envision for future activities. We will be including and emphasizing concepts of empowerment and personal responsibility during these and other future reflection sessions.

4. We need to **re-evaluate and modify our questionnaires and interview/focus group guides** to emphasize more on empowerment and responsibility.

We also need to place higher emphasis on the 6 competences described in the action-based model in our interview and focus group guides. By modifying our questions we might have a better opportunity to gain insight into both the development of these competences and the effect they have in real life professional settings.

5. One of our goals for this cycle is to enhance the incorporation of **precision technologies** in the educational system and farmer networks. To move to this direction we will organize a planning meeting between the AFS representatives and ATEITH professors in order to create a plan of how the technological infrastructures provided (weather stations and insect traps) will be used for the advantage of our student population.

6. Our research team will enhance their role as **facilitators rather that organizers**. During the next cycle we may try to give all actors more power in their choice of activities and also give them motivation to act independently. We will make a selection of the most successful action-based activities and make them available through the NEXTFOOD platform.

   The **NEXTFOOD platform** may act as a platform of free communication and facilitation of inter-system interaction. We will therefore enhance the use of the platform by all our participants and also enrich the platform environment with materials and opportunities.

7. The **multi-actor communication and participation model** of the action-based learning model (learning sets) will need to develop further, since it was very powerful for all parties and produced great outcomes as far as the set of competences described in the action-based model go. Practically this means that we need to facilitate a greater number learning sets. We also need to widen the range of the academic levels and profiles of students that participate in order to determine whether it is the methodology or the profile of the student that produces the observed outcomes.

8. There is a need to give **motivation to other University professors** to engage in the action-based learning model. To do this we may organize a University open **presentation** with the observed outcomes and provide social career and professional development incentives for mental shifts in professors and students.
   By increasing the demands and the expectations that students have, regarding their education, we may achieve a shift in University based educational practices. IHU-International Hellenic University (former ATEITH) as the advantage of having a good number of students who are professional farmers themselves and this is a great asset that we should be taking advantage of.

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Appendix 1

1st week: 10 October 2019

Subject: Male and female reproductive system

- Description of course structure
- Determining students' learning style through filling a special questionnaire (Learning Styles Questionnaire- Honey and Mumford, 1989)
    - **Action learning technique: Learning Styles Identification.**

  Skills/competencies and knowledge to be developed: Identified learning style, discussion, reflection. The activity will be assisted by reflection.

- Presentation of a written group project on an issue related to animal reproduction. The presentations were given in the final two weeks (12th and 13th) of the semester (using the Pubmed and Scopus databases)
    - **Action learning technique: Group Project using the PubMed and Scopus databases**

    Brief description: The aim of this activity was the production of a group project by the students based on a literature review. Students had choosen one of the proposed educational topics related to the course and produced a small literature review on the topic. The written assignment assisted by the oral presentation of the literature review in the classroom.

    This activity will be assisted by 2 tutorials: a) Pubmed and Scopus presentation and use of advanced search in combination with the use of the Mesh database, b) how to write, structure and cite essays.

  Identified steps in this activity will be the following:

    1. Choose a topic that you are interested in studying.
    2. Formulate a research question.
    3. Search the Pubmed and Scopus databases to locate journals that include related information.
    4. Find articles that correspond to the chosen topic.
    5. Select at least 5 journal articles to study.
    6. Read the articles.
    7. Write essay using skills learned.
    8. Present topic in the call during the last two weeks of the lectures.

    Skills/competencies and knowledge to be developed: learn how the search for information, write a literature review, present and communicate knowledge gained, work in groups.

- Students split into groups based on their learning styles (according to scores of Learning Styles Questionnaire)

- Assignment of group projects- set of topics the students have to search and choose
- Reflection process: brief presentation of reflection models.

2nd week: 17 October 2019

Subject: Practical training on female reproductive tract

- Web page evaluation
    - **Action learning technique:** Web pages' evaluation.

    Brief description: Students will be asked to use websites for handling their assignments. Websites will be evaluated on a set of evaluation criteria. The evaluation criteria suggested are the following: AUTHORITY: Authority reveals that the person, institution or agency responsible for a site has the qualifications and knowledge to do so. COVERAGE: It is difficult to assess the extent of coverage since depth in a site, through the use of links, can be infinite. One author may claim comprehensive coverage of a topic while another may cover just one aspect of a topic. CURRENCY: Currency of the site refers to: 1) how current the information presented is, and 2) how often the site is updated or maintained. It is important to know when a site was created, when it was last updated, and if all of the links are current. OBJECTIVITY: Objectivity of the site should be clear. Beware of sites that contain bias or do not admit its bias freely. Objective sites present information with a minimum of bias. ACCURACY: There are few standards to verify the accuracy of the information on the web. It is the responsibility of the reader to assess the information presented.

    Skills/competencies and knowledge to be developed: Website evaluation is an important academic skill. Effective evaluation of the sources credibility becomes even more important nowadays due to the overwhelming array of content that exists on-line. This activity should be used in combination with peer evaluation.

- Put theory into practice
    - **Action learning technique: PiCowSo**

    Brief description: Students draw a picture referring to the life-cycle of a productive cow. Then, their "artworks" are presented to an exhibition. By viewing their own and their colleagues' artworks, students have the opportunity to see reproduction as a part of the life-cycle of an animal. By discussing on their works, students can develop a new understanding of the role reproduction plays not only for the economics of farm but also for animals. The exhibition will be permanent, with the artworks displayed on the classroom walls for the whole semester.

Skills/competencies and knowledge to be developed: Holistic thinking competencies, negotiation skills.

3rd week : 24 October 2019

Subject: Oestrous cycle-oestrous –signs of oestrus- Practical training on female reproductive tract

- Graphical depiction of oestrous symptoms
    - **Action learning technique: PiCowSo**

      Brief description: Students draw a picture referring to the symptoms of oestrous. Then, their "artworks" are presented to an exhibition. By viewing their own and their colleagues' artworks, students have the opportunity to see oestrous as a part of the life-cycle of an animal.

      Skills/competencies and knowledge to be developed: Systemic thinking competencies, negotiation skills.
- Discussion between the group of students and the teacher on students' artworks - Group reflection.

4th week: 31 October 2019

Subject: Practical training on oestrous synchronization of small ruminants under field conditions–Case study

- Visiting the stable
    - **Action learning technique: Sense-making through senses**

      Brief description: Students use their senses to develop an understanding of the context within which animal reproduction is taking place. They visit the stable, use the senses of sight, hearing, smell and touch to collect data and (re)shape their perception of the animals. After the end of the procedure, students collectively reflect on their experience.

      Skills/competencies and knowledge to be developed: Understanding the habitat of productive animals, translating senses into data, reflection competencies.

- Reflection on the experience gained through students' contact with the animals (small ruminants).
- Put theory into practice – practical implementation of theoretical insights.
- Thorough understanding of oestrous symptoms.
    - **Action learning technique: Hotspot**

Brief description: The teacher presents a case study. Students are divided into four to six groups. After a collective syllogism process, each group summarizes the main conclusions derived from the case study by using a post-it parade tabulated into a pros-con grid. These grids are reviewed by the other groups. Hotspots (areas of convergence and divergence) are identified and give rise to a reflection process. This way, students can understand that the same case can be differently approached by different groups or individuals.

Skills/competencies and knowledge to be developed: Contextualization skills, argumentation skills, reviewing competencies.

5th week: 7 November 2019

Subject: Practical training on oestrous synchronization of cows under field conditions

- Visiting the stable
    - **Action learning technique: Sense-making through senses**

  Brief description: Students use their senses to develop an understanding of the context within which animal reproduction is taking place. They visit the stable, use the senses of sight, hearing, smell and touch to collect data and (re)shape their perception of the animals. After the end of the procedure, students collectively reflect on their experience.

  Skills/competencies and knowledge to be developed: Understanding the habitat of productive animals, translating senses into data, reflection competencies.

- Reflection on the experience gained through students' contact with the animals (cows)
    - **Action learning technique: Meet the cow.**

  Brief description: Students, under the supervision of the teacher(s), visit the stall to see cows in various stages of their reproductive life. Then, in small groups, they are trying to determine the differences between these stages. Groups reflect on their experience and exchange understandings.

  Skills/competencies and knowledge to be developed: Understanding the different stages of cow's reproductive cycle, externalization of individual knowledge, peer communication competencies.

6th week: 14 November 2019

Subject: Practical training in setting the artificial vagina in different animal species

- Peer review process
    - **Action learning technique: Peer Review.**

      Brief description: Peer review activity can be combined with the literature review activity. In this activity, students provide their peers with feedback on their literature review assignment (Group project-week 1). Have each student bring to class a printed or electronic draft of their assignment. Have students swap papers with one to two other students (depending on time available). Each student then reads another student's paper and provides them with some form of written feedback on their current drafts. After preparing written comments, students then chat briefly (~5 minutes) with their partner(s) about their paper in order to provide verbal feedback as well.

      Skills/competencies and knowledge to be developed: discussion, group skills development, present and communicate knowledge gained.

- Activity combined with group projects. Exchange of views among students on the first version of the projects.
- Visiting the stable
    - **Action learning technique: The lamporatory; You goat it!**

      Brief description: Students are divided into two groups. The first one visits the sheep stable and the second the cow stable. By observing animals' behavior during different stages of the reproductive cycle, they prepare a short paper referring to the topic. Then, each group presents the paper to the other group. This peer-teaching process is followed by a question-answer session, which ultimately leads to a reflection procedure.

      Skills/competencies and knowledge to be developed: Observations skills, social skills, tutoring skills, reflection skills.

- Reflection*.
    - **Action learning technique: Reflection.**

  Brief description: Most activities will be accompanied at the end of the class with reflection. Students will be provided with one question for a brief reflection. Each student then records and submits their answers. An introduction to the reflection techniques should be given at the begging of the course.

  Skills/competencies and knowledge to be developed: Reflection is a powerful way to assess the degree to which students understood the lecture. It also promotes writing. Students are presented with the opportunity to reflect on a specific topic and to reflect on what they learned from their experience.

- Brief presentation on how to write a scientific essay.
- Video watching
    - **Action learning technique: Unboxing.**

      Brief description: After watching three videos referring to farm animals' reproduction activity, students are provided with some questions by the teacher, so as to engage in a 5-minute self-reflection and to offer their answers. Answers are collected into a box, and then one of the students opens-up the box and read the anonymous answers. The class is trying to connect these answers into a meaningful text.

      Skills/competencies and knowledge to be developed: Critical skills, knowledge extraction skills, abductive reasoning skills, reflection skills, writing skills.

7th week: 21 November 2019

Subject: Evaluation-process-preservation of semen

- Understanding theory – Putting theory into practice through problem-solving activities.
    - **Action learning technique: Unboxing.**

      Brief description: After watching three videos referring to farm animals' reproduction activity, students are provided with some questions by the teacher, so as to engage in a 5-minute self-reflection and to offer their answers. Answers are collected into a box, and then one of the students opens-up the box and read the anonymous answers. The class is trying to connect these answers into a meaningful text.

      Skills/competencies and knowledge to be developed: Problem-solving skills, reflection, analytical thinking, critical skills, creative thinking.

- Microscope and the photometer
    - **Action learning technique: Familiarize students with laboratory equipment**

      Brief description: Students use the microscope and the photometer and individually observe the preparations, depicting in parallel what they see.

8th week: 28 November 2019

Subject: Evaluation-process-preservation of semen- Case study

- Understanding theory – Putting theory into practice through problem-solving activities.
- Thorough understanding of techniques on assessment semen's quality, semen processing, semen maintenance
    - **Action learning technique:** Case study.

      Brief description: Students will read related case studies in relation to various topics that will be discussed in the classroom. After learning the theory (lecture) students will a) be presented with a real-world case to study (this could be an article, a video, a written real-world case), b) form small discussion groups, c) be presented with guidelines or a framework provided by the teacher, d) discuss and analyze the case in groups, e) discuss and analyze the case in the class (everyone participates). The discussion will be facilitated by the teacher trying to connect discussion of the case with the material in class.

      Skills/competencies and knowledge to be developed: Discussion, group skills development, illustrates the application of the theoretical concepts from the course material and their application to real-life cases. Connects theory with practice. Problem-solving skills.

9th week: 5 December 2019

Subject: Implementation of artificial insemination in cows under field conditions

- Video watching
    - **Action learning technique: Unboxing.**

      Brief description: After watching a series of videos referring to artificial insemination, students are provided with some questions by the teacher, so as to engage in a 5-minute self-reflection and to offer their answers. Answers are collected into a box, and then one of the students opens-up the box and read the anonymous answers. The class is trying to connect these answers into a meaningful text.

      Skills/competencies and knowledge to be developed: Critical skills, knowledge extraction skills, abductive reasoning skills, reflection skills, writing skills.
- Learning by doing. Students are involved in the learning process by practicing artificial insemination in cows. The activity is practiced by all the students individually.

10th week: 12 December 2019

Subject: Implementation of artificial insemination in small ruminants under field conditions

- Learning by doing. Students are involved in the learning process by practicing artificial insemination in cows. The activity is practiced by all the students individually.

11th week: 19 December 2019

Subject: Pregnancy Diagnosis Methods-Case study

- Thorough understanding of methods of pregnancy diagnosis.
    - **Action learning technique:** Case study

      Brief description: Students will read related case studies in relation to various topics that will be discussed in the classroom. After learning the theory (lecture) students will: a) be presented with a real-world case to study (this could be an article, a video, a written real-world case), b) form small discussion groups, c) be presented with guidelines or a framework provided by the teacher, d) discuss and analyze the case in groups, e) discuss and analyze the case in the class (everyone participates). The discussion will be facilitated by the teacher trying to connect discussion of the case with the material in class.

      Skills/competencies and knowledge to be developed: discussion, group skills development, illustrates the application of the theoretical concepts from the course material and their application to real-life cases. Connects theory with practice. Problem-solving skills.
- Involving students with pregnancy diagnosis techniques.
    - **Action learning technique:** Construct-Deconstruct-Reconstruct.

      Brief description: The teacher presents the different methods for the diagnosis of pregnancy in farm animals. Students are called to individually reflect on the behavioral, somatometric and hormonal changes which can determine if an animal is pregnant. Then, they collectively produce a grid referring to the comparison of early pregnancy diagnosis techniques. The teacher – through a series of “w-questions” – tries to help students deconstruct and reconstruct knowledge, synthesize the different parts of their knowledge on the issue, and develop a thorough understanding of the different diagnostic techniques.

Skills and knowledge to be developed: Deconstructing skills, synthesizing skills, comparison skills, competencies in synthesizing knowledge.

- Students develop their communication skills and competencies by playing.
  - **Action learning technique: Roleplay between agronomist and farmer**

    Brief description: Students will be asked to participate in real-life communication with a farmer, giving advice and suggestions about real problems and scenarios. Students will be shown a video showing a real-life interaction with a farmer and a real-life situation. The video could be provided by the Next Food Project, based on visits that were already done. Students will be asked to observe and comment on the interaction and possibly come up with alternative suggestions. The professor will play the part of the farmer, presenting the student with real-life concerns and attitudes. The student will be asked to try to discuss the possible solutions. The student will be asked to write a reflection on a) the difficulties he/she faced, b) the hindering forces of communication, and c) positive/supporting forces in communication. They will also be asked to write what he/she liked about his/her approach, and what he/she could have done differently.

    Skills/competencies to be developed: Communication skills, active observation, transferring theoretical knowledge into real-life situations, self-awareness and reflection skills, practical experience.

- Students involved in a reflection process. After a brainstorming session, they prepare and write down a series of questions per topic before visiting the farm.

12th week: 9 January 2020

Subject: Developing communication skills and competencies – focus on student-farmer interaction

- Students are split into groups based on a first week's separation.
  - **Action learning technique: Meet the farmer**

    Brief description: Students are visiting the farmer/breeder in his/her rearing enterprise. They are discussing with him/her focusing on the problems he/she face and they try to provide solutions. Groups of students are undertaking different topics, i.e. diseases, nutrition, welfare, etc. This interaction offers students the opportunity to understand which their knowledge and competencies gaps are and they also learn how to effectively communicate with their future "clients".

Skills/competencies to be developed: Communication skills, observation, transferring theoretical knowledge into real-life situations, practical experience, and team spirit.

- Presentation of the group projects.

13th week: 16 January 2020

Subject: Summing up

- The concepts, terms, and definitions related to animal reproduction are summarized.
    - **Action learning technique: Baby shower.**

  Brief description: Students are asked to reflect on reproduction as a process that affects the functioning of the farm. The associations and causal relationships between reproduction and milking, feeding, and animal welfare will be depicted in a mind map. Implications for economic, environmental and social sustainability will also be incorporated into the map. A collective reflection process will lead to some revisions.

  Skills and knowledge to be developed: Causal thinking skills, holistic thinking skills, argumentation competencies.

- Students are looking back at the beginning of the semester, trying to find out the levels of knowledge they gained through the semester.
    - **Action learning technique: Re-visiting the art exhibition.**

  Brief description: Students review their own (and their classmates) artworks produced at the beginning of the semester with the use of PiCowSso technique. They are asked to explain in a plenary session what has been changed (as well as "How?" and "Why?") during the semester in their conceptualization of the reproduction as a part of an animal's life-cycle and of farm's sustainability.

  Skills and knowledge to be developed: Reviewing competencies, critical discussion skills, peer interaction skills.

- Presentation of the group projects.

***Most activities were accompanied with the reflection process**

3.6 Sweden - Skogforsk

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 meeting have been replaced by web-meetings due to the Covid-19 situation.

Authors: Lotta Woxblom and Tomas Johannesson

3.6.1 ID card

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(s) and course leader(s)

Skogforsk, Tomas Johannesson

Timeline of the activities covered in this report

October 2019 – May 2020

Learner categories and number per category

logging machine operators	4
forest management officers	2
researchers	3

3.6.2 Status

From lecture hall to a diversity of learning arenas

Skogforsk normally offers short courses for professionals and most of the time these are held at a forestry district office or in the forest.

The first case-meeting took place in the forest, at a site where the logging team worked at time of meeting.

Because of the Covid19-situation, *the second case-meeting* was organized as a digital meeting (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 from home 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.

The meeting was led by the project leader who brought a computer to a forest area close to the harvesting site.

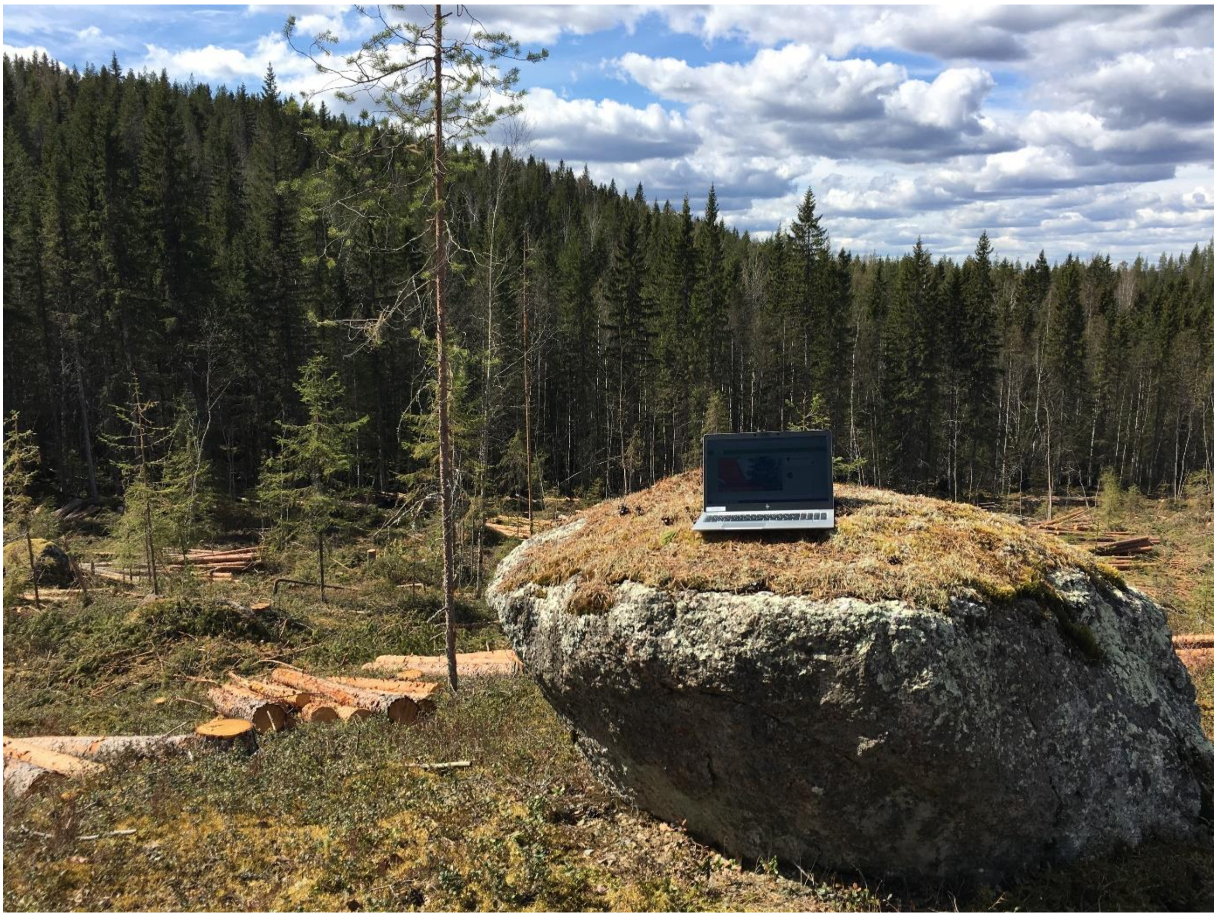

Figure 1. Outdoor office for zoom-meeting during covid19-time.

The computer was used to organize a Zoom-meeting. The project leader was prepared with freshly taken pictures from different places on the site, containing different kinds of natural and biodiverse concern made previously by the operators.

The participating expert on nature conservation, used the zoom app on mobile phone and could walk around on her own harvesting site and show illustrative examples from that site in real time.

General obstacles:

Time for meetings, education, and vocational training. Our “students” 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 for our activities.

Outdoor digital meetings on site - obstacles:

Technical problems, e.g. quality of sound when out in the forest. 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.

From lecturing to co- and peer learning

At our first meeting (February 4:th – 2019) with the machine operators in northern Sweden, the Nextfood-model was introduced and we talked about what the participants would like to learn.

Their answers (together with expectations from researchers collected earlier) create a platform for the upcoming case.

All participants show an interest and are already part of the process and we have a good basis for co-learning.

Obstacles noticed:

The participants from the logging crew are used to work in their machines and some of them are not very comfortable with or used to reflect and discuss. There was an obvious need to build some trust between those who had never met before.

From syllabus to supporting literature/a diversity of learning sources

Each meeting has a predetermined theme (from the above-mentioned platform).

Our main learning source is dialogue.

Between the formal/scheduled meetings the project leader calls the participants (machine operators and forest managers) to keep the project alive and to capture relevant examples from their everyday work. Also, the app Supertext is used by the team to share pictures and ask questions.

From textbook to a diversity of teaching aids

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 students.

We also have short presentations - short texts together with illustrations and photos and to prepare the meetings different topics, i.e. the core competences are repeated and addressed by phone or Supertext.

From written exam to a diversity of assessment methods

Written exam not applicable to our target group. Instead we will use self-assessment of case related topics and core competencies.

Obstacles:

We must ensure that the participants complete the self-assessment forms and submit them to us.

From lecturer to learning facilitator

Each of the Skogforsk-participants – experts and case-leaders need to be well prepared for the role as learning facilitator – to use dialogue - as well as NOT use PowerPoint or similar common tools since the learning area most of the time is located outdoors.

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 Data analysis

First meeting

Self-assessment of competences

In connection with course meetings, participants are asked to complete a self-assessment form. Results from the first meeting for each of the competences are presented below.

OBSERVATION

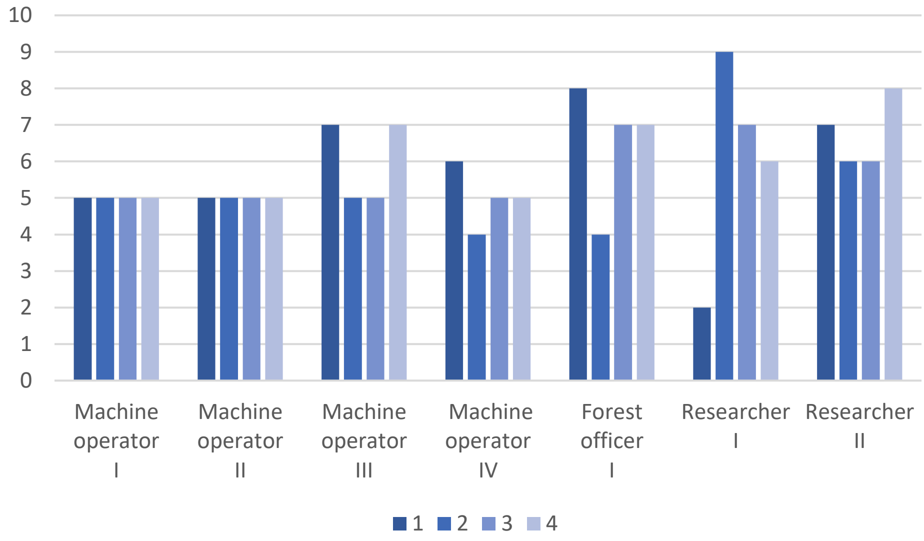

Figure 2. Observation - Questions: 1) Carefully observe a situation in the field from a harvesting perspective, 2) Carefully observe a situation in the field from an ecological perspective, 3) Create a comprehensive overview of a complex situation, 4) Allow for examination of the whole situation before drawing conclusions

VISIONING

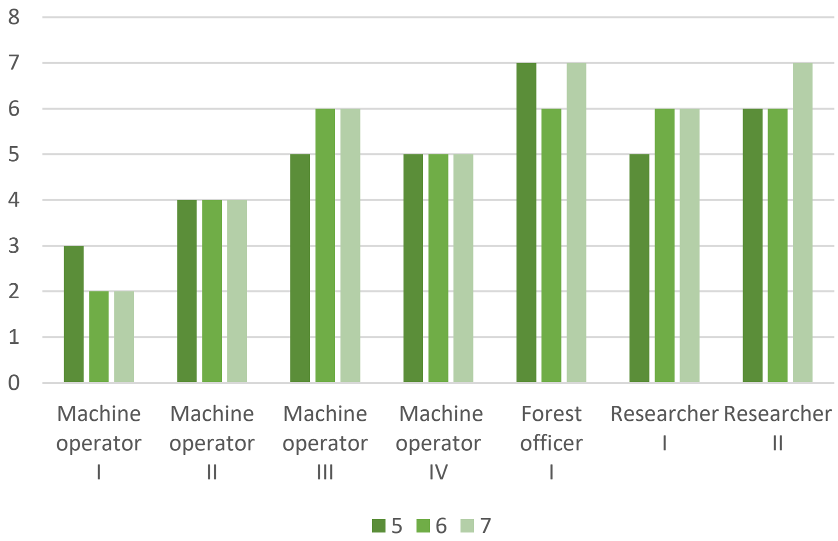

Figure 3. Visioning - Questions: 5)Have basic knowledge of factors that stimulate and block creativity in individuals and groups, 6) Understand the processes that enhance a group's ability to identify today's critical challenges and envision a desired future state, 7) Able to inspire change by helping a group develop and align around a shared vision

REFELCTION

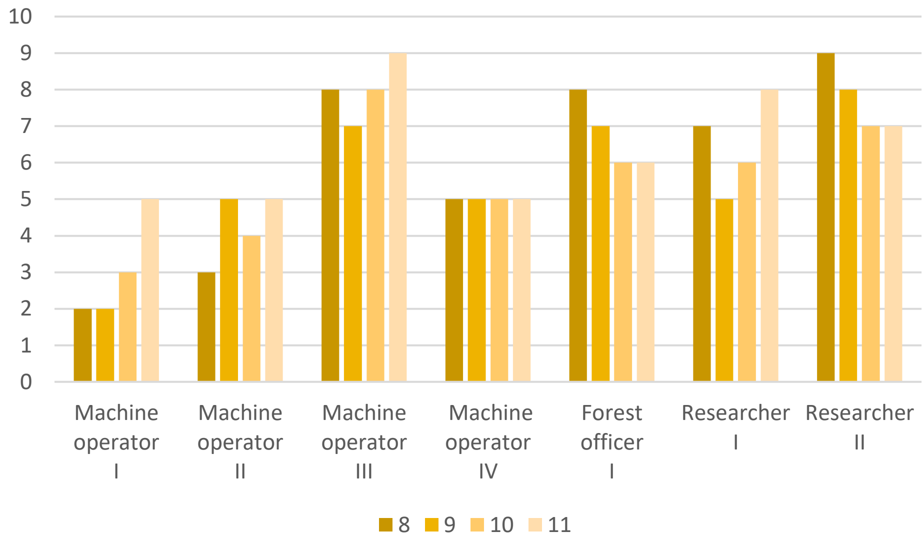

Figure 4. Reflection - Questions: 8) Connect situations in the field to theory related to farming and food systems as well as to personal growth, 9) Connect experiences and theory to own personal development, 10) Ability to embrace self-guided learning, 11) Understand the differences between debate, discussion, and dialogue

DIALOGUE

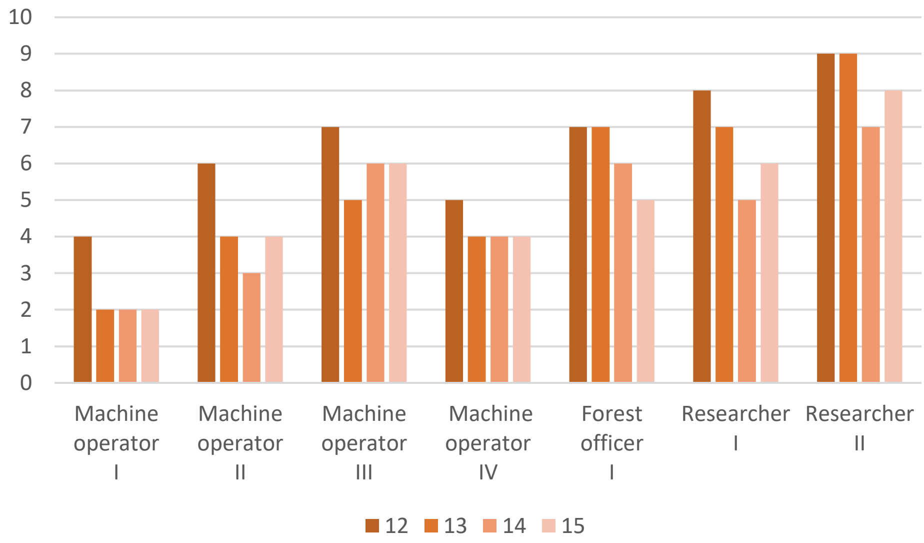

Figure 5. Dialogue - Questions: 12) Understand the differences between debate, discussion and dialogue, 13) Can introduce a group to the purpose and guidelines for dialogue, 14) Can identify and formulate questions which stimulate a dialogic approach, 15) Can appreciate and explore a variety of perspectives and be able to identify and challenge the assumptions behind your own and a group's thinking

Institutional factors affecting higher education

A written report of the focus group interview on institutional factors – Appendix 1

Demographics

Six forestry professionals: 4 machine operators (4 male) 2 forest management officers (2 male)

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

High school – forestry

Master of forestry

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

All the six participants

3.6.4 Cycle report

Cycle 1 – on-going

Planning

A time-plan for meetings in the first cycle was made.

Planning of content of each of the meetings are made step by step – using the subjects listed by the participants.

Implementation

Obstacles

Reality – our “students” are professionals working for a large forest company. This company have a very strong focus on production, and it is difficult for our mission to get full attention.

Appendix 1

skogforsk

Focus group interview/workshop

With part of the ‘Young Professionals Advisory Committee’ at the Royal Academy of Agriculture and Forestry (KSLA[1])

Introduction

A structured interview/workshop was conducted with one of the stakeholders in Sweden, The Royal Academy of Agriculture and Forestry. Specifically, the academy’s advisory committee on young professionals in the green sector was the subject for the workshop.

The interview followed the guide provided in the Nextfood D2.1: Action Research Protocol, Appendix 10. In the following, notes from the discussions are provided in the structure of five themes. In addition to the guide, the discussion also took into account the main task of the academy – “...with the support of science and practical experience and in the interest of society, to promote agriculture and forestry and associated activities” – and the needs in the green sector in general.

Interviewees/participants:

Four persons – three men and one woman were interviewed.

In a second round, via Skype, two women were interviewed.

Facilitator/interviewer: Magnus Thor, Skogforsk.

Date and time: Dec 4, 2019, 15.00-17.00. Venue: KSLA, Stockholm.

Theme 1. Structure and organization of the higher education

Among the participants there was a consensus that there has been a trend for many years that the general core disciplines (e.g. in forestry silviculture, wood products and forest technology) are declining at the benefit of the narrower disciplines which are attracting research funding. The trend is similar in agriculture and forestry. The reasons are manifold, e.g. lack of teachers with a solid professional anchoring, developments

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[1] https://www.ksla.se/en/

in research calls and research fields. The internationalization of research brings about external recruiting of PhD students with no or little domain skills, who after earned degrees, moves on to other universities for research careers. Teaching is sometimes regarded as a minor or major obstacle for a researcher, decreasing the time available for research and publishing. However, there is a change observed recently. At SLU, with many researchers and few students, there are sometimes situations in which researchers want to lecture but run into problems in meriting pedagogically.

The tradition of cooperation between the main provider of higher education in the green sector – SLU – and other universities could be more exploited. Some of the interviewees expressed a feeling that there was a sense of competition rather than cooperation when ‘other universities’ take on agricultural subjects. This is most pronounced in relation to education, whereas in research collaboration is very common. Other universities and centres of learning that were discussed were Linnaeus University (Växjö), University of Linköping, Örebro University, The Royal Technical College (KTH) and Chalmers University of Technology.

There is probably a room for educational bodies between vocational schools and universities, e.g. extended versions of Higher Vocational Education (HVE), which is a post-secondary form of education that combines theoretical and practical studies in close cooperation with employers and industry. Programmes are offered in specific fields where there is an explicit demand for competence.

The road to success should include cooperation in research and education to a considerably higher extent, at undergraduate as well as graduate levels.

Theme 2. Political and financial interests

SLU is reporting to the Ministry of Industry, not to the Ministry of Education as most other universities. This has historical reasons and relates to a task to fulfil needs for the agricultural and forestry sectors. If the dialogue with the ministry is well-functioning, this model seems to imply more advantages than disadvantages for SLU.

The window of opportunity is open; there has not been this big interest for agriculture and related questions in a long time. Still the prospective students are not coming to SLU – why? The conditions for cross-sectorial and interdisciplinary work should be great. These are statements often heard in various contexts. However, once the students are enrolled, there is a large proportion of students that fulfil their education.

Over the years there is a fraction of students that are attracted to the programs rather by opposition, or will to make a change, than the interest of learning the practice. Examples include activists from Animal rights enrolling for becoming veterinarians. How are these issues discussed at the university?

SLU should be even more cooperative in educational matters.

Theme 3. Leadership of higher education

The recruitment of rectors from outside the green sector was discussed. Students were invited to this process, and they stressed competence and experience in sustainability issues and also education (there has been a strong tradition of research among former office holders). In general, there are clear advantages with strong networks in industry and the public society. The rector does not steer the work in practice to a high extent, because the faculties are highly autonomous. Some examples of educational programs that have been shut down despite expressed needs in the sectors were mentioned ("Teknikagronom", Forest-industrial engineering and management"). Participants in the workshop did not have full information about the shut-down of these programs.

The composition of the university board may also have a potentially big impact on the education.

A trend in recent years is a high degree of individualization in education. Very few follow a specific program or curriculum, but courses are building blocks in individually tailored programs. This is a probable cause of the difficulties to recruit students to the master programs in forestry and agriculture[2]. This also stresses the need for collaboration with other learning centres in order to be attractive for new students, e.g. looking for education in sustainability, natural resources management etc. Technology, economy, new forms of teaching (web, remote etc) are elements to consider.

The support from industry is highly relevant in forestry educations. There is also a comparably abundant interaction with forest companies and organizations during the education (a bit less with societal organizations/authorities?), facilitated by specific grants for study visits etc. On the agricultural side there might be greater challenges because the variation in the sector, but the opportunities are also great (cultivation, farming, food etc). For diversity reasons, there are less possibilities to stake united industry claims to the university. The main stakeholders in "agricultural education lobby" are LRF, Lantmännen and Hushållningssällskapet. On the forestry side the major forest companies together with the forest owners' association through LRF are most active.

The pedagogic approach that is promoted and taught at SLU is "flipped classroom", in which the students are more active and focussed on discussion when they meet teachers and each other. In practice this is not always the reality, but all post-graduates learn this method, which is encouraged by the university.

Theme 4. Democratic processes

In the Swedish context accessibility to education is generally high. There are still issues, though. In some of the programs there is an obvious gender skewness in recruitment. The root causes still need to be further addressed, not only in campaigns but as routine business.

One group to be further involved is career officers at high school level. They are often not fully aware of the programs available at SLU.

Search engine optimization and other technical measures (at the university's responsibility) is a prerequisite as an enabler. If you are not among the top-5 search results in the search engines, chances are much lower.

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[2] In the fall 2019, only 50 students started in the MSc Forestry program at SLU (80 spots available). The trend is similar in agriculture. Work is in progress to change this trend.

We spent some time exploring how the participants were thinking in the students-to-be situation. What were they looking for? How did they get information? Some examples:

A. This person was clearly looking at two specific programs. However, after browsing for information he decided to choose another program because of its breadth in subjects and possible applications/work tasks. He had to search for this information by himself.

B. This person expressed a desire to keep doors open in the subject areas of science, social sciences, and nature. The procedure took some time, including consultancy of some friends. At the end, this person chose a program for landscape architecture, a choice that was a good fit.

C. This person did not start at SLU but came from a teacher programme. When in hesitation about studies to be a teacher this person looked for alternatives in Uppsala, the present city of living. After some research SLU became the choice. This person was looking for relevant subjects and courses rather than the occupation.

D. This person, as opposed to C, looked for paths leading to an occupation that was attractive due to social reasons and culture. The person looked for a broad program and found that at SLU.

In general, the examples above indicate that students-to-be wanted to pick general education programs enabling postponing of decisions about career choices. Somebody expressed it as ‘the investment of five years of studies for a 20-year-old person is huge, so you need to be as sure as possible that you choose the right alternative (among very many…). A broad, general approach contributes to risk minimization in this respect’.

Theme 5. Societies norms and values

See comments under the headline 2. Political and financial interests. There is a general interest among young people in sustainability, climate mitigation etc. Agriculture and forestry provide many possible solutions. In conclusion, the sectors and the education related to the sector have all possibilities to attract young talent. When failing to attract talent, the educational bodies must ransack themselves and the way they address young people.

Gender issues were discussed also in this context, and there was agreement in that the sectors have challenges related to gender. This is also reflected in the education programs, of which many are not equal in enrolment of students. However, different programs have different profiles, e.g. forestry programs are heavily dominated by men, whereas veterinarian students are mostly women. The landscape architect program is probably the most equal program at SLU. This program has a strong profile towards societal values and interactions, whereas some of above-mentioned programs have a profile towards the sectors. There is no evidence of this correlation, but it was brought up as one thought.

Conclusion

The interest in forests and forestry is often something that will emerge over years and experience. There is ample scope to secure multiple, redundant entries to forestry education. Employers who can offer possibilities for further education to their employees will be regarded as more attractive. Distance-learning, web-based courses and part-time studies are all elements in this concept. For example, Linnaeus university has developed successful variants of courses in the wood and forestry domains. This would be interesting to develop further.

The participants expressed that SLU probably is on an interesting and relevant track in its efforts to further refine the programs to the Bologna model, thus enabling flexibility for students who are not yet certain of their plans, entries from other backgrounds etc.

The universities should to a higher extent consult the young people in a wide range of subjects: information platforms/media in which to advertise, course contents, creating interest from traditionally ‘white spots’ from a recruiting perspective (urban, low-represented gender, immigrants etc).

There is an obvious task to proceed with gender equality-related work. Role models are more important than a strict 50/50-approach in gender.

Students and alumni are still the best ambassadors for the programs and universities. Put more effort into use that fact, e.g. in career days, high-school career fairs.

3.7 Czech Republic - USB

3.7.1 ID card

Title, level of the course and course language

Development of sustainable farming systems I+II, MSc., Czech

Host institution

University of South Bohemia in České Budějovice, Faculty of Agriculture

Course leaders

Jan Moudrý, Nela Küffnerová

Timeline of the activities covered in this report

Course divided into two parts (semesters).

Beginning of the course 30.9.2019

Winter holiday 21.12.2019-2.1.2020

End of first semester 17.1.2020

Examination period 20.1.2020-14.2.2020

Start of the second semester 17.2.2020

End of second semester 15.5.2020 (due to COVID situation extended, ´till the end of May)

Examination period 18.5.2020-31.8.2020

Due to COVID situation, the final exams (MSc.) were postponed on September/ October and exam period was extended ´till the end of August

Learner categories and number per category

6 learners, all graduates of bachelor course Agroecology

3.7.2 Status

The course is realised as combination of lectures and exercises and student projects. During first cycle, students worked in pairs, three projects were realised by each part. Topics of first project were agricultural (improving sustainability and environmental aspects of farming), second project was focused on social farming and third project on environmental measures in landscape. Student projects are realised on the nearby organic farm, in the garden of social enterprise Arpida, on the social and organic farm Dvůr Číhovice and in the protected landscape area Blanský les.

From lecture hall to a diversity of learning arenas

Ca. 1/3 of the meetings with students took place at lecture room, where the usual structure for frontal learning was changed into one round table. We reorganized the arrangement of the tables in the room from original structure, where the students sitting in rows facing the teacher, to one bigger round table, where we all sitting around. Part of the meetings from the February/March was realized in library and computer rooms instead of usual lecture room. During farm visit students observe the farm structure and current environmental measures, they discussed with farmer their ideas about possible improvements. In Arpida garden the students worked on the proposal of the therapeutic garden with aspects of social farming. This place was visited 3x, students create map background of the garden an in discussion with the workers they started to propose basic structures for the creation of social farming garden. These materials were developed into form of full planes ready for realization, unfortunately due to COVID situation, the practical realization of the student proposals (originally planned for the spring 2020) was postponed for next year. Dvůr Číhovice visit was also cancelled due to COVID situation. Students visited areas in Blanský les solved in project individually, in cooperation with external expert, video tutorials were prepared for them and student works were discussed and evaluated in distant form.

The indicators of the desired effect is mainly the communication activity of the students, which is much higher than usually. Change of (and within) the learning environment, together with other changes, have positive effect on the atmosphere during the course and helps to increase students self-confidence in the communication with other actors. During second part of course students also mentioned topics, which could be interesting for the next run of the course.

Obstacles have more or less technical character, e. g. missing access to the wi-fi in some parts of the campus, lack of suitable lecture room (e. g. some have fixed furniture) or logistic of larger groups of students. Also focus on three project during course was too much and quality of the projects was affected by the lack of time for each of them. Therefore, for the next run of the course it will be necessary to choose another structure of the student works.

It would be good to see some examples of realization on other institutions (logistic, course organization…) and to have more examples of indicators for evaluation of desired effect.

From lecturing to co- and peer learning

Original idea was not to gave the scripts and presentations, to the students, the topic of current lecture/meeting are presented to them in shortcut on the end of the each previous lecture and we are asking them to be prepared for active participation during next meeting, e.g. to find/prepare their own supporting materials and present them to other participants. This was possible only for part of the course, later it was necessary to provide part of the materials in advance, as the individual searching for the materials was time demanding and often led to the lower quality of materials, or to their insufficient focus. But we want to keep this approach at least partially also for following courses, as the student positively commented this step as the factor increasing their ability to work with information.

During preparation of the student project topics, we asked the students to propose their own ideas (some of them will be be used for the student projects next year for another students), but during the next run of the course we will postpone this step to the second part of the course, where the communication with students was more open and they were more creative (resp. they were not afraid to present their own opinion). This decision was made because on the beginning of the course, the students don´t know how exactly the structure of the course, resp. projects will look and due to this lack of knowledge their proposals are sometimes difficult to use or unrealistic (time or equipment demands, distances between university and areas for practical realization, etc.).

Instead of classic lecture we have moderated discussions about concrete topics. This was highly appreciated by the students.

Some indicators of the desired effect are long-term and it is not possible to measure them during the course run or shortly after the end of course, but the higher communication activity was clearly visible and the number of the topics/and materials proposed by the students was increasing from lecture to lecture.

It was difficult for all actors to “step out of the traditional roles”. Even if the communication was much better than usually, some of external experts still don´t see students as partners for dialogue and students need intensive support to present their own opinions and ideas. When this support wasn´t permanently provided, we were back in traditional lecture model (with passive students) quickly. Second part of the course was affected by the COVID situation, where was impossible to meet personally with the students/other actors. We switched into on-line mode, but the lost of personal contact had a visible impact.

We need more information about indicators for evaluation, it would be good to see good practice examples of cooperation with external experts (visit to the places, where this is solved successfully).

From syllabus to supporting literature/a diversity of learning sources

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. Part of information was provided by experts from practice, but in some case we will need to replace them by more active and “involved” ones (farmer). We used relevant movies related to the concrete topics.

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.

Obstacles are in form of technical problems (internet access in some part of campus), language barrier (some of students have only very elementary knowledge of English language and only some materials are translated into Czech language. 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.

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.

From textbook to a diversity of teaching aids

The course is based on three pillars, which are in accordance with the pillars of the agroecology (agriculture-environment-social sphere). In each part there were practical student works realized straight in terrain with assistance of relevant external experts. This learning-by-doing part is probably most valuable. During the meetings in lecture rooms we were focused on interactive approaches, discussions, presentations, etc.

As the indicator, the number and variability of teaching aids could serve, also the ability to work with multiple sources could be evaluated.

As it was mentioned in previous point, 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. It would be good to have inspiration from other courses, to extend scale of teaching aids.

From written exam to a diversity of assessment methods

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. This can´t be canceled (at least ´till the re-accreditation of the programe), but in addition to the evaluation by grade, based on long-term evaluation of student activity and on the quality of student project outputs, we added also 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. On other hand, 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 student from the point of view of the time demand, etc.

From lecturer to learning facilitator

Very individual part for each of the involved persons. As 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. Anyway, especially the change of the learning environment, together with strong focus on student opinions brings positive effect. We are trying to act more friendly, listen to the students opinions, support their discussions, and create much more un-formal atmosphere.

Increasing communication activity could be used as the indicator. During the course, the students were able to talk much more about the project, actively start conversation with other participants, the frequency of questions and discussion increased strongly. On the beginning of the course, the students were passive and only one or two of them tried to act actively in situation, when they were asked to. Later during the course they started discussions without commands and all or almost all of them discussed different topics actively.

Some of the invovled external experts were surprised by the rule of facilitator and it is difficult for them, to perceive students as partners. In one of the cases there was necessary to change external expert and to find another person for cooperation. Sometimes it is difficult, to moderate the discussion inconspicuously in the needed direction.

No questions for this point, but the inspioration from other cases is very welcome.

3.7.3 Data analysis

First week (day) of the course

Student’s understanding, contributions and expectations

Understanding: More practice oriented education, Discussions , Positive approach and relationship between students and teachers

Contributions: Concrete topics knowledge (poultry breeding, biodiversity support…)

Expectations: Practical information, Connection between theory and practice, Skills development, Ability to solve expert problems independently, Concrete topics knowledge (subsidies system, farmers portal on ministry webpages…)

Self-assessment of competences

Most of the students evaluates themselves as beginners, or advanced beginners, in few cases as competent performer and only in two cases as proficient performer

Mid-course

Student’s understanding, contributions and expectations

Student´s understanding and expectations changed little bit, as the students see the improved model of education in practice, they also partially changed their expectation for the second part of the course. Orientation on practice is still the main topic, however the improved forms of work with information, use of multiple sources, their analysis and evaluation, etc. are now perceived by students as similarly important. Student contribution is still on similar level as on the beginning of the course – they are contributing with knowledge in concrete topics, but during the course they started to be more active, propose new potentially important topics, places for excursions, etc.

Self-assessment of competences

Self-evaluation changed in some areas, usually students perceived themselves as “better” against beginning of the course, in case of some persons/areas, the rate was decreased, as the students now better understand to the content of the questions.

Mid-term course evaluation

Students are very enthusiastic from current form of education, they often mentioned discussions, cooperation with experts from practice and communication with teachers in very positive way. The see this form of education as important – it should be extended on more courses and applied also earlier, not only in frame of university education, but also on high schools. Students were asked also to highlight what is negative or what should be improved, some of them mentioned lack of time for some of expert topics, partial deflection from the course original syllabus. Also the model of the three project is too time demanding. This form of education is too different from previous usual lectures/exercises practice and it is difficult to adapt and to be fully involved.

Most of the comments was very positive and supportive, students also mentioned their increasing abilities and skills, even if the total sum of new knowledge is probably little bit lower against expectations (resp. from expectations based on usual lecture/exercise model). Most of the students think, that that development of skills and abilities is very important and they prefer this approach against strictly knowledge oriented one.

Last week (day) of the course

This evaluation is not done yet, as the course is still running and data will be collected on the beginning of June

Students’ final documents

Stakeholder document(s)

During mid-term course evaluation students evaluated stakeholders positively in case of environmental experts and worker from social enterprise Arpida, mostly negative comments were related to the farmer, due to his approach (he just shoved the farm to the students and his involvement into discussions, student works evaluation, etc. was minimal. Communication with stakeholders and consultation of student works with experts from practice was perceived as very important part by the students.

Reflection document (individual)

These documents are not ready yet, as the course is still running and the reflection document will be prepared by the students on the beginning of June.

Comments from the main stakeholder in farm, food, or forestry about

The direct usefulness of the student work (process and report)

Student work was most positively evaluated by the workers of the social enterprise Arpida, where the improvements of gardens in accordance with Social farming principles were realised and structures proposed by students were created/built. Students were perceived as the partners with important knowledge and the process of information/experience transfer worked in both directions.

Positive was also cooperation with expert from environmental practice, where, due to topic, the usefulness of student work is difficult to evaluate. External expert mentioned valuable discussions with students and also increase of his pedagogical skills and experiences (creation of video tutorials for the students, due to COVID situation).

External expert from farming practice see some potential in future cooperation with the students, but he wasn´t involved too much into education due to time reasons.

The quality of the student work (process and report)

The quality of student work was highly appreciated by the external experts from the social enterprise Arpida (selected project were “ready-to-use” and they already started practical works on their realisation) and by the expert from the environmental services (activity of the students and their understanding to the discussed topics). Farmer perceived student projects as average, but this cooperation will be improved in next run of the course, as the farmer wasn´t involved into cooperation overall.

Teachers’ final documents

Reflection document

The action learning methods were successful applied within study course Development of sustainable farming systems I+II, where the external experts were involved, more practical works end excursions was realized and students were very active (proposals of own topics for discussions, active approach during exercises, meetings and discussions with external experts). Complexity of student works and deeper interconnection with practice have to be established. This study subjects is suitable for further development of methods and approaches covered by NEXTFOOD project.

Very positive factor was students approach, they perceived projects as something, for what they are responsible, actively proposed improvements, new topics and also contacted external experts without straight assistance or commands of the teacher. Change of learning method will be in future connected also with changes in syllabus of the course, as the action learning method is more time demanding and some topics probably will be dropped from course outline. Also the planned student project in three basic fields of agroecology were too much and new system of student projects will be necessary for the next run of the course. There are still minor problems with suitable places for education, as the internet connection is very often needed and there will be logistic problems with larger groups of students in future.

Institutional factors affecting higher education

This part need to be developed further, as due to changes in the faculty management, no new interview with responsible actors were realised ´till now. Previously in this topic was mentioned:

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.

Universities and their absolvents are often perceived by practice like insufficient – absolvents gains practical skills during employment, not during educational process.

Budget for development of educational activities is limited

Cooperation with practice is often mentioned like important factor, in reality the support is very limited and evaluation of institutions is based mainly on scientific results.

Limited interest for cooperation in research between agricultural practice and science (agricultural companies have their own research capacities and are focused on types of research, which are “not enough scientific” for universities, at the same time universities are strongly focused on research, which is in current situation incomprehensible for agricultural practice). This is related to the situation, when university have to do (almost only) science and agricultural companies (almost only) business.

Current rate of unemployment pushing companies (also agricultural) into stronger cooperation with educational institutions (opportunity for collaboration development).

Demographics

Number of students starting the educational activity:	5x M, 1x F
Number of students passing the educational activity:	6
Educational background of students:	Bachelor
Number with over three years of experience in the field:	2

3.7.4 Cycle report

Cycle 1

Planning

Planning in cooperation with external experts – in this phase all of them were very positive and bring lot of interesting ideas

Finding the new places for the education activities

Involvement/motivation of the stakeholders (some of them)

Time capacities – active learning approach is much more time demanding, it is necessary to decrease amount of information provided by simply lectures

Start planning phase earlier, some points are clear even before reflection phase

Implementation

Very positive approach from the side of students, it is possible to involve them more also into planning phase

¨During the course, some improvisation was necessary even before COVID situation – changes in the outline of the course due to unplanned breaks during semester, changes of terms of the excursion, field visits due to weather/time capacities of external experts…

Original plan of three student projects was too time demanding, it is almost impossible in our time-frame handle all three project in good quality

Approach of external experts changed during the run of the course, some of them were passive, or only insufficiently involved into educational activities

There are still some technical problems (internet connection in some part of campus), changing of the lecture environment is limited by the time-schedules of the university rooms/places

Structure of the course will be changed, students will solve only one project and present the results to the others – this will be planned in detail during summer (planning phase)

Reflection

Students were very enthusiastic, some of their ideas will be used during the planning phase, they supported strongly this model of education and worked with much higher activity and responsibility than usually.

We still need to explain better the importance of feedback collection, creation of reflection document to the students and also teachers need to understand better, how to write them most effectively (good practice examples are warmly welcome!)

Cycle 2

As the course is 2 semesters long, we finished first cycle and we are on the beginning of the planning phase for the second cycle.

3.8 Italy – UNISG

3.8.1 ID Card

1 week course in “Sustainable Agriculture and Agroecology” for Master in Food Culture and Communications, taught in English

The University of Gastronomic Science, course leaders: Dr. Paola Migliorini and Prof. Geir Lieblein

2018 2019

96 Master students (52 in 2018, 44 in 2019)

3.8.2 Status

From lecture hall to a diversity of learning arenas

For this 1-week Master course we have used not only university classroom. The students divided in groups of 5 person, spent 2 full days in a farm. Moreover, they were assigned to develop a group report and to do this they used different place outside the classroom.

For the action leaning activities the follow learning arenas are used:

- several classrooms (they are necessary for the group work)

- university restaurant (used for lessons with degustation)

- farms and fields (used for practical learning of antique varieties of cereals, rice productions ecc.)

From lecturing to co- and peer learning

In the 1-week course the students had very few frontal lectures and many other activities: flipped class, 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 rich pictures and demonstrated them to other students. Thus, all students in a group could learn different experiences through the presentations made by their colleagues. In this case, creation and presentation of Rich picture as a tool of co- and peer-learning, required the students' creativity, group work 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.

From syllabus to supporting literature/a diversity of learning sources

The student learns not only from frontal lecture (around 20-30% of all hours) but from real case and peer learning

From textbook to a diversity of teaching aids

This course didn't have a textbook but we used 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 we provided in English that is not native language for several students.

From written exam to a diversity of assessment methods

The students didn't have a written test but they were assessed by a group paper for stakeholders and an individual reflection documents.

From lecturer to learning facilitator

2 teachers where involved into full time designing the course cycle and action learning activities. In their feedbacks the students positively characterised the presence of the

two professors, opportunity to have two different approaches in teaching and facilitation of class.

3.8.3 Data analysis

Demographics

Number of students starting the educational activity

96 students starting educational activity (52 in 2018, 44 in 2019), 34 female students and 10 male students in 2019, 38 female students and 14 male students in 2018.

Educational background of students

-2019: 40 students with B.A. degree and 4 students with Master degree

-2018: 48 students with B.A. degree and 4 students with Master degree

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

- 2019: 25
- 2018: 31

The students of MOG (Master of Gastronomy) had the same courses in 2018 and 2019 (2 groups of the students in 2018 and other 2 groups in 2019). During the course they were asked to do several written exercises. They answered several questions provided in Tab.1. The students had 6 written exercises in 2018 and 4 written exercises in 2019. The students' data were provided by email (in 2018) and uploaded to the University Electronic Platform (in 2019). Then, all data (written exercises) were extracted and pasted into two documents (2018 and 2019).

Data were clustered and analysed in order to answer Research Questions listed in the Research Protocol.

Nvivo is a software used for qualitative data analysis. The main issues (repeated categories in the students answers) were coded.

According to the Research Protocol the follow Research Questions were formulated:

RQ1: How do students experience action learning process in terms of:

RQ 1.1 learning outcomes (what it gives them?) – *which achievements do students have from the course of Agroecology based on the NF approach?*

RQ 1.2 Students transformation: does 1 week of action learning provide the students' transformation?

RQ 1.3 missing issues (What is missing in course organisation?) – *course evaluation by the students*

RQ 1.4 How do the students adapt to action learning approach? – *reflection document*

RQ 2: How and to what extent do various education activities enhance the students' abilities to deal "the challenge of the whole" including to take or facilitate informed action and the competences considered necessary for doing so?

In order to answer the Research Questions, available students data were systematised in Table 1.

Table 1. Correspondence of the research questions and available answers

RQ	Students exercises	Available responses	
		2018	2019
1.2	What I would like to learn in this course?	x	--
1.4	Reflection document	x	X
1.1	What have we achieved?	x	---
1.2	What are the questions I am now asking myself?	x	X
2	What will I do to find the answers to these questions?	x	--
1.1	Note down three things you liked about this meeting, that you found useful, inspiring, interesting	x	X
1.3	Imagine that you were the one to be completely in charge of the next meeting! What three things you would do differently?	x	x
1.2 1.4 2	Reflection document	x	x

What does the data indicate?

RQ 1.1 learning outcomes (what it gives them? - *as formulated in the Research Protocol*) **–** Which achievements/learning outcomes do students have after the course of Agroecology based on the NF approach?

All students were asked to answer the question "What have we achieve?". Their written answers were collected into one document and analysed. The students described their different achievements of the course. Thus, besides achievements in core-competences demonstrated on Fig. 1, the students noted achievements in the thematical areas of the course and in other competences. Thematic areas of the students' achievements (or knowledge) included received information and experience in Agroecology, Sustainability, Biodynamics and Organic ways of production. Other competences (or skills) mentioned by the students included achievements in critical thinking, group work and making new relationships.

These are a couple of examples of the students' answers:

I think we have now a better understanding of how an organic/ biodynamic farm works, from the practices to the challenges related to it. We have achieved picturing and *working on a holistic picture, directly looking, discussing and questioning many different aspects.*

What have we achieved?

- *A better understanding of the practices and challenges of organic farming in Piemonte*
- *(More) Hands-on farming experience*
- *Practice thinking critically, intentionally observing from a variety of perspectives, analysing what works and where improvements can be made*

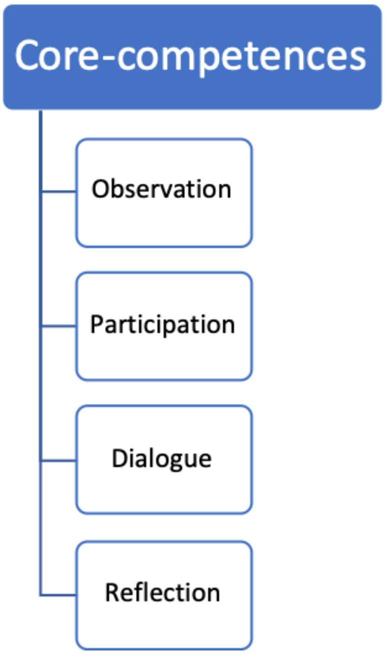


Figure 1. Learning outcomes in terms of core-competences (RQ 1.1.)

The core-competences as a course achievements included 4 core competences (observation, participation, dialogue and reflection). The course is very short (only 1 week) but very intensive. At the same time, the course didn't include any specific exercises for improving vision competence. That is why the students didn't mention vision competence among course achievements.

Achievement in observation competence was underlined by many students as they had observation activities during farm visits. Participation competence was improved due the students' involvement into group work activities and different experiences on the farm.

Competence of dialogue was improved as in the students' group work as in their experience on farm. The students mentioned, that they improved their ability to communicate to the farmers.

After the course, the students' reflection competence was improved due to their written exercises. They had to write a Reflection document. Notwithstanding provided guidelines for the Reflection document, the students wrote them differently. It demonstrated different ways of the student's reflection such as:

- Only recap of the course activities;
- Listed course activities and provided citations from reading materials that impressed the students;
- Only personal reflections on the course activities that included personal reaction, attitudes and perception of the farm experience.

Despite of the short duration of the course, all these achievements could be interpreted as part of the students' transformational process.

RQ 1.2 Students transformation or does 1 week of action learning provide the students' transformation?

In order to answer this research question, was executed analysis that included two parts:

a) Students initial expectations were compared to the students' final questions,
b) Students reflection document was analysed through Nvivo, and students' assumptions in terms of their changes were coded as "Transformation"

Students' transformation was analysed in two directions:

a) Comparison between initial expectations and final questions

For the analysis were used the students' exercises, particularly, their answers the questions: "What I would like to learn in this course?" and "What are the questions I am now asking myself?"

Students answers the question "What I would like to learn in this course?" were collected as Initial questions, whilst students answers the questions "What are the questions I am now asking myself?" were collected as Final questions. Principal difference between Initial and Final questions is provided in Table 2.

Tab. 2. Initial and final questions

Initial questions	**Final questions**
Many "What" questions Brief questions Questions on agroecology and sustainability Questions on the general concepts Demonstrated interest to agriculture in general Questions like "Where food does come from?" from the students without agricultural background	Many "How" questions 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 Interest to future and sustainable development of agriculture Global questions related to policy-making and financial issues Specific questions: "are we setting the right standards?"

The difference between compared questions could be interpreted as a students' transformation from being passive learners to players of agri-food system that willing to improve agri-food system. Students' expressed their willingness to participate and at the end of course they were wondering how to imply themselves into the system in order to be useful and efficient part of the system. This is evidenced by Final questions such as:

"*How am I as a consumer can help the farmers?*" *"What is my role in this system? How can I better connect producers and consumers?"*

Examples of initial questions:

- What is Agroecology?

- What does it mean to be an Agroecologist? How do they work? What is needed?

- What is a food eco-system?

- What models of sustainable agriculture we have working today?

- What are the traditional ones used as models and what are the new improvements regarding innovation?

- What are the bases or precepts agroecological systems have ?

- What is the difference between the terms; agroecology, permaculture and agroforests?

- What are the bases and commandments that agro-ecological systems have?

- What are the certifications existing today?

- Is there a difference between «agroecology», organic and/or permaculture farming?

Examples of final questions:

-How am I as a consumer can help the farmers? Is paying the right price is enough?

-How the students of the universities that collaborate with the farm can help it in a deeper way? In marketing for instance.

-What is my role in this system? How can I better connect producers and consumers?

- May I apply sustainable approach just by myself or I need a sustainable network in order to be as much as sustainable as possible along the whole cycle?

-If the goal is not to make money how does that fit in with our current capitalist system?

- Which tools can be used to spread the shift of agriculture to a sustainable practice once the payment of ecological services in an organic farm does not even cover the cost of the certification?

- Are sustainable agriculture and agroecology realistic approaches to answer the issues caused by the climate change? (Same question on changing the food system) or is it an utopia? Meaning, how can sustainable agriculture and agroecology be successful means of transition and/or ultimate transition goals?

- How does an “idealist” sustainable farmer judge whether his plans or visions are realistic?

- When we talk about carbon footprint and sustainability, are we asking the right questions and setting the right standards?

Example of the students’ questions formulated by two students:

Initial questions #1:

I’d like a deep understanding of agroecology and sustainable agriculture, so as to clearly position them in relation to other farming terms like organic, biodynamic, permaculture, conventional agriculture, etc

Final questions #1:

With only two days on the farm (Fattoria Italia), I feel invested in and worried about their survival. Their thin margins and “bare-bones” staff means no one gets a day off for vacation or the flu and it seems to me that they’re deeply vulnerable to market changes—and I’m left wondering what I can do to educate and advocate on their behalf.

Initial course expectations #2:

I have the feeling that it’s going to be a very interesting course especially because we are going to experience on the field what we are studying. That is already very important for me (especially because, at least in Italy, we have a more theoretical approach).

Final question #2:

May I apply sustainable approach just by myself or I need a sustainable network in order to be as much as sustainable as possible along the whole cycle?

May I become an agroecologist? Or would it better being a group of experts (about different fields) in order to get enough knowledge to face all the agroecologic cycle?

Where can I start to agroecology? From experiences/case studies or theory?

Is Agroecology applicable for real or just in part, or it is just a dream?

The differences between initial and final questions could be interpreted as an increased students’ interest to the sustainable agri-food systems and their role in it. In turn, this is referred to process of the students’ transformation.

b) Students’ transformation extracted from the Reflection documents

At the end of the course students were asked to write a Reflection document and to describe several issues such as «What happened» «What did I learn», «What did I feel», «What more do I need to learn, and how will I do it?». However, not all the students followed this structure and answered the questions. Therefore, for analysis we have 3 types of Reflection documents that demonstrate different ways of the students’ reflection:

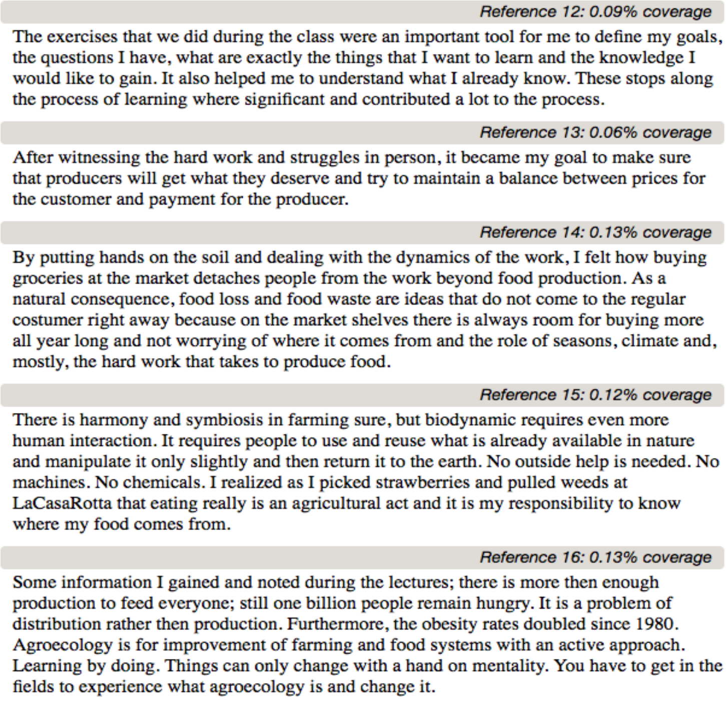
- With specified structure and clear description of all answers;

- Detailed description of only «What happened», i.e. all course activies and contents with citations of the suggested literature and without personal reflections;
- Only personal thoughts focused only on «What did I feel».

Most of the appropriate answers concerning the students' transformation were described in the chapter «What more do I need to learn, and how will I do it?». So, the descriptions of the students' transformation were coded as «Transformation» in Nvivo (some answers are provided below).

Summarizing, the students' transformation could be described by the follow issues:

- Asking wider critical questions;
- Realising existing gaps in agri-food systems;
- Willingness to apply the core competences into students' future life (use them as an instrument to the projects);
- Deeper understanding of agri-food systems through creating connections/bridges between the different pieces.



Reference 12: 0.09% coverage

The exercises that we did during the class were an important tool for me to define my goals, the questions I have, what are exactly the things that I want to learn and the knowledge I would like to gain. It also helped me to understand what I already know. These stops along the process of learning where significant and contributed a lot to the process.

Reference 13: 0.06% coverage

After witnessing the hard work and struggles in person, it became my goal to make sure that producers will get what they deserve and try to maintain a balance between prices for the customer and payment for the producer.

Reference 14: 0.13% coverage

By putting hands on the soil and dealing with the dynamics of the work, I felt how buying groceries at the market detaches people from the work beyond food production. As a natural consequence, food loss and food waste are ideas that do not come to the regular costumer right away because on the market shelves there is always room for buying more all year long and not worrying of where it comes from and the role of seasons, climate and, mostly, the hard work that takes to produce food.

Reference 15: 0.12% coverage

There is harmony and symbiosis in farming sure, but biodynamic requires even more human interaction. It requires people to use and reuse what is already available in nature and manipulate it only slightly and then return it to the earth. No outside help is needed. No machines. No chemicals. I realized as I picked strawberries and pulled weeds at LaCasaRotta that eating really is an agricultural act and it is my responsibility to know where my food comes from.

Reference 16: 0.13% coverage

Some information I gained and noted during the lectures; there is more then enough production to feed everyone; still one billion people remain hungry. It is a problem of distribution rather then production. Furthermore, the obesity rates doubled since 1980. Agroecology is for improvement of farming and food systems with an active approach. Learning by doing. Things can only change with a hand on mentality. You have to get in the fields to experience what agroecology is and change it.

RQ 1.3. Space for improvement – course evaluation by the students

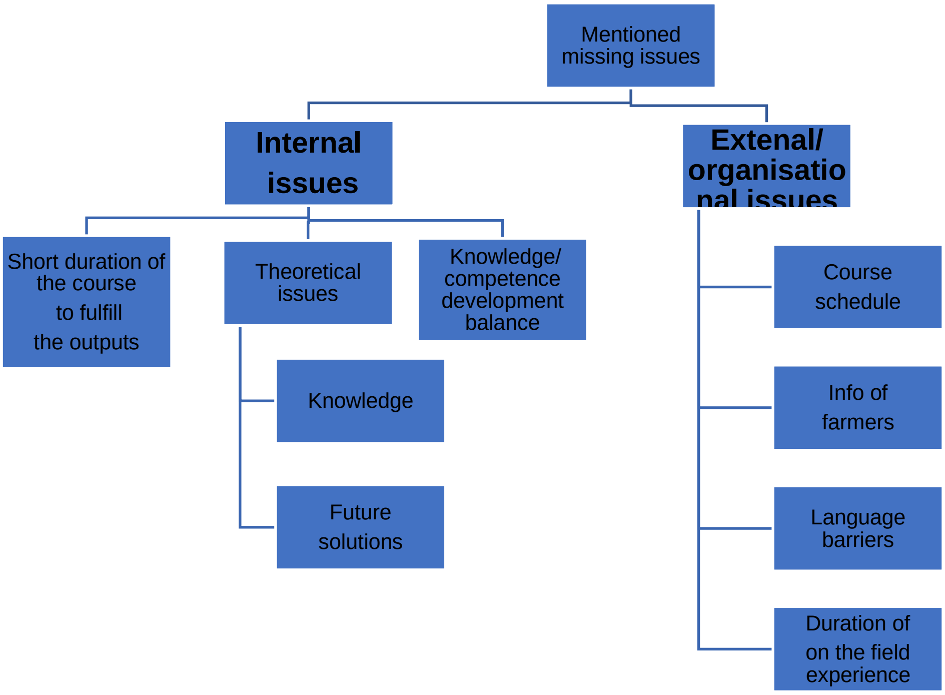

Mentioned missing issues
Internal issues
Extenal/ organisational issues
Short duration of the course to fulfill the outputs
Theoretical issues
Knowledge/ competence development balance
Knowledge
Future solutions
Course schedule
Info of farmers
Language barriers
Duration of on the field experience

Figure 2. Coding tree for RQ 1.2 (Missing issues)

In order to answer the RQ 1.2, we decided to separate missing issues into 2 groups: internal issues and external (or organisational) issues.

Internal issues are related to the internal organisation of the course, and, according to the students' opinions, include improvement of assessment, theoretical issues and balance of time dedicated to explanation of competences and to knowledge.

Short duration of the course to fulfil the outputs includes the students' requirements to have more time for preparing their outputs.

Theoretical issues means that students would like to have more theory as knowledge (on agroecology, organic methods and biodynamics) as future solutions for sustainable agriculture.

Knowledge/competence balance means that students suggest either to separate classes on methodology and theory, or to decrease time devoted to competences in favour of knowledge.

Content/process (competence) balance means that students suggest either to separate classes on methodology and theory, or to decrease time devoted to competences in favour of knowledge.

Organisational issues include:

1) changes in course schedule required by the students,
2) more information on farmers and on their activity,

3) alleviating of language barriers, that could impede to dialogue to farmers, and it was crucial for some students
4) according to the students, more time on field would be more efficient to the learning goals.

RQ 1.4 How do the students adapt? – based on the *reflection document*

The question “How do the students adapt?” can be interpret as consequence of the answers the questions: “Which challenges do the students meet”, “What do the students do to meet the challenges?” and “Which additional personal skills do they develop in order to meet the challenges”

Concerning question “Which challenges do the students meet”, according to the reflection document, could be distinguished the follow challenges (points of adaptation) that students mentioned in experience of action learning.

The first challenge is related to the different students’ backgrounds in agriculture (some students have no agricultural background, while other have several years of experience). This affected their process of learning theory and practice in different ways:

- for the students with agricultural background was a problem to not judge the observed realities: *I realized that it was a true challenge to separate my prejudgments and feelings of sustainability and organic agriculture from my data gathering;*
- for the students without agricultural background was a problem to understand all observed processes and realities*: I have no background in agriculture whatsoever. For me the even the basics of farming are new which means that sustainable agriculture is even a step further in this topic.*

The second challenge is language barrier in dialogue with stakeholders (farmers) and in reading suggested literature. In each group of students was native Italian speaker that translated everything into English, thereby providing a certain level of communication between the group and farmers. Other students had to internalise the common understanding of agricultural realities to overcome language barriers: *We also were able to have lunch with the children, eating the same food as them, and to literally internalise the nature of the farm and its production through all five senses*.

This language challenge encouraged the students to use observation and dialogue rules in order to better understand the situation.

The third challenge was related to the group work. Thus, different agricultural backgrounds, different points of view, different results of observation and dialogue activities caused misunderstanding and needed more time for balancing of the group outputs. On order to meet this challenge the students forced the dialogue rules and learn how to organise a group work.

As a group with different backgrounds, it was very interesting to see how we could caught different information and organize it to make the best version of the big picture, which became the basis of the Stakeholder document we presented, after reflecting *longer about the aspects involved in our analysis. We can say that the biodiversity of the group enriched the work.*

The fourth mentioned challenge is time pressure. The students had very intensive week and limited time, that required more efforts from them in order to handle their output in time. This forced them to develop ability to work in the stressful conditions (under time pressure) and to be very efficient in their time management.

RQ 2: How and to what extent do various education activities enhance the students' abilities to deal "the challenge of the whole" including to take or facilitate informed action and the competences considered necessary for doing so?

In order to answer this RQ, we used the information extracted from the students' answers "What will I do to find the answers to these questions?" and from Reflection Documents

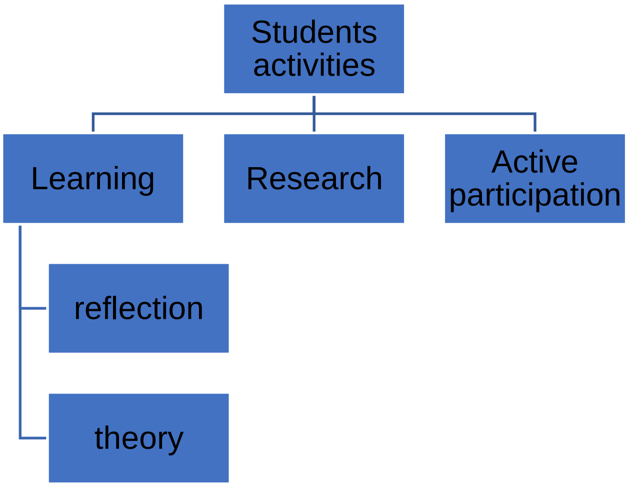


Figure 3. Students' answers on question "What will I do to find the answers to these questions?"

As demonstrates Fig. 3, the students suggested 3 main activities to change the current situation: learning, research and active participation.

The first category mentioned by the students is Learning. It means 'learn more' and includes two learning activities: learning through reflection and learning theory. Thus, the increased students' interest to learning process derived from their practical experience.

The second category of the students' activities is research. The students demonstrated high interest to the research process as to the instrument of facilitation, that could provide solutions.

The third category of the suggested students' activity is Active participation. It refers to the personal characteristics rather to education process. However, the students mentioned that it is important to ‘stop to be an outsider’ and to have willingness to contribute. This is also caused by their practical experience and by dialogue to the farmers.

Besides, we used the reflection document in order to understand how the methodology (as one of education activities) enhance the students’ abilities to “challenge the whole”

There are three assumptions extracted from the student’s reflection document.

Thinking of the Agroecology education, this experience made me aware of the importance of all the steps of a conscious analysis. The five core competences to become an agroecologist, but also to analyse situations or subjects, are a good path to follow. First, the observation makes you aware of the scenario, helping you to create a rich picture of a situation, and to carefully examine situations before drawing conclusions. Then, the reflection is view as the ability to think deeper and embed the experience, adding your personal knowledge and the main theories. That for me was the Achille’s hell, just because my impulsivity leads me from the study directly to the solution. That’s the reason why I love working in a group; what I don’t have or what I am not good at is balanced from other people. Participation and dialogue are in fact very important; the contributions of everyone, the process of reflecting together are fundamental. In the end, go beyond existing thought patterns and think in a newer way is the main goal. That’s visioning: the willingness to take risks and not to be inhibited by a fear of failing. If learning is an active and social process, not a simple transmission of knowledge, visioning is also about learning, but from the future.

This part of the reflection could be interpreted as a positive perception of the course methodology and understanding the necessity of each core competence.

Especially, the self-assessment exercise, that I did in class the first day, helped me to understand better what my strength and weaknesses are, giving me a good hint about what I should work on in order to improve and to reach my future professional aspirations that I predetermine for myself. I think this exercise was also useful to realize that, before conducting an interview on the field, which evidently leads you to judge the person you have in front, it is important to know yourself, in order to be as objective as possible in the final evaluation of the whole experience and to internalize in a positive way all the potential teachings.

This text could be interpreted as very positive and useful appreciation by the students all core competences and their practical application.

Through my work with L'Orto del Pian Bosco, I realized the need for new research that analyses farming costs in new ways, examining time to be as precious of a resource as money. To gain a better understanding of this, I will continue reading and researching about the ephemeral costs and benefits associated with sustainable agriculture. If need be, I will also use my past experience conducting ethnographic research to start my own research or to help others design research investigate the intangible underlying aspects that guide and hinder choices for sustainable farmers

This could be interpreted as a positive effect on the students in terms of the future activity. The student demonstrated willingness to continue his research in a certain direction.

Moreover, we provide some students answers that characterise their intentions

- *I think that thanks to the clear methodological guidelines we were given, we were able to refocus our energies; although we couldn't fulfil the core competency of Participation, we doubled down on Observation. Through this, as well as Dialogue and Reflection, we were able to acknowledge the limitations of our perspective.*

- *We had been equipped with tools on how to conduct qualitative research, and these are tools I know I will be transferring to many other situations in the future. I found the guidelines on how to conduct research interviews particularly helpful; they made me a better listener and a better interviewer, skills I know I will need in the future as I intend to go into the field of food journalism.*

- *I'm inspired to utilize the resources we were given in class and do some additional reading to educate myself and others about the impact of their eating choices, not only on the planet, but on the livelihoods of the farmers and future generations.*

- *There were a lot of questions about the actual practice of biodynamic farming that I had while on the farm and I want to continue to do research on how practices are carried out and visit other biodynamic producers to see the variation in the field.*

Self-Assessment of competences

At the beginning and at the end of the course the students were required to fill self-assessment test. The average results of start and end self-assessment tests are provided in Table 3, that demonstrates the equal growth in the same competences after both courses (in 2018 and 2019): the highest differences were demonstrated in Participation and Visioning competences.

At the beginning of the course, visioning competence had the lowest assessment comparing to other competences (4,3 in 2018 and 5,21 in 2019). Exercises on Visioning competence were not included into the course program, however it was increased. This could be explained by the psychological factor that might affect the students'

Participation competence was mentioned by the students in their several written documents. Whilst visioning competence was not mentioned in terms of its progress or as a part of the students' transformation.

Table 3. Students' competence self-assessments at the beginning and the end of the course in sustainable agriculture.

	2018 (n=52)				2019 (n=44)			
Competencies	First day	Last day	Diff	Significance P value[3]	First day	Last day	Diff	Significance P value[1]
Observation	4,8	6,3	+1,5	<.0001***	5,82	6,38	+0,55	<.0001***
Participation	5,2	6,9	+1,7	<.0001***	6,07	7,14	+1,04	<.0001***
Visioning	4,3	5,8	+1,5	<.0001***	5,21	6,63	+1,42	<.0001***
Reflection	4,7	6,0	+1,3	<.0001***	5,58	6,35	+0,77	<.0001***
Dialogue	6,2	7,2	+1,0	<.0001***	6,63	7,33	+0,71	<.0001***

Levels: 1–2 = novice; 3–4 = advanced beginner; 5–6 = competent performer; 7–8 = proficient performer; 9 = expert;

*p-value < .05, **: p-value < .01, ***: p-value < .0001

Besides both these competences, sufficiently high growth was in Observation competence (in 2018) and in Reflection (in 2019). As was mentioned before, Observation and Reflection competences were developed by the students in their farm visits. The differences between their growth could be explained by the personal students' assessment of their competency level.

3.8.4 Cycle report

Cycle (n+1): Master 2020

Planning

Online Master course of 1 week "Agroecology and Sustainable agriculture"

Course leaders: Paola Migliorini and Geir Leiblein

Support: Charlotte Prelorentzos and Natalia Rastorgueva

Due to recent condition of COVID19 we had to shift the full course online.

In order to keep Action-learning approach, we used 5 virtual cases: real farms described in a documents where rich information were provided about the farmers, the climate, the farming systems, the cropping and livestock systems, the marketing strategies and future expectation.

We divided the class into 5 groups of max 5 students according to time zones.

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[3] Results of a pared two-tailed Student t-test that followed Test of Kolmogorov-Smirnov (data has a normal distribution). Statistical analysis was performed on IBM SPSS Statistics 25

Each group was assigned with 1 farm web-case.

We give them 5 pre-course assignments:

- literature list and papers to read

- Self-assessments test START of core competences

Answer the initial questions:

- "what I would like to learn?"
- "What are the competences (knowledge, skills and attitudes) do I bring to the course to make it a success?"
- "What are the knowledge and skills we need to support sustainable development in farming and food systems?"
- "What are the competences I´d like to train/improve in this course?"
- "What are my initial reactions (reflection) to the readings"

- Get familiar with your group web-case

Implementation

We offered 5 afternoon sessions from Monday to Friday

Monday, May 11 – Intro and preparations.

Tuesday, May 12 - Exploring cases and developing rich pictures

Wednesday, May 13 - Peer feedback and starting group work

Thursday, May 14 - Group work on farm web-cases

Friday, May 15 - Peer feedback and wrapping up

Final assessment:

- Group report of web-case
- Individual reflection document
- Answer final questions
- Course evaluation
- Self-assessment END on core competence

Reflection

The online course had several challenges: short time; some unknown tools on Blackboard (e.i.peer-feedback in group and others), possibility for students to meet from different time zone, students reaction to fast request on complex issues (e.i. group rick picture and peer-feedback).

Due to availability of resources (technical assistance, Blackboard platform, web-case document available) the course was a success according to initial feedback from students (still under evaluation).

3.9 India – UoC

3.9.1 ID card

Title, level of the course and course language:

Three months' Certificate course in Agroecology for farmer trainers - bachelor degree holders are prefered. The course language is 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:

July 2019-October 2019

Learner categories and number per category:

Farmer Trainer – 3

Agrifood Entrepreneur – 3

Researchers - 3

3.9.2 Status

From lecture hall to a diversity of learning arenas:

The three months 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 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.

Throughout the course different reflections were collected from the students who participated in this course.

- Students reflected that they found it useful to spend more time in the field and face real time challenges.
- Their feedback says the capacity of handling complexity, thinking creatively/ differently has improved.
- Soft skills were useful for them to improve their reasoning, analytical and communication capabilities.

As the number of students were less, it was difficult to attach a group of students to a farm. Often the number of students in a group of students reduced to one or two. Handlining the expectation of the farmer's group in terms of continuous engagement was also a challenge. Most of the farmers expect that students will come there and work there for a longer period. It's very difficult for the students to earn the trust from the stakeholders and work with them in such short span of course. So prior engagement and discussion with all the stakeholders involved are needed before engaging students with them.

From lecturing to co- and peer learning

The students were encouraged to think independently and then work in groups. The classroom 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. 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.

Most of the students who participated in this course were from different background. Many of them had prior misconceptions about this course. Like learning teqniques of organic farming should be incorporated into the curriculum etc. We had to make them understand that those were beyond the scope of the course. Due to the small size of the classroom, the working groups formed were very small, many of them had personal issues with each other to that extent that they sometime refused to be in a particular group. Personal conflicts were a major issue in forming groups and working together.

To overcome this situation we need to Increase number of students to 15 at least, so that number of group members could be increased to avoid personal conflicts.

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

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.

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.

We didn't face any such obstacles in implementing these. We faced a challenge of maintaining an organised, perhaps an online library for different kinds of resources/ reference materials A better organised online library should be maintained.

From textbook to a diversity of teaching aids

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. The major obstacle we faced were to make all the teachers/facilitators understand the tools beyond conventional textbook and presentation. Hence the discussion on the methodology of teaching with the teachers/facilitators beforehand are required

From written exams to a diversity of assessment methods

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
- Vision Document
- Class Performance
- Participation/Dialogue
- Stakeholder's feedback
- Oral Test

Since this assessment method was continuous and many of stakeholder’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. 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.

From lecturer to learning facilitator

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. The reflections from the students suggest that few of the resource person could not deliver what was expected from them. Connections between various topics could have been dealt in a better way. There should be a teacher’s workshop prior to the course. The role of the coordinator becomes very important in linking up various topics, facilitators and modules.

3.9.3 Data analysis

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 in carefully observe a situation in field (t= 0.0002, p<0.001) among the students whereas there was no significant differences in other competences. 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 recognise values and goal conflicts of different stakeholders in society (t=0.0002, p<0.001) but other competences do not show any significant change. 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. No other competence showed any significant changes among the students. 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. None of these competences showed any significant differences among the students after finishing of the course.

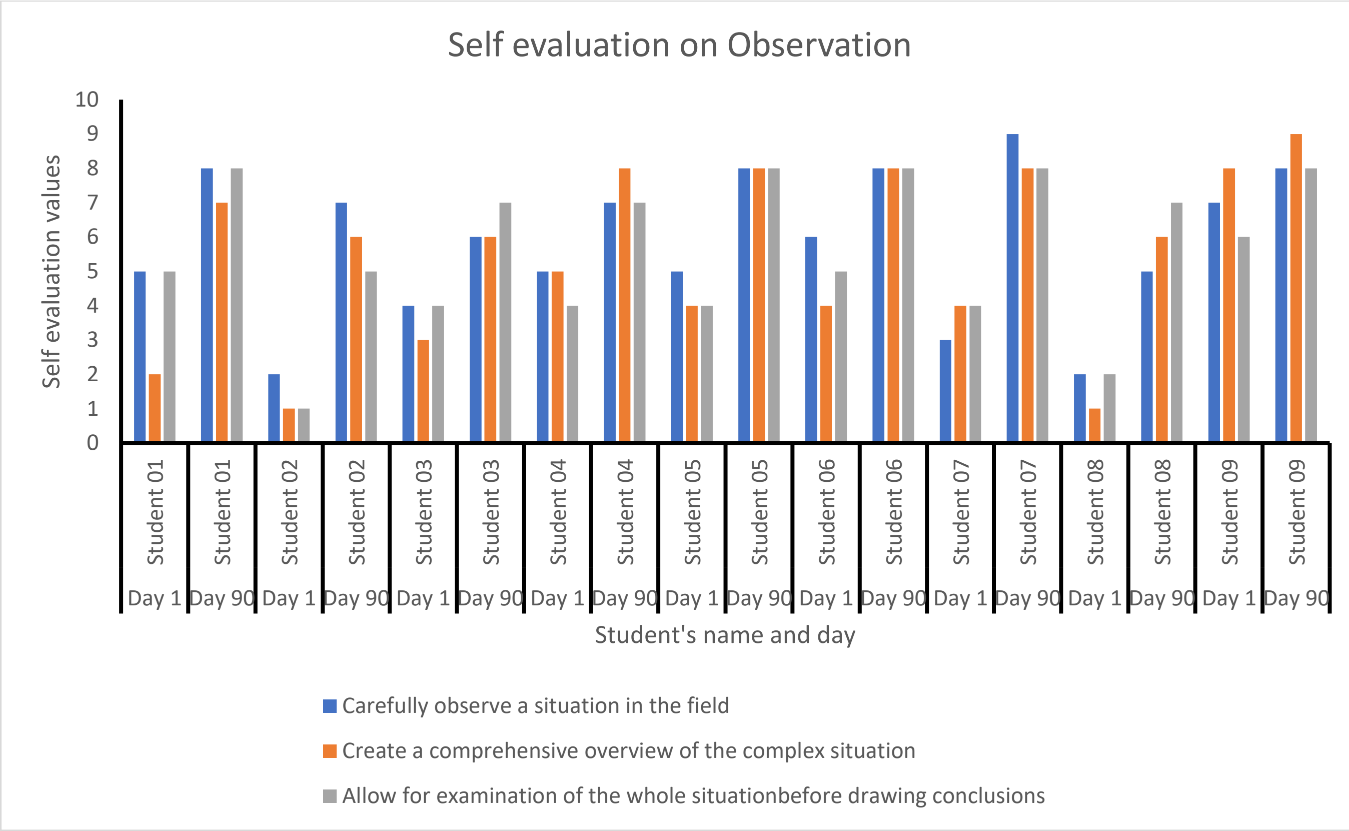


Fig.1. Comparison of self-evaluation values on observation by students on first day of the course with the last day of the course

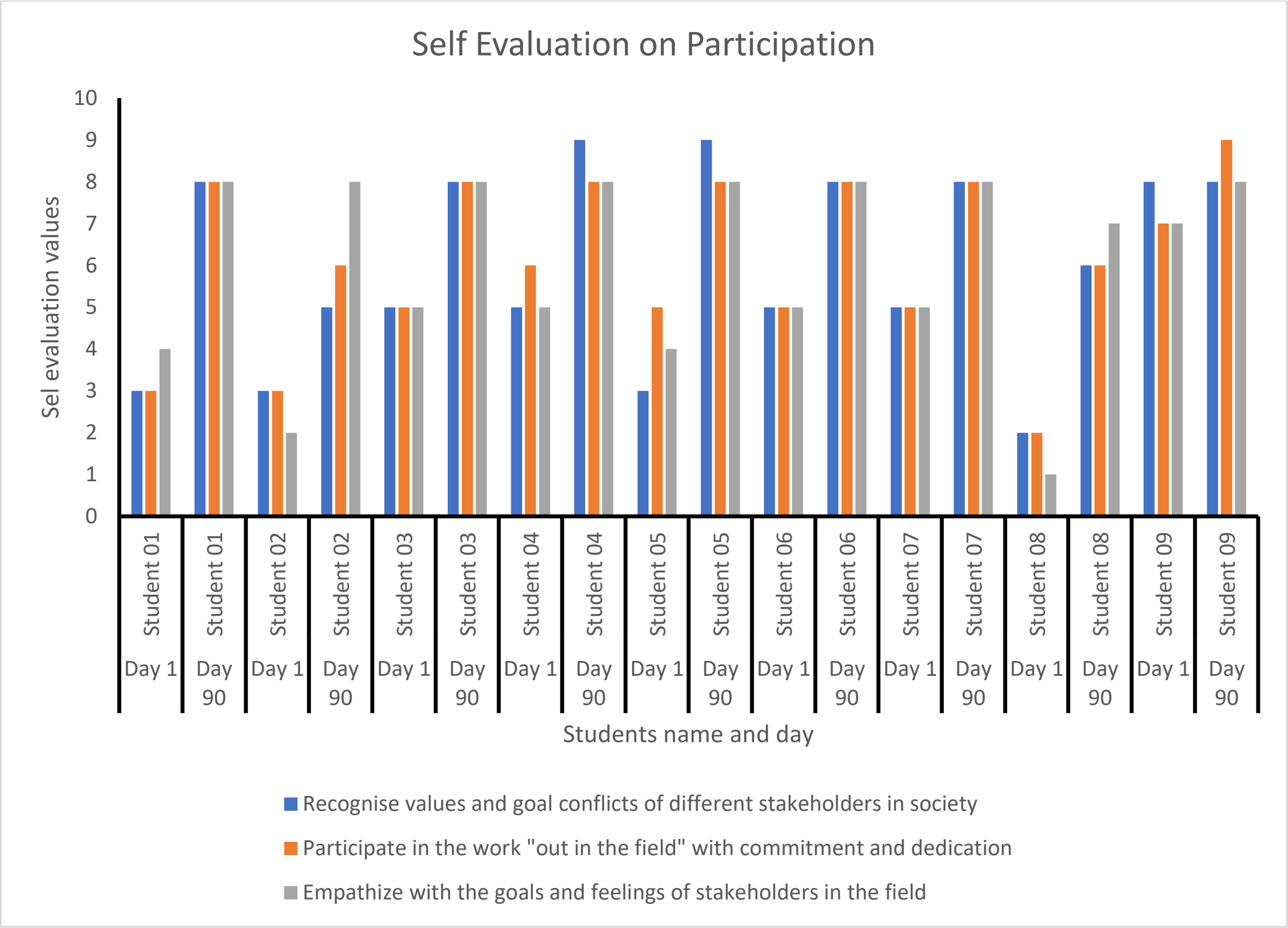


Fig.2. Comparison of self-evaluation values on participation by students on first day of the course with the last day of the course

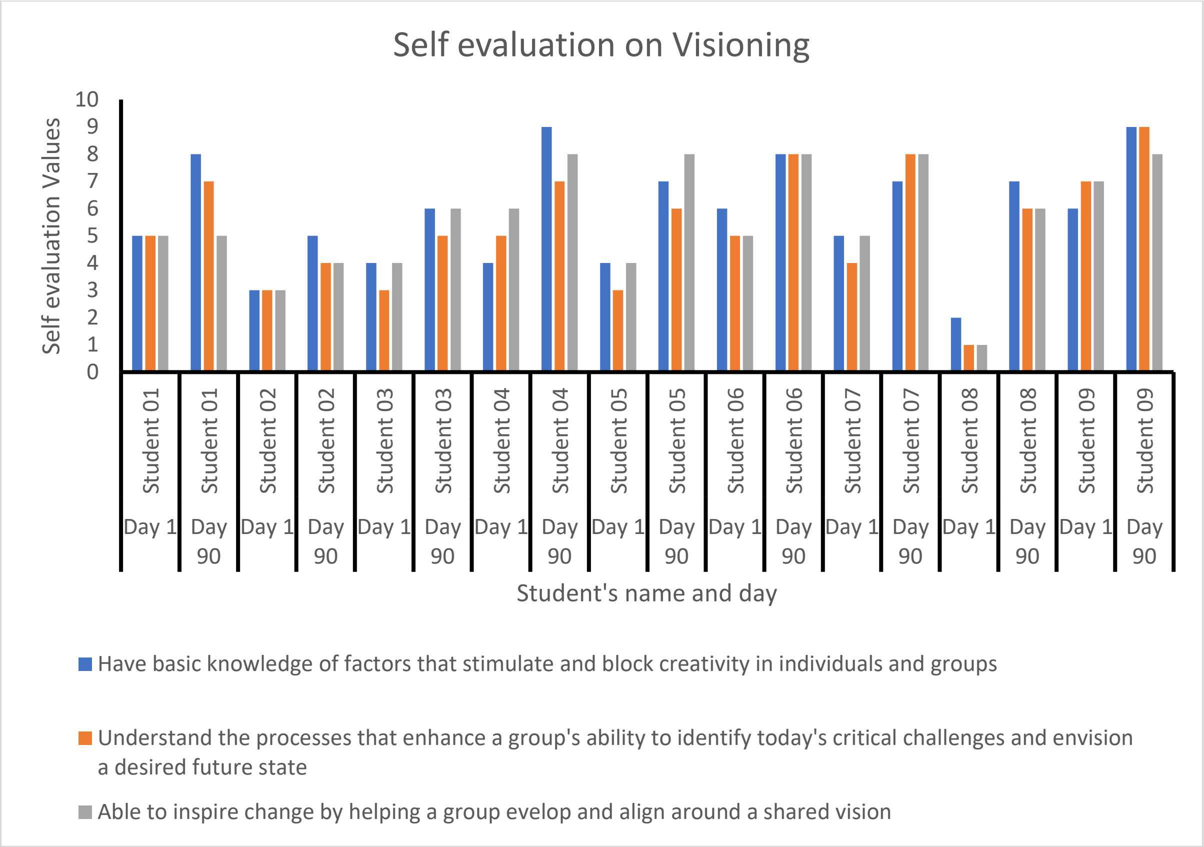


Fig.3. Comparison of self-evaluation values on visioning by students on first day of the course with the last day of the course

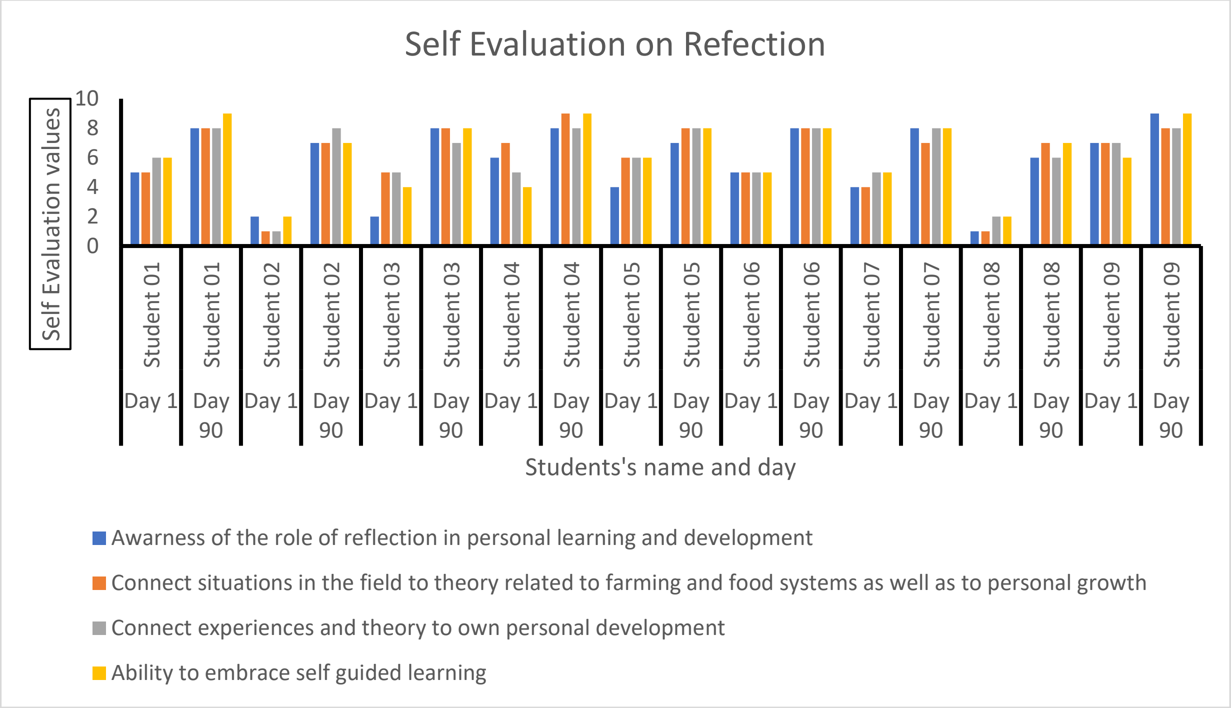


Fig.4. Comparison of self-evaluation values on reflection by students on first day of the course with the last day of the course

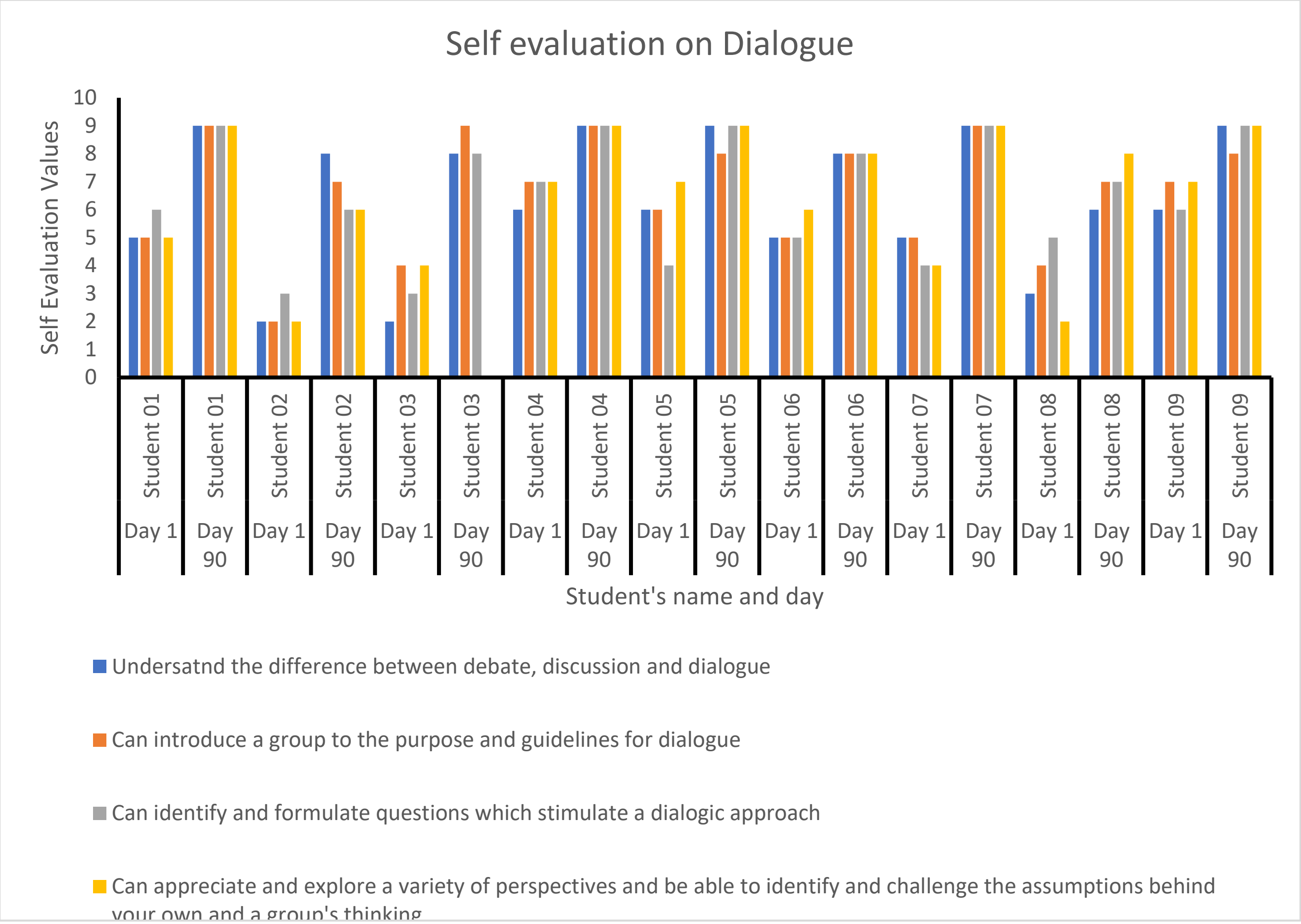


Fig.5. Comparison of self-evaluation values on Dialogue by students on first day of the course with the last day of the course

In the final reflection discussion with students the following structured questions were asked to each students and there were many feedbacks that came up. We asked them few questions and they came up with different ideas. Here are the questions and the various ideas and important reflections that came up.

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

- 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.

2. Which of the experiences and competences I brought to the educational activity contributed the most to the learning community?

- Most of students had a Preconception that this was about organic farming. But after this course they reflected that this course showed them How to transform, what are the complexities and where is the scope of change.
- Students are now thinking creatively, differently.
- System understanding was a big achievement for the students.

3. What questions did this educational activity help me find an answer to?

- 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

4. Which competences did I train/improve significantly in this educational activity?

- 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

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

- We learned – but how do we practice in future?
- We now know there is still to learn.
- How to build trust?

6. How can we improve?

- Sometimes science was complex but they learned to apply them systematically. .
- Get together of everyone again in 6 months to follow up what they learned and how they are applying now.
- They can build capacities of the host institutions in the field.
- Can the students repeat the process particularly with the farmers?
- Can they go to fix places, where they worked during their case work so that Next batch can work on the same?

The students were evaluated on the basis of few points (Table.1) and they were finally evaluated with a viva voce.

Table 1. Final evaluation result of the students

	Full Marks	Highest Marks	Stud 03	Stud 09	Stud 06	Stud 07	Stud 01	Stud 04	Stud 05	Stud 08	Stud 02
Self-Assessment	10	8	5	8	8	8	8	8	8	5	7
Learner Document	15	13	11	5	13	11	5	12	13	9	7
Case Doc	10	8	6	6	7	8	7	8	8	4	6
Vision Document	10	9	7	3	8	9	2	9	8	5	7
Class Performance	15	12	7	5	9	10	6	11	12	8	9
Participation/ Dialogue	10	8	5	2	6	7	4	7	8	7	8
Stakeholder's feedback	10	8	4	2	6	7	3	8	8	8	5
Oral Test	20	17	12	2	14	15	2	16	17	13	3
Total	100		57	33	71	75	37	79	82	59	52

Students' final documents:

Students submitted individually their learner's document at the end of the course and the vision document for the farm they have worked on during the course as a group. When these documents were coded using NVivo the competences (visionary thinking, observation, participation) came the most followed by facilitation by teachers. When the documents were coded using 'transformative learning' few interesting points came up. 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.

Most common reflection about the course were that if the curriculum were structured it would have been helpful and also few of the teachers could not follow the nextfood model during the sessions. So students struggled to follow the sessions and felt these were unrelated.

The core competences learned through the course came up various times in the reflection documents and the summarized competences learned are following.

Observation: Students are encouraged to observe a situation or a problem, and they express themselves in term of rich picture before analysing.

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.

Visioning: Students draw a future vision followed by reflection on a situation, in an uninhibited way - revealing the capacity to go beyond existing thought patterns.

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.

Participation: Students work together in group and with other stakeholders – and recognize conflict of values and goals and empathically engaged with each other.

Analysis based on reflection documents submitted by students 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.

- The learning methods are 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.

Teachers' final documents:

The final reflection documents received from teachers raised a few point on running of the course--

- There has to be a document which describes 1) structure of the course 2) objective of the course 3) prospect after the course.
- There should be teacher's training workshop on Nextfood ideas.
- It is a challenge to keep practitioners/farmer-trainers for such a long course. There were suggestions for both sides. The idea of breaking it up into 7 days of theory, 7 days of practical came up. But a couple of risks were also expressed related to this suggestion. As this is a free course, there is always a possibility of someone coming and not coming back for the next class. The second risk is that if someone is coming from afar, it might be difficult for them to come and go so frequently as would be required with this new suggestion. A third challenge mentioned was that if they are going back to the practice, they will miss the collaboration possibilities.

Institutional factors affecting higher education

- The formal structure of the classroom is often a challenge in India, 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.

Demographics

Number of students starting the educational activity – Female – 4, Male - 5

Number of students passing the educational activity- 9

Educational background of students - Bachelor

Number of students with more than three years of experience in the field/business - 3

3.9.4 Cycle report

Planning

There would be major changes in the evaluation system, like we want to put the student in the field for a period of time and see how they work as an extension worker. We would like to invite the extension workers to participate in the course. The biggest obstacle is to find full time students (Extension workers) who are eager to learn for three month. 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.

Implementation

Students were experienced in the farms and they were eager to learn and implement in their future. The difficulty we faced were to have students for three continuous months.It is very difficult to have students who are working to keep them engaged for three months. So, we need to break up the course into field and lecture sessions separately.

Reflection

Student’s reflection on how they enjoyed the new nextfood approach was really inspiring. But Personal conflicts in small groups and getting leaves from their (Student’s) workplace were very difficult to manage at times. Breaking up of course will be useful for the students who are working. Also we need to have teacher’s training on nextfood approach. Breaking up of course and structured course and teacher’s training on nextfood approach would much more helpful to move forward into the next cycle.

3.10 Egypt - SEKEM

3.10.1 ID card

Biodynamic Agriculture Course

Level: Undergraduate level

Cycle: 1

Phase: Fall 20219

Language: English

Institutions: SEKEM Vocational Training Center, Egypt

Course leaders: Prof. Hassan AbouBaker

Dr. Reham Fathy

Ms. Angela Hofmann

Mr. Ueli Hurter

Mr. Peter Kunz

Mr. Reto Ingold

Category: Students of Faculty of Organic Agriculture, Heliopolis University: 44 students

Extension Engineer(s): Egyptian Biodynamic Association (EBDA): 1 person

Course Timeline

The course duration was running for 12 days, and it has divided into two blocks; Animal Block and Plant-Soil block. Each block is divided into 10 topics, each topic is divided into three sessions per training day. Examples of topics covered in the animal block were defining farm components, animals in the farm and description of animal anatomy. While for the topics covered in the plant-soil block were types of soil and its formation, crops that promote, and increase soil fertility and farm components interaction. Under each block, students have carried out two assignments to wrap up the topics of every week.

Bootcamp Entrepreneurship Course

Level: General

Language: English/Arabic

Cycle: 1

Institutions: SEKEM Entrepreneurship and Social Innovation Centre, Egypt

Course leaders: Prof. Omar Ramzy

Mr. Mohamed Anwar

Ms. Menna Mohamed

Mr. Mo'men Ahmed

Category: Young Entrepreneurs, 20 persons

Timeline (Summer 2020 - In progress)

3.10.2 Status

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 into a relationship with agricultural practice. Besides, short introductory and descriptive contributions, the students were introduced to “Goethanistic” observation of soil, plant and farm phenomena. Also, shifting the teaching system form the traditional semester by using PowerPoints and pictures in a classroom style to a more interactive approach with the subject. The interactive approach is enhancing the students’ observation skills and to the animal and plant morphology. Also, it is improving the students’ skills towards animal behaviour and development by closer interaction, touching and observe which is not naturally possible in traditional classroom style. The outcome of students’ observation has represented by drawing and discussion. Students also have experienced planting plots for some selected crops such as fodder beet, taking soil samples and identify the soil texture by hand on site. Therefore, the program through the two weeks at SEKEM farm were divided into (i) traditional classroom with brief theoretical background to (ii) lectures in the open field and practical instruction based on observation and doing (Fig1). Also, the assignments 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. At the end of each training day, lecturers and students are gathered in a circle to give their feedback and day by day evaluation to the training (Fig 2). Students’ feedback has helped to change, shift or focus more on some topics on each training day. For instance, students have greatly appreciated the information over the function of cow horns. On the other hand, some students have complained on the lengthiness of the session.

Fig 1: (left) students were observing the cow's morphology, movement and behaviour and express their observation in a drawing, (right) the students were present their finding in one of their assignments in an open classroom in the Animal Unit.

The entrepreneur training would be designed in two components; the first component is designed to train participants on how to build a successful business and start-ups focusing on business model canvas (BMC), financial plan, marketing, and soft skills. The second component of the training is, the entrepreneurs will be given specialized training on business opportunities within the geographical challenges and peoples' needs (collected through questionnaires). This specialized training will be on one of the following topics; reuse of agricultural waste materials; composting and biodynamic/organic farming practices. The two weeks program will be a Bootcamp style which is an intensive, focused, short-term learning program that will equip the learners with the aforementioned skills. The Bootcamp is planned for summer 2020. The training will be learner focus and the program will be carried out by lectures on each topic. The program consists of 4 topics: Topic 1 focus on basic of market research, identifying the target groups. Topic 2 Basics of business planning, the participants will go through how to create their business plan, business model canvas (BMC), financial plan and setting for budget, how to apply for fund and marketing. Topic 3 Social and Business skills which will cover presentation skills, pitching and communication skills. Topic 4 will cover the biodynamic/ organic agricultural practices such as intercropping, crop rotation, weed management, livestock production, and composting.

The program will be advertised on social media pages of Heliopolis University (HU) e.g. Facebook and Twitter and through the HU website. Also, the program announcement will be carried out through a joint project "13 villages" project which aims to develop the villages around SEKEM farm. Brochures will be used to announce the program with the description and agenda of the program.

The candidates' selection will go through two cycles, the first cycle the candidates will submit an online application and a brief motivation letter of why he/she likes to participate in the program. The second cycle will be a personal interview to assess their capability to join the program. Women are very encouraged to apply for the program.

The assessment of the program that each candidate will present his/her project idea based on what they have learned during the training program. For instance, he/she must present his/her business plan, BMC, and financial plan based on making compost, shredder sharing with other farmers etc.

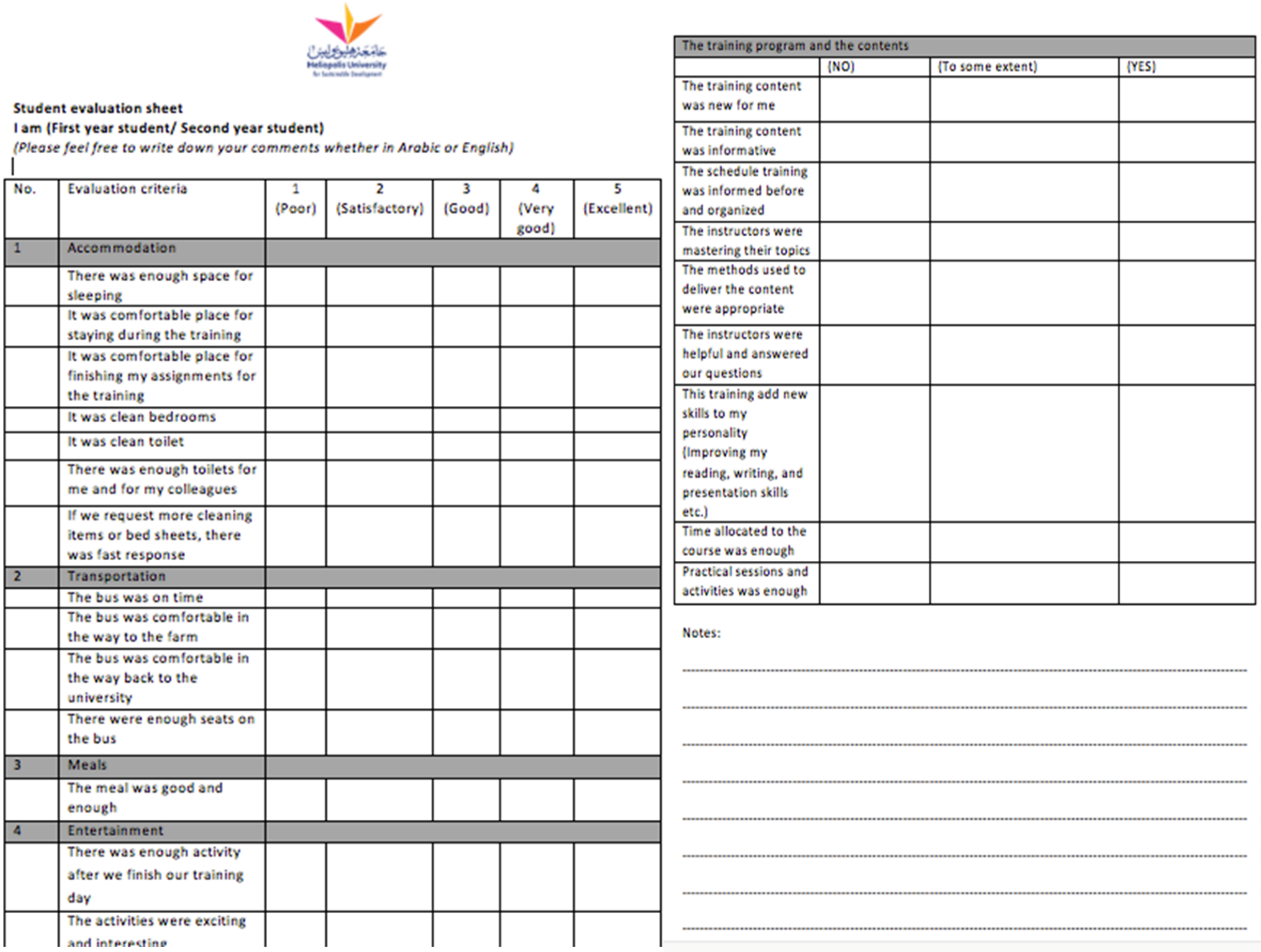
Later, They will present their projects in front of a committee from HU business professors, HU incubator centre experts, and other funding agencies and investors. Eventually, the candidates will pitch their ideas to the committee with the possibility to win a prize to fund their projects.

Fig 2: Each training day there was a reflection circle in which students and lecturer(s) can express what he/she has learned, what he/she has expected from the day and what can be improved the next day.

3.10.3 Data analysis

Students evaluation on the training content (final course evaluation):

The data has been collected through an evaluation form at the end of the training period. The percentage of the students who mentioned to some extent the course has covered a new knowledge is 25.3% while the students who mentioned it was totally added new knowledge was 74.7% According to the evaluation, the students were satisfied with the training program and the content. The percentage of the students who mentioned that the training content was new is 82% while 50% of the students were to some extent the training schedule was informed before and organized. 82% of the students has reported their full satisfaction to the methods used to deliver the content. In the accommodation section, the students 57% found that accommodation was not comfortable. Currently, the teachers of Heliopolis university are discussing with Goetheanum lecturers about the materials that will be taught in Fall 2020. Also, they discuss the accommodation facilities with SEKEM farm manager.



Student evaluation sheet

I am (First year student/ Second year student)

(Please feel free to write down your comments whether in Arabic or English)

No.	Evaluation criteria	1 (Poor)	2 (Satisfactory)	3 (Good)	4 (Very good)	5 (Excellent)
1	Accommodation					
	There was enough space for sleeping					
	It was comfortable place for staying during the training					
	It was comfortable place for finishing my assignments for the training					
	It was clean bedrooms					
	It was clean toilet					
	There was enough toilets for me and for my colleagues					
	If we request more cleaning items or bed sheets, there was fast response					
2	Transportation					
	The bus was on time					
	The bus was comfortable in the way to the farm					
	The bus was comfortable in the way back to the university					
	There were enough seats on the bus					
3	Meals					
	The meal was good and enough					
4	Entertainment					
	There was enough activity after we finish our training day					
	The activities were exciting and interesting					

The training program and the contents			
	(NO)	(To some extent)	(YES)
The training content was new for me			
The training content was informative			
The schedule training was informed before and organized			
The instructors were mastering their topics			
The methods used to deliver the content were appropriate			
The instructors were helpful and answered our questions			
This training add new skills to my personality (Improving my reading, writing, and presentation skills etc.)			
Time allocated to the course was enough			
Practical sessions and activities was enough			

Notes:

Fig 3: Students Evaluation sheet

Challenges

- The preparation of the accommodation was not enough before arriving at the farm. For instance, the student's accommodation was not ready to receive such number (44 students and 6 HU staff) for the training. Additionally, the teaching materials and 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.

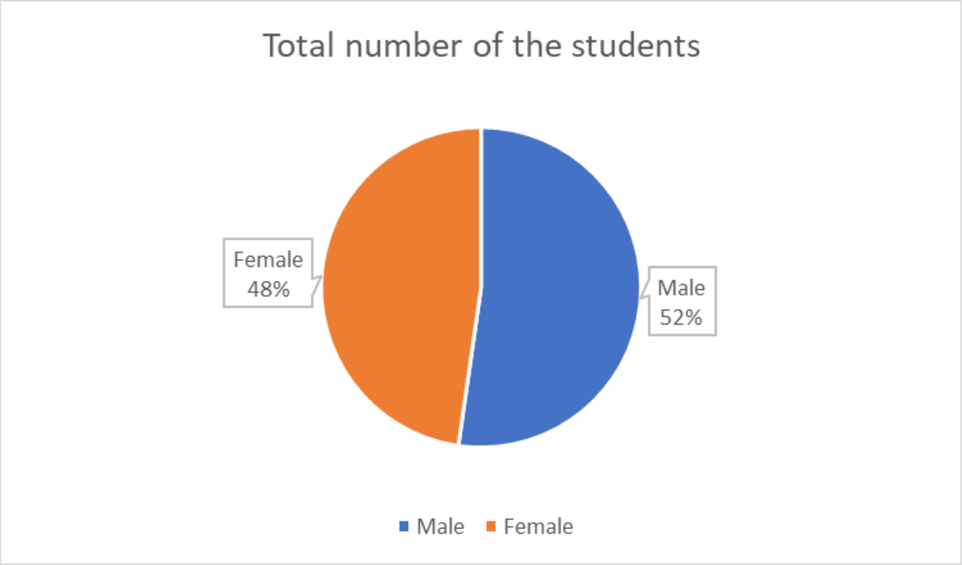
Demographics

Number of students starting the educational activity **44 students**

Number of students passing the educational activity **44 students**

Educational background of students: **Undergraduate level**

Number of students with more than three years of experience in the field **2 students**



3.10.4 Cycle report

The Biodynamic course pilot cycle of 2018 was the first time to implement the module teaching system. Therefore, we preferred to recruit international experts to give both the students and the staff a complete image of the module teaching system. The number of students joined was 27 students with a basic background of agriculture and farm life with 4 teacher assistance and 2 professors. One topic was covered during the training period. Challenges we faced in the cycle of 2018 were missing the modernist education and training tools (ICT, case-studies, videos, etc.); missing proper quality assurance methodology and evidenced-qualitative analysis of the program's outcomes and how to assess the skills enhancements. In the pilot cycle of 2019, the number of students was 44 students, 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. In this cycle, 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. Also, students experienced self-confidence, creativity, teamwork, language skills and presentation skills. Assessment schemes and student evaluations have been set for this cycle which was not well developed in the previous pilot cycle. For future cycles, the course program agenda should be clear and presented to the students with enough time. Teaching materials should be clear to the university staff. Currently, there are discussions between HU staff, SEKEM agricultural officer, and Goetheanum lecturers about what they can offer to cycle “Fall 2020”. The most inspiring moments during the training was the cooperation between Level 2 and level 1 students. Level 2 students were providing support and advice to the new students of level 1 since they were not familiar with farm life. Also, one of the inspiring quotes mentioned by Mr. Peter Kunz to the staff and students at the lectures: I hear and I forget, I see and I remember, I do and I understand.

3.11 Italy – CIHEAM

3.11.1 ID Card

1. **Title, level of the course and course language**
   - Course title: *Mediterranean Organic Agriculture*
   - Course level: *Master of Science*
   - Course language: *English*
2. **Host institution(s) and course leader(s)**
   - Host institution: *CIHEAM*
   - Course leader: *Lamberto Lamberti; Coaching team: Lamberto Lamberti, Virginia Belsanti, Patrizia Pugliese and Suzana Madzaric*
3. **Timeline of the activities covered in this report**

   The present report covers the period from 28 October 2019, until May 15, 2020.
4. **Learner categories and number per category**

   The action learning activities included a total of **14 learners**, all belonging to the post-graduate students category.

   Countries of origin: Algeria, Egypt, Kosovo, Lebanon, Morocco, Palestine and Tunisia.

   Gender: Female – 9; Male – 5.

   Age categories: 20-25: 6 students; 25-30: 4 students; 30-35: 4 students.

Considering the background, 12 students are having agricultural studies background and 2 environmental science.

3.11.2 Status

The second cycle continues with the involvement of MSc students in the Mediterranean Organic Agriculture course. Students were divided into 3 groups (4 or 5 students each), being coached by 2 learning facilitators/coaches. Within the MSc programme, Action learning activities are devoted to the design and implementation of the students' final project, which contributes to 15% of their final grade, and delivers a total of 10 credits (ECTS). As for the first cycle, the group report is complemented with an individual essay, providing the space for each student to have a personal reflection.

The role of the main actor was played by the "Local Action Group – Alto Salento" (LAG) and his president. LAG represents a non-profit-making entity including public and private organisations from rural villages that mobilises local resources for the development process. The activities were centered around the recovery and valorisation of traditional products (linked to local varieties), as a part of LAGs call for the projects for local economy development, within their current action plan. While the main local actor facilitated interaction with different local stakeholders in the agri-food and rural development sector.

The connection stage involved the interaction with the main actor and local stakeholders intending to identify local traditional products with the potential to be valorized and try to design each group's final project around the necessary steps and measures to achieve the product valorisation. The purpose of this process is to face learners with real needs and opportunities presented by the territory. After several meetings with different local stakeholders, combined with students group work and interaction with facilitators, it was agreed that the focus will be placed on local varieties of artichoke ("Carciofo nero di Ostuni"), pepper ("Diavolicchio di Carovigno") and different local varieties of melons. The schematic representation of our activities is presented below.

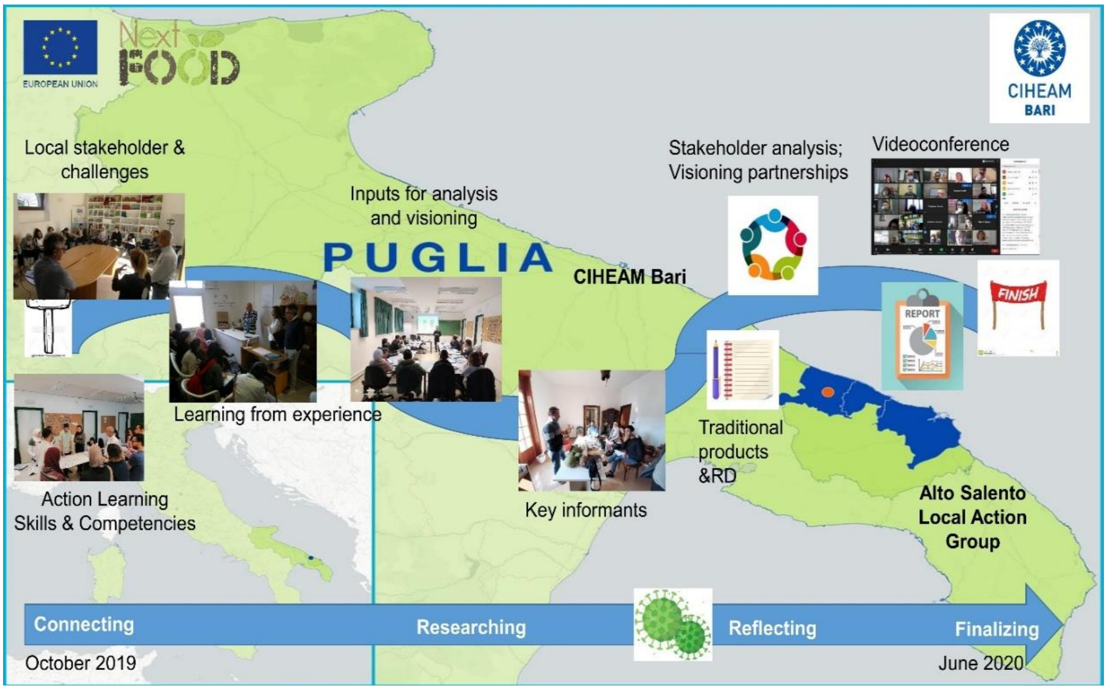


Figure 1: Course timeline and activities

Besides working on the project, the idea was that the students will work out and come out with shared contributions to the sustainable development of the rural context of reference, which will be as well helpful for local actors to apply for the LAGs call. Students activities resulted in the final reports, containing detailed analysis of literature useful for concerned actors, SWOT and stakeholder analysis of the project proposal, vision for the valorization of selected products and recommendations to the LAG and main actors. The activities were finalized in the form of the videoconference, where three groups of students presented their work in the form of presentations to the various actors interested in rural development and valorisation of traditional products.

1. From the lecture hall to a diversity of learning arenas

Increased number of on-site visits and possibilities to interact with local stakeholders was one of our objectives, before the start of the second cycle. This increase was targeting especially the connection phase, to give a possibility to students to see different realities and a wide array of local actors. This approach was selected to avoid initial framing around the information provided by LAG, their action plan and call for projects, but rather to collect new ideas all around the territory and from diverse agricultural and agriculture-related actors. As a result, students had the possibility to have informative sessions at LAG premises, where they interacted with the president and other employees of LAG. They visited several agricultural producers, involved in the production of olive oil, tomato, vegetables, etc. From the field to nurseries and greenhouses, all being our new learning arenas.

Further, students had a chance to visit local food processors, an agricultural cooperative, cultural association and the area of the state nature reserve park. Here the learning process as arena included factories, gardens, museum, monuments, wetland and even the facilities for recovery of injured sea turtles, altogether serving to better connect the learners with the territory and people within. Due to the unfortunate conditions caused by COVID 19 emergency, our most recent learning arenas include as well several IT tools, such as Skype, LifeSize, Zoom applications, etc.

Analysis of the students individual assignments and group reports revealed that students appreciated very much time spent out of the classroom. Further, within the final course evaluation, they highlighted the possibility to work on real case management and interact with different stakeholders as the most important features of the course. Nevertheless, from their comments we realized that this on-site/on-field engagement should be extended, giving the possibility to students to remain for at least a day or two working directly with the actors.

Positive effects coming from the different learning arenas are as well reflected through students indications about Italian culture, natural heritage and willingness to transfer acquired experience in their countries of origin.

2. From lecturing to co- and peer learning

To have actively engaged students our approach did not include “lecturer in front of the classroom”, instead it was based on co-learning with stakeholders, coaches and learning facilitators in general. Recognizing some gaps in diversity of lecturing activities, as a result of experience coming from the first cycle, we enriched the second cycle with a higher number of topic-related seminars, held interactively. The intention was to turn our classroom to a productive place, full of movement, voices, dialogues and visual expressions of findings, all aiming to construct the new knowledge.

The “peer-learning” was involved due to the contribution of our ex-students from the first action learning cycle. We invited them soon after the beginning of our activities to convey their last years’ experience, and as well to support us during some of the field visits and share their views with new students.

Efforts given in the direction of co- and peer learning were positively reflected within students individual and group work since in each report they elaborated important insights coming from the seminars and how they used proposed methodologies and approaches in their work.

3. From syllabus to supporting literature/diversity of learning sources

As already reported in our update report, we perceived the supply of alternative learning sources as a shortcoming in some groups during the first cycle. Thus, we invested additional forces to improve this aspect, even in collaboration with the last year students, and to diversify our learning sources. Here we developed the idea of “Learning memories” and “Key messages”; the first one presenting coupling of field visit experiences with knowledge coming from scientific articles, and the second extraction of key concepts coming from interactions with stakeholders - to be directly useful to the group project.

In the case of “Learning memories”, the idea was to further support participation, observation and dialogue competences (asking for full attention during the field visits) and to create the links with scientific evidence coming from the literature. After the visits and readings, we invited students to reflect on things they did and discussed together and to go through a detailed reflection, after which they were asked to report what they learned and what they would like to learn more.

The concept of “Key messages” was very important during the visits to the actors not directly related to our project since it asked from students to listen and observe well while looking at the details and how certain mechanisms, concepts and experiences coming from different contexts could support our activities.

Even though at the beginning of the course it was not so clear for the students why should they reflect on each part of their activities in written and/or oral form, with the course finalization they realize the importance of this activities, having all information stored as a valuable repository for their final reporting.

4. From textbook to a diversity of teaching aids

Diversity of our teaching aids is reflected in the use of videos, presentations, flip charts and even format of different games. All of them were used in the frame of a flexible learning path, allowing students to have various means for engagement and expression.

Graphical representations in the form of territory assets and stakeholders mapping were used as an opportunity to let students visually express their learnings. Moreover, hands-on experience was achieved during the onsite visits, where they could get familiar with different stages and machines needed for plant seedlings or pasta production, to have a short course on sensorial analysis of olive oil, rapid appraisal of soil quality, etc.

Students visual and graphical expressions within the final presentations and reports confirmed this important shift, being able to summarize many different aspects in one diagram or even video. Still, from discussion with them, we could see that 8 months of the course are not sufficient time for full achievements.

5. From written exam to a diversity of assessment methods

Building on the last year's experience for the second cycle we employed different assessment methods, such as questionnaires, individual assignments in form of short essays, group presentations, etc. to allow us to monitor the development of the course along its duration. Besides questions and self-assessment test proposed by the project research protocol (D2.1), we developed an additional questionnaire to be administered at the end of the cycle, intending to understand, among others, 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 concerned.

Classical evaluation and grading were not an option for us, thus at the individual level, we asked students to prepare an “argumentative essay” on project-related topics, through which they need to convince the readers to agree with their position, providing evidence. We asked for evidence from accredited sources (literature) and their personal experience, in particular within the Alto Salento Territory. Students were asked to take a clear position on the argument, but to be able to report as well contrasting views.

During the course, students worked for understanding potentialities for recovering traditional agro-food products of the Alto Salento LAG Territory. Even if the stopped the research in a crucial phase due to the COVID-19 related obstacles, we asked them to deeply reflect on all findings and give recommendations to LAG for actions. Thus, each team was asked to prepare a final project report addressed to LAG Alto Salento, where they described and discussed results and findings, providing at the end useful recommendations to the LAG, as it was confirmed by their final feedback.

6. From lecturer to learning facilitator

Our action learning functions as a complementary module, integrating the “conventional” course syllabus, thus we are all acting as learning facilitators rather than lecturers. Due to the knowledge and information received from regular courses, when delivering content we always try to be innovative and to provide the part that has not been covered by the course programme. Thus, we facilitate the learning and serve as a guide among those two sources/pillars. We focused our attention on acquisition of knowledge and competences in a creative learning environment, where we stimulated discussion and curiosity, taking often the role of students team-mates to arrive together to important conclusions or to find sources for information we need. We delivered guidelines and feedback all along the course, trying to remain always active in students development. Feedbacks were frequently challenging to direct students towards personal and group proactive behavior.

We do not consider walls of the classroom as the end of our work, but instead, we are available for students during the daily work duties, when they need some clarifications, help, or want to share with us some of their ideas. This approach proved to be very useful, since in the period of the pandemic we only changed our communication channels, while the quality of communication already present was not affected. Using the online tools did not force us to change our initial plans but only to adapt, and students outcomes were delivered as set at the initial stages of the course.

3.11.3 Data analysis

Data were collected according to the research protocol (D2.1), anonymized and stored according to the instructions for the first week, mid-course assessment and final evaluation. The responses we received were 13, 9 and 14, respectively for three indicated data collection times. All textual parts were subjected to the analysis by Nvivo 12 software (QSR International – 2020), while self-evaluation data were subjected to t-test using Excel as an analysis tool, to compare initial and final values of the core competence level among the students. All data were collected in the written form.

First data collection – overview and findings

Students provided their answers on five questions from the research protocol, considering their opinion on the knowledge and skills needed for sustainable development, core competences fostered by project, their expectations, etc. All answers were anonymized and subjected to coding, following data analysis instructions shared by the WP leaders. Beside 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. We observed that for first data collection students often mentioned very technical aspects of agricultural science, thus we decided to code it separately. This was done as well to follow possible shifts within course duration, thus to see if with time students will indicate less technical knowledge and skills, giving additional space for project core competences.

When looking at the World Cloud generated for the first data collection (Figure 2), we had as the most frequent words sustainable, activity, learning, system, development, while the words skills, competences and knowledge had medium frequency. This indicates a more general approach of the students, providing a wide variety of answers and not being still fully familiar with the terminology promoted by the project. Despite being introduced with core competences in the form of presentations and classroom exercise, students still very not enough familiar with this new concept to highlight it more while providing the answers on questions. However, their strong orientation towards actions and participation is pronounced and confirmed with data elaboration in the form of a hierarchical map (Figure 3).

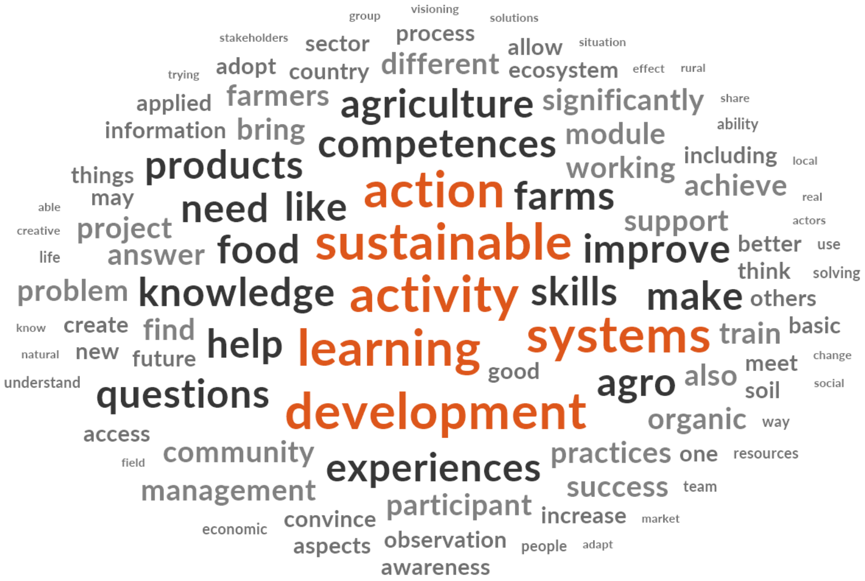


Figure 2: Word frequency from the first data collection

Text coding resulted mostly with the competences, while transformative learning was recognized only in very few cases, which could be expected for the initial stage of the course. Here, as we already mentioned in the introduction of this section high proportion of students was highlighting very technical knowledge and skills as primary (e.g. farm nutrient management, composting, data analysis and use of software, marketing strategies, water management, etc.) – orang part of the map.

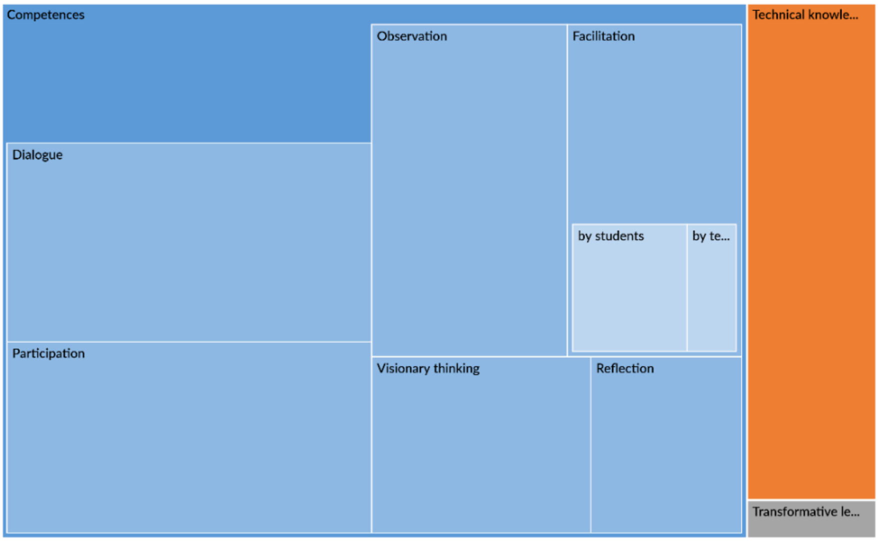


Figure 3: Hierarchical map compared by the number of coding references for the first data collection

Considering the coding frequency of the competences, as it can be seen from the map dialogue and participation were the most represented, followed by observation and facilitation. Within the facilitation competence are nested two sub-levels, were facilitation by students was more present. Visionary thinking and reflection were coded to a lower extent compared to others.

To explore more issues of technical knowledge and/or competences, compared to project core competences we created compare codes diagram, contrasting these two. As demonstrated in Figure 4 most of the respondents documents contain both codes, while we have two containing only technical aspects vs. one respondent not being coded for technical knowledge/skills. Looking at the students background, with the high majority coming from the agricultural studies it is expected that at the beginning of our activities they will be more focused on agronomy and its technical aspects.

What we recognized during the first data collection is that even form of the question guided students more towards listing skills/competences/knowledge/questions, without providing wider description and elaboration. Based on this we asked them for mid and final evaluation to provide more comprehensive answers, with the rationale supporting their indications.

One of the comments combining in a nice way theory and participation as needed for sustainable development was as follows: "*First we need knowledge about the agronomy and food processing combined with real-life experience in these fields (preferably in the same context/region of the project), additionally, we need to link these two sources of information (experience and knowledge) by trying to come up with actual sustainable development projects so that the experience can be complete*".

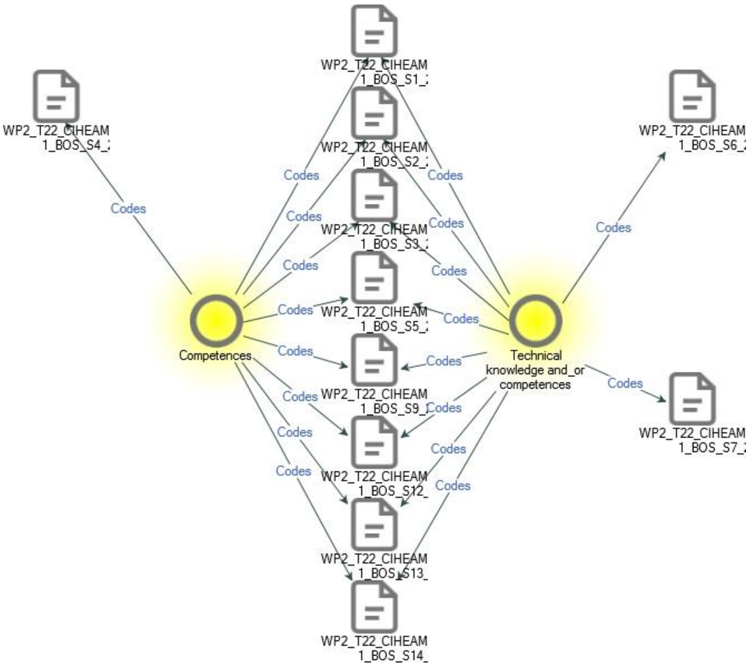


Figure 4: Compare codes diagram (competences vs. technical knowledge and/or competences) at the beginning of the course

Mid-course data collection – overview and findings

From interactions with students, we found data collection to some extent overwhelming for them, thus self-evaluation was not performed for mid-course data collection. Here again, we repeated the same text analysis in the form of coding and results elaboration like at the beginning of the course. Interestingly, Word Cloud revealed beside learning and activity already present for first data collection, word education and interested as the most frequent one (Figure 5).

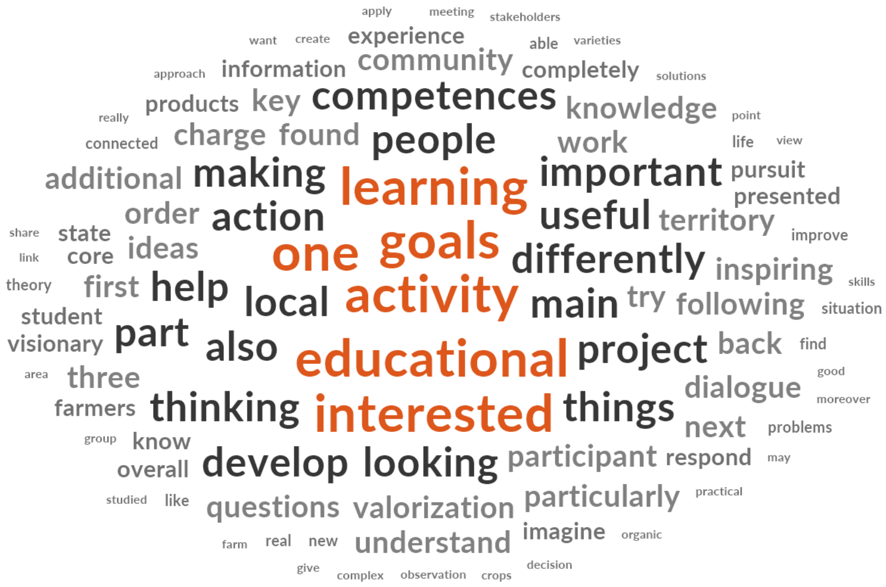


Figure 5: Word frequency from the mid-course data collection

Further, we can see that terminology related to students activities, such as valorization, territory are appearing as quite frequent, but as well some of the competences promoted by our action learning such as dialogue, participation and visionary. This indicates that students are involving deeper into the activities, and are providing answers more in the context of action learning. This shift is supported by coding frequency, where we see that "*Technical knowledge and/or competences*" less present, leaving the space for transformative learning (Figure 6).

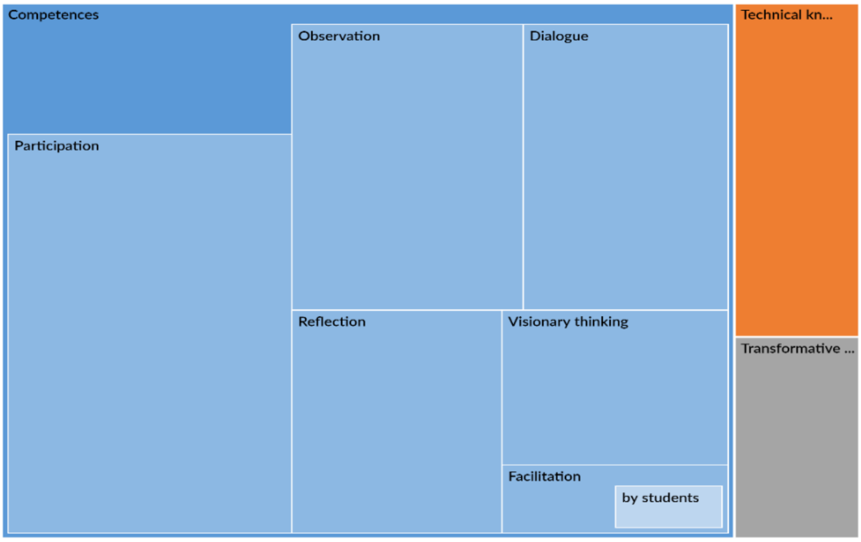


Figure 6: Hierarchical map compared by the number of coding references for the mid-course data collection

It is interesting to see an increase in the participation code, with the double frequency compared to the beginning of the course. Here observation and dialogues had very similar frequency, followed with reflection and visionary thinking. In the case of facilitation, frequency is lower compared to the beginning of the course and includes only the one by students. We attribute all these findings to the fact mid-course evaluation was done after the period of frequent field visits and interactions with different actors. These activities allowed students to understand better importance of the participation, to recognize the power of the dialogue and richness of the insights coming from the observation and reflection.

Some of the students comments illustrating the shift toward competences:

⇒ "*I find myself more interested in the dialogue and having knowledge about the farming and food system, as these two elements are the key to try to handle the complex realities. To link theory to reality it is important to try to be an autonomous learner, also dialogue and having conversations with people we met makes me understand more about the situation and try to come up with new ideas to try to find solutions for their problems*".

⇒ "*It was amazing for me that there are people of really care about the ancient varieties and make effort to keep the identity of their territory. It was also new for me the concept of valorization and I can say that it would be useful for me to do the same thing in my country*".

⇒ "*Introducing active learning experiences is important and essential in theory courses because I think many of us (students) fail to connect theory knowledge to practice and may even view theories as information we are required to memorize for the purposes of completing a course requirement rather than information that can greatly aid our understanding of the world*".

The shift from technically rooted elaborations to more "*soft*" one is present as well when comparing competences vs. technical skills. At the mid-term data collection, we have almost half of the respondent's documents not being coded for technical aspects related to agriculture (Figure 7). For sure some outliers remain, being still cantered on technical issues of agricultural production, being supported with the following comment: "*to have knowledge of farming and food systems is my goal since I am not only interested in being called an engineer - I want to be professional in the major*". Nevertheless, we see it as something positive, which only should be coupled with some of the soft skills and we believe that even this responded by the end of the course recognized values of soft skills and competences.

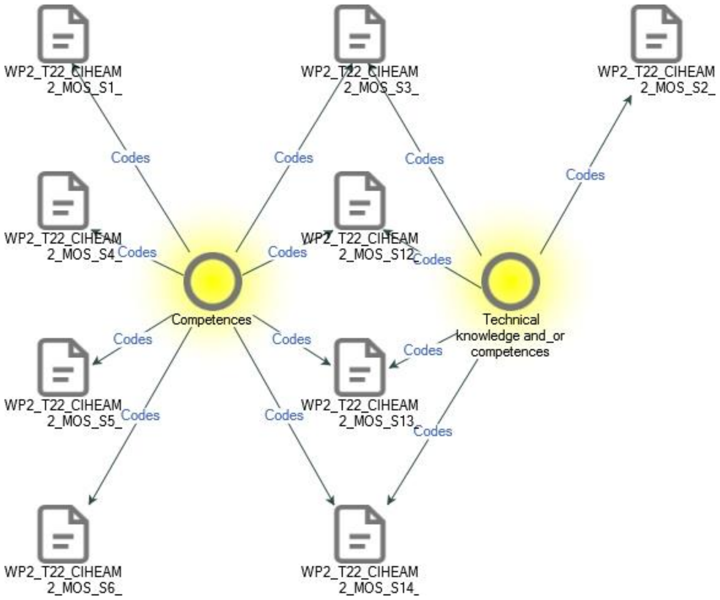


Figure 7: Compare codes diagram (competences vs. technical knowledge and/or competences) for the mid-course data collection

Final data collection and course evaluation

Running word frequency query at the end of the course brought word competences and knowledge among the most frequent ones, while the word educational remained there. For the word sustainable it was expected to come again to the focus due to the similarity of the questions as at the beginning of the course (Figure 8). Below are some examples of how students commented which are the competences they improved significantly:

⇒ "*Throughout this activity, I found myself constantly improving, and significantly developing new competences such as: how to properly reflect about a defined situation, together with visioning abilities, the ability to work in a group and to split the work between the different members; and I also found myself enhancing my effectiveness and productivity together with my leadership and soft skills*".

⇒ "*Observing more, pay more attention to detail, learning how to avoid a fail from learning of other experiences, how to come up with valuable information from having dialogues with people that can help me developing and improving something*".

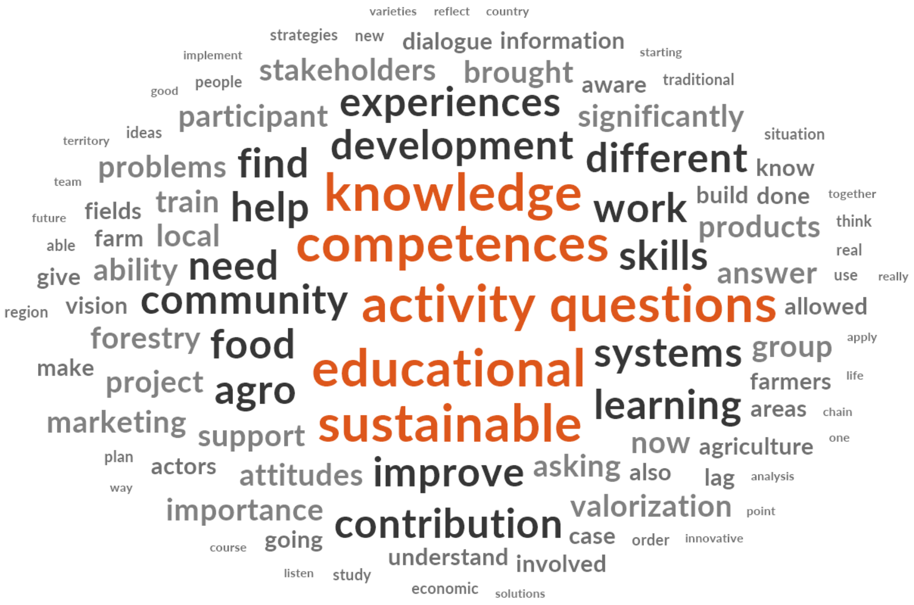


Figure 8: Word frequency from the data collection at the end of the course

By the end of the course, transformative learning was even more frequently coded than for the mid-term evaluation. Considering the other competences they had very similar coding frequency, while the first level code – *Competences* was more represented, indicating more complex expressions by students, bringing together several different competences (Figure 9).

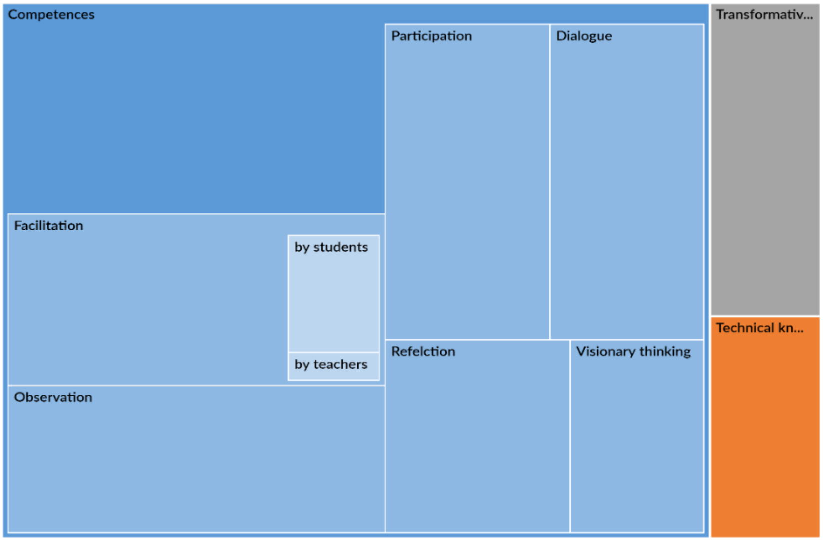


Figure 9: Hierarchical map compared by the number of coding references for the data collection at the end of the course

Facilitation was more frequently coded compared to the mid-term period, bringing back both sub-categories. We must note that visionary thinking for all three data collection points was the least coded competence. This is supported through our interaction with the students, most of their requests for clarifications and support where addressing visioning and vision development for their group report. It was challenging for them to distinguish vision from observation and to understand how broad and free in imagination their vision can be.

One of the students comments describes well their oscillations in the general understanding of our activities: “*In the beginning it was good and I was impressed, then after a while, I felt so confused and I thought it is useless. It was foggy at the beginning but then things started to be clearer and I liked it very much. It opened a new door for me, I liked a lot the project and felt it is very useful for me when I go back to my country. It is going to be a wonderful thing to implement it back home and I thought it would be great to have a thesis based on action learning in my second MSc year*”.

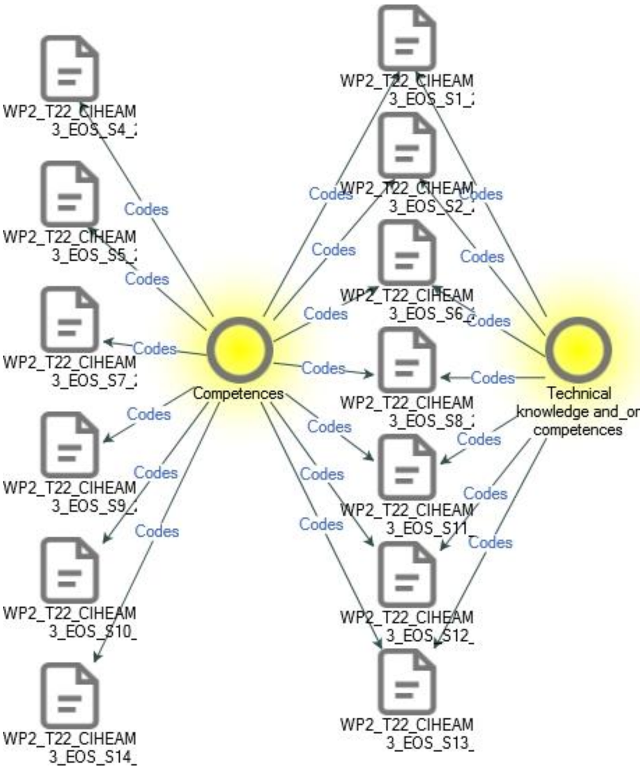


Figure 10: Compare codes diagram (competences vs. technical knowledge and/or competences) for the mid-course data collection

When looking at the competences vs. technical knowledge/ skills codes, compared by the number of coding references, we see a further increase in the number of respondents not focusing on technical competences at the end of the course (Figure 10). We assume that within the 8 month course period action learning approach started from the seed, but by the end it was well rooted in the minds of our students, with promising prospects for future growth. Below is the example of widening in vision and applicability of action learning:

⇒ “*Now and at the end of the action learning activities, I would think if these activities done in Alto Salento with the contribution of local stakeholders and especially the LAG can be considered in other areas in Apulia. How would be the products, the stakeholders and the involvement of the local population, the approaches and the outcomes: Would they be similar to Alto Salento’s ones or different. In this last point, is the difference relevant and what does it concern? For me, it will be interesting to have a broad vision with other experiences in order to be able to capitalize on all the positive and negative points that could allow this region to achieve real sustainable development*”.

Self-assessment of competences

Self-assessment of the competences was performed at the beginning and the end of the course. The average score was made for both data collections and subjected to a t-test to identify if the competences development was significantly different at the end of the course. Results presented in Table 7 show a significant increase in the level of all targeted competencies.

The highest increase was achieved in the case of the visioning, and this was partially expected since visioning was quite new for all students, even as a term (difference of 2.6). The increase in score for the other four competences had a value from 1.4 to 1.9.

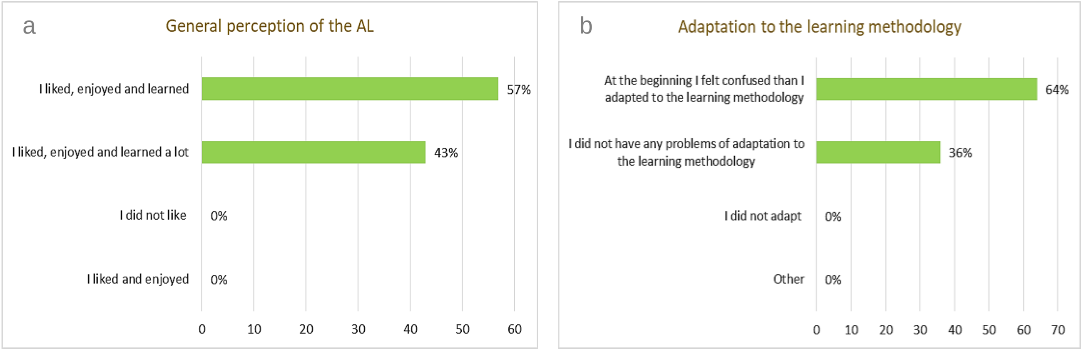
Table 1: Average scores for competences level obtained by students self-evaluation (Scale: 1 – novice to 9 – expert) (n=14)

Competences	**Average scores** **Start**	 **End**	**Diff**	**Significance** **P-value**
Observation	5.2	6.8	+1.7	< 0.01**
Participation	5.4	7.3	+1.9	< 0.01**
Visioning	4.7	7.3	+2.6	< 0.001***
Reflection	5.7	7.2	+1.4	< 0.01**
Dialogue	6.5	8.0	+1.5	< 0.01**

P-value: * < .05; ** < .01; *** < .001 (paired, two-tailed, Student t-test)

Final course evaluation

At the end of the course, besides evaluation indicated by the research protocol, we developed an additional questionnaire aiming at getting an overall evaluation of the action learning activities and level of alignment with students general MSc course. Our findings are presented in Figure 11 below (a, b, c and d).



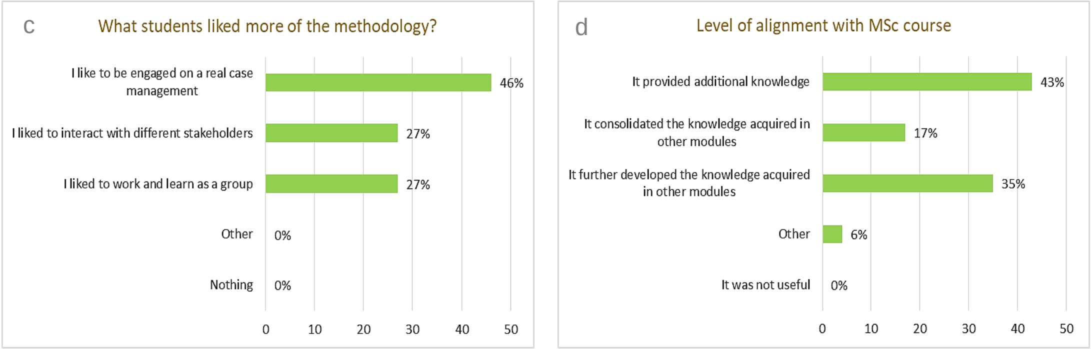


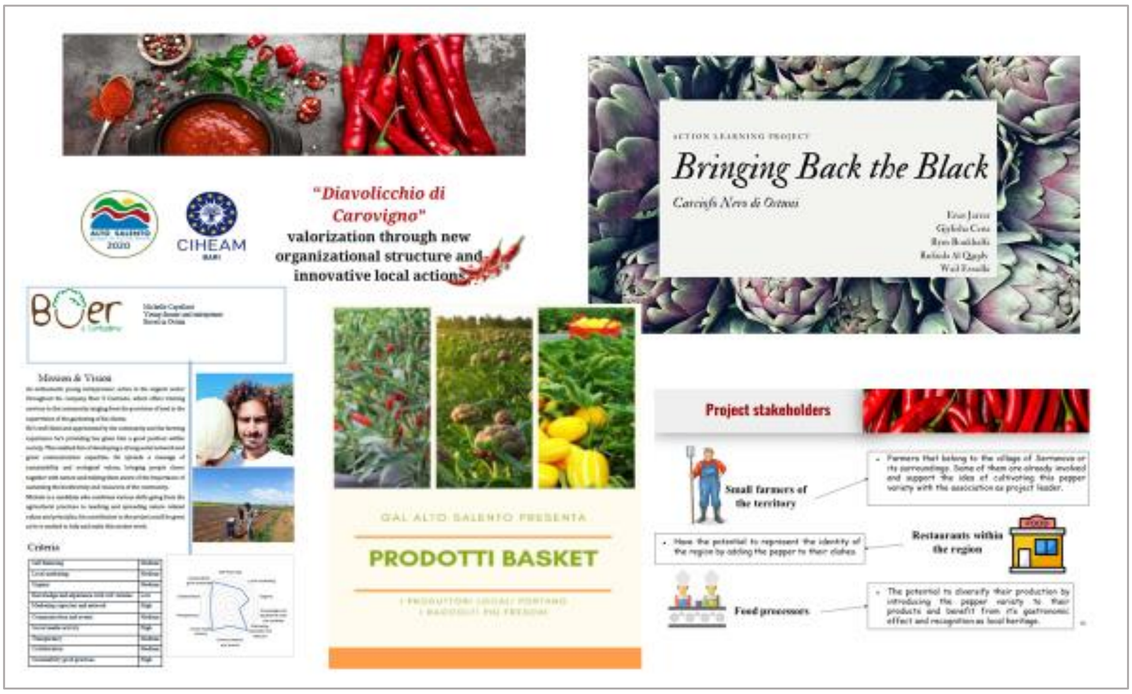
Figure 11: Students final evaluation of action learning activities performed at CIHEAM

Most of the students reported that they liked, enjoyed and learned from the activities, despite being confused at the beginning by the learning methodology. This shows how the shift from traditional learning requires time and significant efforts from lecturers and students. Still, 36% of the students did not have any problem to adapt to new learning methods, presenting very good result for us. They appreciated the possibility to work on the real case and to interact with the different stakeholders of the territory, also they enjoyed the teamwork. For 43% of them, action learning activities provided additional knowledge to the one obtained with general MSc courses.

Students’ final documents and reflection

As we reported in the case study initial description student prepared group report to serve the targeted actors as support for project proposal development, to be submitted to LAG call targeting rural development of the territory. All along the course students have been very much interested in the activities, and very much active during the meetings with different stakeholders. However, we found at the beginning a superficial attitude in the analysis of the outcomes of meetings and visits, probably due to difficulties in understanding the nature of the action learning approach and a need to record on each activity. In the final part, in contrast, we saw much more a proactive attitude and responsibility in the management of their project. They worked as a good team, taking care to prepare proposals well-tailored on the capacities of the actors. Some picks from their final reports and presentations are shown in Picture 1, while all the three group reports will be available on our WP1 MS Team platform.

As general achievements we conclude that students have been able to produce a coherent and very good final report of the experience; present and discuss results within a public event and shown interesting presentation skills.



"Diavolicchio di Carovigno" valorization through new organizational structure and innovative local actions

ACTION LEARNING PROJECT

Bringing Back the Black

Carciofo Nero di Ostuni

Mission & Vision

Criteria

GAL ALTO SALENTO PRESENTA

PRODOTTI BASKET

I PRODUTTORI LOCALI PORTANO I RACCOLTI PIÙ FRESCHI

Project stakeholders

Small farmers of the territory

- Farmers that belong to the village of Serranova or its surroundings. Some of them are already involved and support the idea of cultivating this pepper variety with the association as project leader.

Restaurants within the region

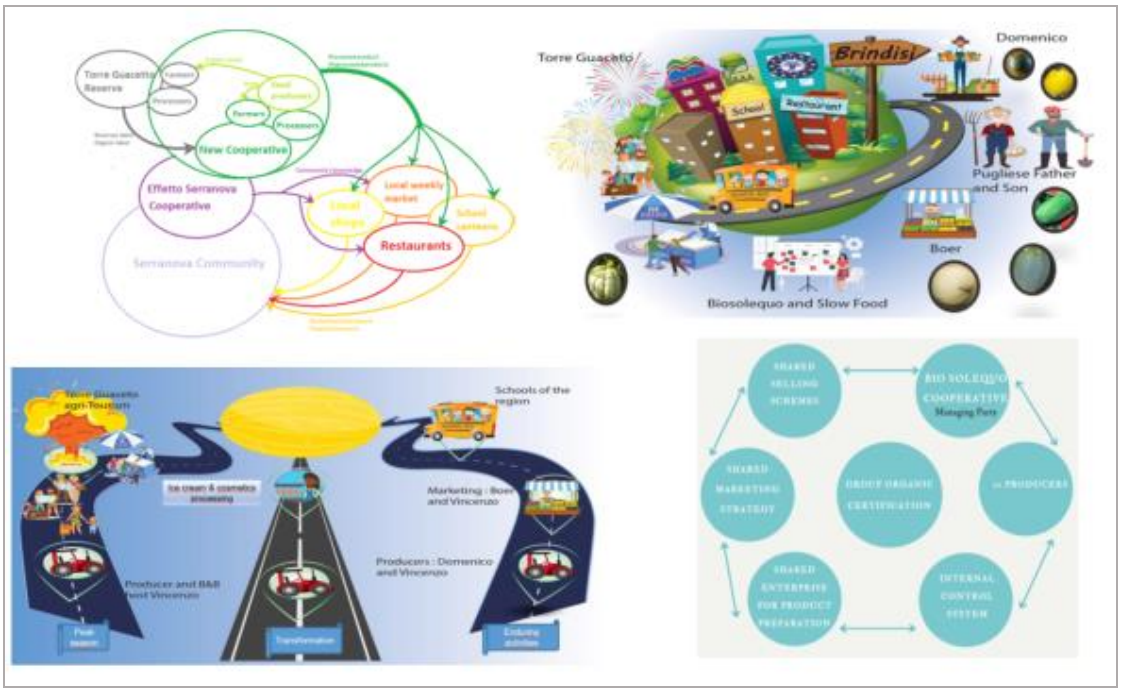
- Have the potential to represent the identity of the region by adding the pepper to their dishes.

Food processors

- The potential to diversify their production by introducing the pepper variety to their products and benefit from it's gastronomic effect and recognition as local heritage.

Picture 1: Set of the snapshots from students final reports and presentations (AY 2019/2020)

From the final reports, we concluded that students cached very well the meaning and the importance of the competencies and have worked along the project with the right attitude, finalized in skills development. They have improved their understanding and capacities in reflection, participation and dialogue, which was very much connected to the activities such as field visits and their team dynamics. They got also an understanding of visionary thinking, even if more practice would have been necessary to increase these competence to a higher level. Vison examples developed by students as part of their final report are displayed on Picture 2.



Picture 2: Visioning diagrams and schemes developed by students (AY 2019/2020)

More detailed, in terms of competences learners are expected to develop, we have recorded the following achievements:

Observation: they have been able to take into consideration all different aspects involved in their case, they have not been influenced by any individual perspective but have considered all information collected as part of a context and have been able to draw a picture of the reality to which they have been exposed.

Participation: effectively interact with key informants and actors from the territory, they showed interest in the role of each of the actors and tried to prepare questions that could clearly define roles, interests, conflicts, objectives; they prepared their fieldwork developing the tools to use and the questions to make to key informants. They have effectively interacted with coaches, reflecting on their suggestions and integrating them in their work in a knowledgeable way.

Reflection: they have been able to organize notes and materials from fieldwork; carry out a tentative preliminary literature review; use specific tools for analysis (e.g. Stakeholder Analysis & SWOT analysis). However, what came out of reflection did not entirely contribute to create a group approach to the case study. It was more the combination of different individualities that successfully managed to do a good job.

Dialogue: they have been able to discuss progress about their findings among themselves, with the coaches and, whenever doubts arose, with the local actors. The results of this process have been conveyed in the final report and presentation. Their improved skill and the fact they have fully grasped the core rationale of the exercise has been expressed by naming the whole path as “their journey”.

Visioning: They have been able to put all the pieces of the puzzle together, despite conflicting interests and objectives and practical obstacles and come up with a shared visioning that shows a real improvement of the black artichoke context and gives the local actors a substantial ground to move towards that vision.

Comments from the main stakeholder in farm, food, or forestry about

On May 22nd, 2020, in a form of a video-conference, students presented their outcomes to a panel of key actors, including, among others, *Alto Salento LAG, Biosolequo Cooperative, Effeto Serranova Association, SlowFood Apulia, farmers, CIHEAM researchers*, etc. Students proposed them concrete multi-stakeholder partnerships for the traditional products recovery and enhancement. At the end of the conference, panelists expressed their satisfaction with the quality of the students' outcomes.

"…*students set up concrete and strategic ways for having community-based actions around the selected products on which we wish to engage as soon as possible*…" - Gianfranco Ciola (Alto Salento LAG).

"…*themes and approaches perfectly match Slow Food policies centered on traditional products recovery and food community establishment*…" - Leonardo Manganelli (Apulia Slow Food).

"…*students' outcomes help us to engage even more on the protection of products of our territory. We will succeed in the recovery of black artichoke*…" - Antonio Capriglia (Biosolequo Cooperative).

"…*I was very emotional and impressed listening to students about their outcomes on our Diavolicchio di Carovigno*" - Angela Argentieri (Effeto Serranova Association).

"…*we work with a passion for the development of sustainable agriculture. We store by generations traditional melons seeds and are ready for the partnership for their recovery*…" – Vincenzo Pugliese (farmer).

"…*I was very happy to see that our motivations and dreams have driven students activities to such interesting results*…" - Michele Cappellari (farmer).

"…*their work is a source of inspiration for future research activities that should be also presented to stimulate new project activities*…" - Gianluigi Cardone (CIHEAM Bari scientific administrator).

"…*a best practice for an innovative students' education, designed within an EU project. We should prepare other projects for up-scaling the experience to other institutions in the Mediterranean region*…" - Claudio Bogliotti (CIHEAM Bari research and innovation planning officer).

All the process was well described in the statement of case study leader: "…*a journey for students who learned about a new territory and its challenges…. A journey for their coaches who discovered new things in their territory*…" - Lamberto Lamberti (CIHEAM Bari scientific administrator).

Students final outputs will be delivered to actors which participated in our activities and we hope to serve them well in the future valorisation of their local products.

Teachers' final documents

Students were coached by four coached, while part of the other CIHEAM staff participated in the activities in the form of the seminars and short presentations and the MSc tutor was supporting activity. The coaching team considered that despite the limitations and constraints imposed by the COVID-19 outbreak - students' involvement and commitment have been satisfactory throughout the whole period from the beginning to the end. They put a lot of efforts in finalizing their presentation to the local actors as well as the report, exploiting coaches' recommendations and suggestions. Coaches reported to be very happy for being able to accompany them on this journey.

Following concerns were expressed from the coaches:

⇒ "*Literature review efforts, though presented in the report and the presentation were not fully exploited for reflection and discussion on findings and proposed strategies for action*";

⇒ "*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, successful though. Working more on the group identity-building should be strengthened in order to have a collective intelligence emerge. This did not affect at all the final - very satisfactory – results*".

In terms of space for improvements, coaches and teachers highlighted the following: Need to further expose students to multiple actors, activities, landscapes from the territory, possibly organize their direct longer, practical, involvement in some specific on-field activities; More exchanges between the groups need to be scheduled in the activity program for cross-contamination and alignment; The dilemma is if the Action Learning should have as the main objective to develop a new mindset of students, training them on competencies; or should have the main objective to bring students to master specific arguments and disciplines, while developing their competencies.

One of the coaches described the course process and personal involvement as follows: "*It is challenging for coaches to go after students for an entire year. It needs a lot of commitments and passion, and also extraordinary activities such as translation and driving. However is undoubted that from the activity both students and coaches learn a lot and set the ground for more practical research. Mechanisms should be better organized to find ways to increase the quality of the student's knowledge. The organization of assignments to undertake a literature review and prepare an essay, showed to be a key factor for the purpose*".

Regarding the reflections on actors involved, the coaching team agreed that most of the local actors met and initiatives presented during the field visits proved to be relevant for the work generating useful ideas and providing good insights.

Demographics

- The total number of students participating in our action learning activities was 14, from which 9 are females and 5 are males;

- All students passed educational activity;

- Considering the educational background, 6 of our students have a master degree, while the remaining 8 had a BSc degree;

- Only two students had work experience before taking part in the CIHEAM MSc course and our action learning activities.

3.11.4 Cycle report

Cycle no. 1

1. **Planning**

Enthusiasm and commitment coming from the action learning team was the most inspiring aspect during the planning stage. Despite having, with some of the team members, strong experience in the “learning by doing” approach applied for 10 years in an advanced course in Sustainable Agriculture at CIHEAM Bari, experimental and action learning were quite new concepts for all, creating a high level of curiosity. Further, working with local actors and being aware that the final product of our activity could be beneficial for their future work and territory as a whole was as well a very important source of inspiration.

At the planning stage, it was challenging to select the main actor, since the concept was new and it was even difficult to convey to the actors our plan and activities in a clear manner. However, counting on positive institutional experience with the selected actor proved to be a good decision.

As one of the main lessons, we can highlight that having the vision in the planning stage is of crucial importance since this helps a lot in the identification of the stuff to involve and of the main actor to be engaged. Also, an in-deep understanding of the action learning methodology is important at the initial stage, especially for the first year of the activities, to reduce misleading at institutional and team level.

2. **Implementation**

Our implementation phase had the following stages: Connecting, Planning, Acting and observing, and Restitution and reporting. The inspiration in each of the phases for sure was coming from interactions with students and with local stockholders. Having the chance to see real problems of agricultural sectors, and challenges of rural areas were an important motivation for action, apart from inspiration.

In general, the highest number of challenges was faced during the connection phase, coming mostly from students discomfort deriving from the lack of a clear final objective and their “unusual degree of freedom” to administer while becoming familiar with the process and resistance to abandon their “conventional” view of the education process. At the initial stages of the planning stage, the level of discomfort was lowered thanks to the identification of a specific focus for each group and the general comprehension of the added value coming from an action learning approach conveyed by the coaches facilitation. From the learners’ perspective, limited time for the activities and language barriers are important challenges to mention. Limited time with students required to communicate more via emails or during their breaks whereas having professional translation services implied that part of the interaction with stakeholders is “mediated” and it is the intervention of the group coaches that is needed to close this gap with additional explanations.

We learned and put forward a plan for the second cycle that supportive materials should be further developed, keeping the idea of openwork path, and just providing additional information to make students better understand our approach. Also, we learned that additional attention should be given to group formation, taking into consideration not only aspects of gender, country of origin, or educational background, but as well of research interest.

3. Reflection

Reflection was an important stage for us, bringing the views from the students, teachers, stakeholders and all other actors involved.

One of the challenges was that a reflection workshop was organized quite early in the process, missing the information coming from the "whole experience". Anyway, this activity was well complemented with a final evaluation by students, final workshop with main stakeholders and post-activity dialogue at the institutional level.

We were informed that students appreciated the high level of involvement in all phases along the process, the motivation provided by the coaches, the creation of different connections, multidisciplinarity of activities and the possibility to contribute with their project to real challenges of the local sector. The main actor and all stakeholders involved have found the experience very stimulating, recognizing its innovative character and useful contribution to their activities. The teachers considered as a stimulating element to be fostered and improved the relationship with the main local stakeholders and more time need to be dedicated to coaching.

The team found all this as an indication that we are on a good path, but as well it took into consideration all the shortcomings indicated earlier, with an idea to overcome or reduce them in the second cycle.

Cycle no. 2

1. Planning

"*Fortified*" with experience from the previous year, we entered the planning phase of the second cycle much braver compared to the first year. The very initial objective of the planning stage was to keep our team together and to build on what they already acquired during the first cycle. After confirming the involvement of most of the coaches from the last cycle, we discussed the selection of the main actor. Here again "save side" was to continue to work with the same main actor of the last year, only this time presenting other institution (LAG Alto Salento).

Considering the feedback from the students of the 1st cycle as the main challenge in front of us we put improvements considering learning methodology, to try to reduce the level of "initial confusion" among students of the second cycle and to have well balanced practical and theoretical inputs during the course. We increased our network of colleagues at the institutional and external levels to take part in our learning process. In general, as the main lessons appeared to be that timely approaching planning stage and attention to detail help a lot for the implementation of the case study.

2. Implementation

During the second cycle, we slightly modified the names of our implementation phase, compared to the first year, being as follows: Connecting, Researching, Reflecting and Finalizing. Unfortunately, due to the pandemic conditions we very forced to reduce our direct contact with the actors, thus "*Acting and observing phase"* this year was more transformed to "*Researching and reflecting"*. For sure this immediately exposes our main challenge of the second cycle – COVID 19.

After the closure of our institution and shift towards "*Smart working*", it took us around two weeks to buffer new obstacles, emotions and overall conditions. We gave students some time to adapt, and to have more time for themself. After that coaching team had an online meeting and we agreed on how to approach the rest of the course remotely. First, we had a meeting with all class, being cantered around dialogue and building of trust that we will pass all this process together. Later each coach guided its group until the finalization of the work.

We understood that commitment and common will are a crucial factor in times of crisis, having the chance to see that students final documents and course evaluation had even higher performance compared to the first cycle, despite working on distance and being limited with "*screen to screen*" dialogue.

3. Reflection

Summarizing inputs from students, teachers, stakeholders and others involved we had an overall very positive feedback, while identified drawbacks we see as very useful for future improvement.

When asked what action learning requires from them, students highlighted interaction with team-mates, good time management, flexibility and active participation. They evaluated the activity as highly useful for our main actor and as able to increase the level of their competence. Coaching by the CIHEAM staff was highly appreciated, giving us the motivation to continue and improve our activities. Considering the contribution to students future careers, they found action learning as an important experience with medium to high contribution in the future for them.

Stakeholders involved expressed their readiness to realize students ideas and to build on the proposals elaborated by the. Their satisfaction level was confirmed with openness to continue our collaboration for the next cycle. What was particularly important for us, is the fact that at the institutional level we managed to involve a much higher number of persons, especially for the final videoconference. Commenting on experience pictured their very positive impressions, while after that the "word of mouth" made a lot of people informed and interested in action learning at the institutional level.

For the coming cycle, we intend to be more discipline-oriented, since specific disciplines and arguments came out as important during this year's activity. We think that for the next cycle we should think to frame the action learning in a specific discipline, thus orienting activities of students to increase also specific knowledge competencies. Further, one of the ideas is to organize in advance a package of relevant references to share with students. Such references should be of course relevant for the topics addressed in the course and exercises; while at the same time clear, explicit connections should be created with taught disciplines and materials distributed within the master program.

3.12 India – UoK

3.12.1 ID card

Case: Improving sustainability in farming and food systems by bringing in agroecological approach through action learning, Kerala

Title: Certificate Course on Agroecology: Action Research and Education

Level: Post Graduation

Medium of Instruction: English

Host institution: Centre for Agroecology and Public Health (CAPH), University of Kerala

Course leader(s): Dr. Manju S. Nair (Hon. Director (CAPH), Professor, University of Kerala and Dr. Anupama Augustine, Research Associate, CAPH.

Timeline of the activities covered:

Cycle 1:

Initial Planning (Planning workshop and Focus Group Discussion) : 27th , 28th March 2019

Implementation (Conduction of Short Course on Agroecology: Action Research and Education): March 29- April 27

Learner categories: Post Graduate Students

12 in total, 8 Female, 4 male

Age- 20 -30: 11 students

>30-1 student

Nationality: Indian- 11, U.S- 1

Agriculture / Forestry: 2 students

Social Science background: 5 students

Natural Science: 5 students

3.12.2 Status

The Kerala case completed the two phases- initial planning and implementation- of the first cycle and is planning to conduct the reflection workshop, before entering in to the next cycle. A prudent reflection of the two phases quintessentially involves, analysis and interpretation of the data collected during the first two phases, including reflection journals, educational activity documents and feedback from both students and facilitators, so that the iterative process of action research can be carried away to the next cycle. The midterm report submitted during 2019, narrated the process by which the intended shifts envisaged in Next food approach was inculcated in the planning and implementation of the course, and how both students and facilitators responded to the new try-outs and what improvisations has to be brought into the program to make it better during the next phase.

The six shifts, - to include diverse learning arenas, learning resources, teaching aids, peer learning techniques, assessment methods, and of becoming facilitator, -was discussed during initial planning workshop and based on the curriculum plan developed during the workshop, the course was implemented during April 2019. The course was of 28 days, and twelve students from multi-disciplinary background participated in the course. The course was planned in such a way that there is a right blend of theory and practice and learning process is guided by the principles of action learning. The curriculum involved both classroom activities and field work, in which skills and competencies were imparted to students. The curriculum explicitly showed a clear deviation from the conventional patterns of classroom teaching techniques, and provided students with new learning arenas and resources along with innovative peer learning techniques. For instance, new learning arenas such as, ‘Nature Lab’, Meeting stakeholders at their organisation’ was introduced in the course. In order to understand the impact of learning process as a whole and each educational activity in depth, the reflection documents and educational activity contents of both students and teachers are analysed and the progress in relation to the intended shifts envisaged in the project are identified. Major insights are given below:

In order to practice the intended shifts in Nextfood approach, the core theme chosen was agroecology and the curriculum activities were organised accordingly. One important aim of the course was to introduce the concepts of agroecology to the students and an analysis of learner documents clearly shows each student trying to define agroecology with the support of literature (especially based on the article given for reading, Agroecology: Science, Practice and Movement). The major theme arose was defining agroecology as science, movement and practice and stressing up on how it has features of both science and social science disciplines and is related to farming and food systems and have system properties. However, some students tried to develop their own definitions of agroecology and has linked it with participation at fields and experience from their life. Apparently, agroecology was explained in relation with ‘India’s ancient agricultural practices’, ‘first-hand information regarding the issues of farmers’ and ‘use of locally adapted crops’, ‘poverty reduction’, ‘government policies promoting organic agriculture’ and ‘need to respect experiential learning of farmers that is time tested’. In this regard, students raised caution about the “little political support for systemic change in a government that is heavily lobbied by industries, (and opines that) rigorous, action based, data driven approaches will be critical, and here multidisciplinary studies (like the course) that take a clear advantage of co learning, finding shared experiences, and learning from one’s peers (can contribute to) a strategy that is more likely to inform implementable policy”.(Learner Document 2019).

According to the students, in order to understand the concept, a change in the attitude to recognise the gaining interest worldwide and the ability to recognize the need of holistic and multidisciplinary approaches to ensure sustainability are the essential prerequisites. Agroecology can explore opportunities for an ecologically sensible and economically sustainable agriculture system and students feel that that the approach is superior to other approaches in ensuring sustainability. Students understand the course as an opportunity to do action research in cooperation with farmers and other stakeholders and to learn the realities of agriculture and to experience the issues that farmers face and it helps (them) in developing a sense of multidimensional thinking. It makes them to appreciate and respect the knowledge of farmers and their commitment and emotional attachment to farming. Also, it teaches students to be in tune with nature and gives deeper understanding of environment and agriculture. Outwardly, the learner documents invariably approve, choice of agroecology as the core theme in the course.

With regard to the new learning techniques (the action learning method) adopted in the course, student reflections start with critique on the conventional learning styles. Accepting a change starts with understanding the limitations of the existing systems; and this holds in the case of action learning too. Apprehensions and abhorrence with the existing learning system is the major factor that made the course an appealing one to students. And it is evident from the learner documents, as students have compared almost everything- from the teaching practice to learning resources- with the conventional learning system and stated this as a superior technique. And this is the reason why there is less criticism with the new tools, as they don’t have another similar experience yet. There is huge discontent against ‘compartmentalisation of knowledge’, ‘dramatic series of syllabus’, assignments’ ‘due dates’, ‘grades’, ‘exams’ and students feel that they were ‘barely aware of the reality in society’. And they feel that the conventional system never allowed the students ‘to think freely, instead it ‘forced the students to think in a particular way only’ (Learner Document, 2019). Education created duality in personality and it has been explained sighting the example of ‘development vs displacement’ and they were ‘never satisfied’ and was ‘doubtful of the practicability of theories’. It is stated that the experience in the course was ‘less than ordinary’ and where as in the conventional system ‘mind was tamed-tamed to be unimaginative, stoic and passive’. Many have criticised the ‘boring lectures of teachers’ and the lack of interaction in traditional class.

In this regard students appreciate the ideas related to soft systems methodology and they identify SSM with system thinking and acknowledge the importance of sub systems and its inter relations in solving the real-life problems. For instance, students talk about the environmental, social, economic and political systems in dealing with sustainability issues and tries to bring about even a historical context of the issues. It is understood as a ‘purpose exploring approach’ and the tools such as rich picturing, multidimensional thinking becomes important.

Students look for ‘training to think in whole’ and feels that a conscious effort to practice system thinking is important. To them it helps to learn and appreciate the problem situation between the group of stakeholders rather than trying to solve the problem with a pre-defined method. Students have made use of SSM in tackling issues related to group work and in benefitting from peer learning and they feel it as a 'effective problem-solving tool.' The method benefitted them in field work also, to deal with farmers and other stakeholders. Students have shown the prudence to connect system thinking with the initiatives of the state government and analysed in length using a system perspective, and has highlighted the usefulness of considering the whole supply chain, when policy is been formulated targeting farming systems. Also, the lens has extended to evaluate the course itself, saying that the course reveals the beauty of system thinking and this makes it 'superior' learning technique. The students talk about the two experiential learning system; one in the classroom where through peer learning you understand a bit of human psychology and ideas related to sociability and at the field, the arena of learning is widened to many stakeholders- making a holistic learning experience. And they clearly differentiate it with the conventional classroom system where you compartmentalise knowledge.

Students see the course as an experiment to inculcate multi-dimensional thinking in students. It is opined that the course changed the way of thinking from just thinking on a single subject to multi-dimensionally looking at it, and it made them to think the fact that not only scientific aspects but social, economic as well as political aspects are also having a great influence on the agri-food system.

Following is a narration on how the intended shifts were adopted with respect to specific areas of learning and explores the experience of students (in undergoing the new shifts) deciphered from learner documents. The course was structured in such a way that it become a forerunner in deriving a process of learning that can generate capabilities for agroecological transition, which is materialised through the intended shifts explained in Next food approach. And the shifts include,

From lecture hall to a diversity of learning arenas:

Introduction of new learning arenas was one important point that surfaced in discussions during the initial planning workshop. And many ideas were jolted. Of these, observation sessions (Transect walks), regular reflection sessions, participation at filed (interactive sessions at field), visioning sessions and dialoguing sessions (meeting the experts) were introduced at the course and it seems to be very interesting according to students. The aim was to experiment with new learning arenas both inside the campus and outside university. These sessions have helped the students to improve their competencies- transect walks helped them to learn and practice the competence of observation; reflection sessions at regular intervals in the class room polished the skill of reflection; filed work instilled competence of participation, dialoguing and joint visioning.

From lecturing to co- and peer learning

Peer learning was accepted and adapted by the students as it was missing in the conventional stream of classroom teaching and they felt "learning methods so far practiced seem to be less competitive and productive compared to the new method of peer learning" (Learner document, 2019). It was defined by some students as 'collaborative learning' explained in Vygotsky theory. All the students found it interesting to practice a new learning method and there was a conscious effort to make it a success, by unlearning some of the things they already practiced. Students feel that peer learning can be good for two reasons; firstly, peers can understand more easily than a teacher does and they (peers) can suggest a solution that they have already experimented. Secondly, since versatile opinions arise in group, that itself really improves group member's interest in subjects (as different ideas pop up in discussions)

Peer learning techniques in the course included **group sessions, IGP model discussions, field work, rich pictures and mind maps** and **peer evaluation**. Students have made a distinction between formal and informal peer learning, and they feel that conscious grouping of the students by facilitators has an important role in the performance of groups (groups were divided after personality test and it was reshuffled).

The learner documents show that peer learning is explained in relation to three activities- **writing the client documents, field work and dialoguing**. Peer learning was most evidently felt by students when they started to prepare the client document and did the field work, "there was a combined effort to make use of every one's strength and make use of each of our weakness" (Learner document, 2019) and 'discussion on dividing the work'- writes the students. Similarly, dialoguing seems to be the most important competency that is inevitable in co-peer learning. Most of the students connect the success of peer learning with the ability to communicate and socialise and therefore many of them have tried to improve the competence of dialoguing. Also, in the attempt to keep the relationship in the group intact, students improved their dialoguing competency. Similarly, peer evaluation helped students to think from the point of view of facilitators and giving comments to fellow students improved the confidence level.

It was noted that students took some time to familiarise with each other and understand each other's background and learning styles. Some students took initiative to create a rapport with group and some activities such as **drawing mind maps and rich pictures** helped in creating a friendship among the students. Students feel that "good team work is the key to success, when time and resource are limited" (Learner document, 2019), and in peer learning students can feel the energy of the group and it creates an urge to contribute to group. It improves 'communication', 'cooperation and 'sense of interdisciplinary understanding' and provokes to think 'holistically'. Also, students sensed a freedom to discuss 'as they were allowed to discuss what they find necessary at each point of time' (Learner Document, 2019). Similarly, it makes a change in attitude of students and creates 'situational improvements or synthesis of opinions.'

The reflections from the students points out that the activities aimed at changing the conventional pattern of lecturing to co/peer learning techniques was welcomed and it helps it cultivate holistic thinking capability in students and there by enhances the quality of education. However, it is felt that effectiveness of facilitation and minimum capacity to communicate has a great role in making peer learning effective. Engaging the right choice of intervention from the part of facilitators and making students feel about the importance of freedom with responsibility are the most challenging part in promoting peer learning.

From syllabus to supporting literature/a diversity of learning sources

Roles and responsibilities of both students and facilitators were redefined, so as to provide students with an opportunity to decide up on the topics to be studied and to make students active learners. Thus, the over emphasis on syllabus was removed and multiple learning sources were introduced. It included use of multimedia resources, writing response paper (individually and in groups) and peer learning.

Reading literature and writing **response paper** is noted as an important source of learning. To students they find it very useful to keep track of literature related to the subject. To them, it is a chance to communicate in writing the personal view point and learning regarding a book/article. It is said that the text, the artifact alone has no meaning; it is given meaning by the reader. Here, the student is being "asked to transform the new experience into a context that is meaningful to you, born of the interaction of reader's and writer's meanings" (Learner Document, 2019). It has helped the students to establish a 'connection between the subject at hand and own experience. Similarly, interactive sessions with farmers acted as a learning resource; **oral history** can act as a best source of learning and interaction with famers has opened this opportunity for students. Students were exposed to documentaries/ videos and it seemed interesting to them.

From textbook to a diversity of teaching aids

Teaching to learning presupposes a transition from textbook to a diversity of teaching *(it is felt that 'learning aid' is a better term since the teacher's role has changed into that of facilitators)* aids, as there is inherent limitation in defining the syllabus and thus reducing the 'phenomenon' at stake in to compartments and applying theories to explain the particular issue. A diversity in teaching aid is the essential shift which states that 'text books' are not only the teaching aids, instead it is only one among them.

Instead of using textbooks, power point presentations were used. Facilitators used short videos and **power points** to explain concepts. Students shared their field experiences using the power point and the presentations helped in knowing about the three diverse field visited by each group. Having versatile farming patterns and situated in different geographical area each farm was different and the use of multi media presentation helped other groups to closely watch the fields and discussions were initiated. Also, **role play** was used to introduce certain concepts and it was welcomed by students well.

Another two important tools used were mind maps and **rich pictures**. Drawing rich pictures in group helped students to have clarity of ideas and initiate discussions regarding diverse aspects of the experience. According to students, through **mind map** monotonous information can be transformed in to 'colourful', 'memorable diagram' that works in line with your brain's natural way of doing things. To students it is a constructive learning method and an effective way of getting information out of the brain, where you can 'put ideas down in any order, as soon as they pop up in the head, not constrained by thinking in order'. It helps the students to structure information, and to better analyse, comprehend, synthesise, and recall, generate new ideas. It is a way to organise large amount of information, combining different views. When they first used it, they were doubtful about making it, but it was a very natural process once they started to do.   Students have used **online applications** to draw mind maps. Similarly, in preparing client and learner documents various **computer applications and software packages** were used.

From written exam to a diversity of assessment methods

Peer evaluation, writing client and learner documents and continuous assessment were the diverse techniques used for assessing students. And these techniques helped in evaluating both the competencies and the subject knowledge of students.

From lecturer to learning facilitator

Two facilitators and a mentor facilitated the course. And the change of role from lecturer to facilitator needed much more planning, hard work and a change in attitude with regard to shared responsibilities of both students and teachers. The curriculum was scheduled early, and there were review meetings after each day's class. Facilitators tried to ensure participation of each student in the learning activities and it necessitated explaining the reason behind adopting new learning techniques and clearing the doubts from students. Along with that, smooth conduction of group activities had to ensure keen observation of student activities and creating a platform to tackle the interpersonal issues generated.

Students who attended the course were of three categories with regard to their expectations and scepticism. Firstly, students who expected a conventional curriculum with strict schedules of class room learning and aimed at acquiring maximum knowledge. Secondly, students who knew about the action learning methodology and were familiar with some of the methods (from the previous batch) and were curious to understand more about experiential learning. Thirdly, students who knew about the new learning techniques but were confused (whether the method in itself is prudent and/ or whether I am able to learn it). The greatest challenge in front of the facilitators was to satisfy all categories of students by instilling an urge towards action learning and research by developing an interesting, inspiring and useful curriculum. Students note that 'this agroecology class has succeeded in going beyond my expectations of learning about farming to become a class that has challenged my vision of myself and of my life'

The analysis of data from learner documents signals the need of **cross code analysis**, since codes are interrelated to each other and there are more areas of student experiences to be explored. Particular competencies are more important to certain learning techniques and vice versa. A cross code analysis can generate ideas related to enhancing curriculum, especially in ordering certain curricular activities.

3.12.3 Data analysis

During each activity, forms and guidelines for collection of data was prepared and distributed to stakeholders. The major activity during the cycle 1 was conduction of initial planning workshop (with regard to initial planning phase) and conduction of the 28-day certificate course (with regard to implementation phase) and so major stakeholders were students and facilitators Stakeholders consisted of students who participated in the Short course on Agroecology: Action Research and Education held as part of the project Indo-Norway Cooperation during 2018 (who participated in the initial planning workshop), students who participated in the Short Course during 2019 as a part of the Next food project and facilitators and mentors of the course. The documents from the **Initial Planning** workshop in which seven students, three mentors and three experts from Next food project participate, include,

1. Reflection documents as a group
2. Individual reflection documents filled in by nine participants
3. Report of activities

The first two documents are hand written and the third one is typed and shared.

From the Phase 2 i.e. **the Implementation,** data collected during the educational activity include the following:

1. Student's understanding, contributions and expectations at the beginning and at the end of the course.
2. Self-Assessment of competencies
3. Client Documents
4. Reflection Documents of students linking experience, theory and personal reflections
5. Reflection document of facilitators regarding the course
6. Demographics: there were twelve students and all of them submitted the documents and passed the course. One student who hailed from U.S. possessed experience in the area.

The feedback schedule given in the beginning of the course included questions relating to their expectations regarding the course, their previous expertise and major issues faced by Indian agriculture according to their perspective. At the end of the course students were asked three questions relating to their subject knowledge relating to agroecology, the process of learning agroecology in the course and the reason for adopting the particular process for studying agroecology. Also, students were told to write most inspiring, interesting and useful things in the course and three changes that they will love to bring in the implementation of the course. Self-Assessment rubric was used to measure the enhancement in competences. Client Documents prepared by students in groups, included details of farming systems, experience of students at the farm and the joint vision relating to farm, developed with the support of farmer. On the very first week of the course, students were introduced to the process of reflection and was told to start writing reflection notes related to each day's activity and compile it and submit as learner document at the end of the course. These documents include thoughts of students regarding the various learning arenas, resources and teaching aids used in the course and helped them to comprehend their experience, being introduced to these particular techniques.

The data consisted of mostly qualitative data of descriptive nature. The attempt was to capture the process of learning as experienced by the students, in which they were given complete freedom to decide up on how to express their 'lived experiences' during the course. And content analysis of the documents was found useful, and for doing content analysis, each of the reflective documents were edited by removing the photographs (mind maps and rich picture were kept in the document, as without the diagrams the content doesn't make sense) and irrelevant information (names). Data was anonymised and assigned with a number as suggested in the instructions for content analysis. Later the data was analysed using NVivo software.

Coding was the most important technique used. The code tree included seven codes namely, observation, reflection, participation, dialoguing, facilitation by students and teachers, visionary thinking and transformative learning. The definition of each code was looked into based on three scenarios; (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).

And these three interpretations emerge in relation with aspects which is mentioned as the research question;

1. How to adapt (both as practice, skill, relational to developing other competence by either student/other participant/in general)
2. What it requires from (stakeholders)
3. What is the impact it created on students (stakeholders)?
4. What is missing?

In short, the competence development in relation to each curricular activity is assessed, and on the basis of the derived insights, the intended shift in learning arenas, resources, teaching aids, assessment methods and peer learning has narrated. For each code, key words were identified from the coded text relating to the research questions and based on the key words data was interpreted. (given in Appendix).

New codes:

During the coding, it was found that the existing codes were inadequate for including all contents in the learner documents which are relevant to the research questions. The research question raised was “how and to what extent various educational activities enhance student’s abilities to deal with ‘the challenge of the whole’ including to take or facilitate informed action, and the competences considered necessary for doing so”. And this quintessentially include,

How the competence practice was done (either the student, or any other participant /generally how the practice is being done) against the contextual factors.

How the competence- was improved (decreased) (either for the student/participants/ general view)

The relation of particular competence to another (competence/ educational activity).

The coding tree shared, stress on the core question- ‘how the competence was improved or decreased during the educational activities. And it was felt that first and third questions could be answered elaborately (with particular reference to our case), by including new codes. The competence development in a student is invariably linked to the prior knowledge, background, and a shift in the thought process of students. There are some enabling factors (like understanding concepts of agroecology, adapting multidimensional thinking or understanding or appreciating diversity that actually enable students towards competence development). At many times, the process of competence development is a two-way process. For instance, dialoguing is a competence that get enhanced during dialoguing sessions, group learning sessions and participation at field. However, some of the writings related to dialogue is included in ‘peer learning’ as the objective of those statements were not to explain the process/competence of ‘dialogue’, instead it was to say how dialogue acted as a component in making peer learning effective. Similarly, rich pictures are closely linked with observation and is a way to enhance the competence. (As per the existing code tree, all contents relating to rich pictures goes in the section of observation since both are linked and focus is only on competence development). But, many of the students has experienced drawing rich pictures and mind maps as a technique that can actually improve the internal dynamics of the group (mostly for psychological reasons and perceived it as a group activity instead of understanding it as direct competence enhancer) and thus, indirectly contributes towards competence development (or the quality of learning as a whole). Here having a separate code for action learning tools can help since educational activities and competence development at some points overlap (to demarcate the actual components and competence development as dependent and independent variable for analysis may get biased results). In addition, regarding the code transformative learning, it was felt that as many students have narrated it in versatile ways, having sub codes can derive patterns towards the intended transformation. The new codes include:

Sustainable/Agroecological approach: Understanding the approach-agroecology/ sustainability concepts- of the course seemed to be one important enabling factor that contributed towards the competence enhancement throughout the course. Most of the learner documents began with how their understanding about agroecology/ sustainability moulded/enhanced/changed during the course and these understandings actually formed a base in which the entire educational activities were imbibed by students. Under the code student’s understanding of the concepts are discussed.

The second code introduced was Action Learning Tools and it included four sub code namely multi-dimensional thinking, peer learning, rich pictures and mind maps, Soft systems methodology.

Under the main code of ‘Transformative learning’ five sub codes namely, critique on traditional learning, understanding diversity, interdisciplinarity, self-directed learning and lifelong learning were included.

Format of Analysis Matrix:

					Research questions -Key words from analysis			
Frame work	Themes	**Variables**	**Code Category**	**Sub Codes**	**How they Adapt? Approach**	**What it Requires? Process**	**What it gives? Outcome**	**What is missing? Challenges**
Approach		Knowledge creation	Agroecological/ Sustainability					
Process	Intended shifts	a. Learning Arenas b. Assessment Techniques	Competencies	Observation				
				Reflection				
				Visionary thinking				
				Participation				
				Dialogue				
				Facilitation Students				
				Facilitation Teachers				
		c. Learning Resources d. Teaching Aids e. Peer learning	Tools					
				Multidimensional Thinking				
				Peer learning				
				Rich pictures/ Mind maps/SSM				
Outcome			Transformative Learning	Critique on traditional method				
				Inter/multi disciplinarily				
				Lifelong learning				
				Self directed learning				
				Understanding diversity				
Challenges			Expectations and scepticism					

(filled in matrix attached in appendix)

What does the data indicate? Present your analysis in a structured and clear manner.

Process: The curricular activities and the competences

a. **Observation**

Students have adapted to ‘observation’ in two sense; the practice sessions and as an applied competence;

Observation practice sessions: Students have tried to define ‘observation and its features’ by citing the observation practice sessions such as ‘**Transect walk’** where they have explained how they acquired/ polished the skill of observation, thus making the observation sessions as a new learning arena and as a teaching aid by which the relation between observation and reflection is established (after the observation practice, facilitators tried to introduce the features of good observation and how it is related to reflection). For instance, one student note that “personally, I started to observe many things that I have never observed before (after the transect walk)” and another student opines that “ observation, which we do daily in our life, when applied as a systematically practiced competency provides an understanding of the situation, because it (observation) becomes non-judgemental.” Students see this as an ‘inherent human skill which, when developed scientifically can provide an understanding of many real-life problems. It helps to illuminate the importance of ‘sensory rich learning’ (through observation).

Secondly, students have talked about observation, where they have made use ‘observation’ as a competence to enhance the learning experience – to answer the question ‘what is there’. Here, they feel that observation as a very good starting point towards practicing other competencies, especially reflection and participation.

The transect walk was followed by **rich picturing session** and rich pictures was one learning activity that every student cherished. Rich pictures ‘illustrates the richness and complexity of a situation, and ‘contains detailed traits’ of phenomenon and clearly ‘represent the interconnectivity within and between system elements. Students feel that ‘it is useful to understand the main elements and relationships that need to be considered when intervening to create some improvement’ since it depicts the ‘visionary image of the subject.

Most of the students has noted it as a **group activity**, where it ‘helps in combining each one’s observation in the group. And it ‘provide an internal reflection for the individual group members’ to understand the multidisciplinarity and to be inclusive. To them, creating rich pictures ‘stimulates the innate abilities in us, helps to reduce our ego by making us to draw without thinking. It is a way of thinking holistically, to see relationships and connects and helps to convey information in a hilarious way, especially when there are differences in opinions.

Students feel that they have to be ‘non-biased and non-judgemental’ and have to ‘remove the presumptions’ to have a good observation. It is written that ‘to maintain objectivity before judgement, our particular emotional state, ambitions, pre-existing knowledge, political and cultural background and value judgements has to be set aside as much as possible’ (Learner Document, 2019). This allows a ‘focus on openness, the inclusion of details, imagination and creativity’, and a ‘dampening of subjective impulses’. In their view, observation requires ‘focus, concentration, presence of mind, active involvement, patience, timing and planning’ which quintessentially ‘require use of all senses’ and should be ‘systematically practiced’.

To students, observation activity was a 'pleasant surprise' and could improve the 'thinking capability and knowledge of environment'. It was stated that students 'started to observe many things that they have observed never before'. It made students understand the importance of having 'holistic understanding towards everything'.

What is missing in the observation practice sessions is that handling the bias towards one's disciplinary background and managing the diverse opinion that may be generated. The sessions after observation deliberately tried to explore the commonalities in observation; but there were differences in finding the commonalities also. Hence it is important to make students understand, how to comprehend and interpret the observations that they made. All the students have written about how the results of observation varied among different students and an apprehension regarding reaching consensus, even though they cherished the differences.

b. Reflection:

Capacity to reflect is one competence that decides the strength of action learning process. The learner document itself is a reflection of students relating to the experiences in course. However, here 'reflection' is considered as a competence and includes experiences relating to **'reflection sessions'.**

Students have identified 'reflection' with 'reflective observation' and has explained the competency based on Kolb's learning cycle and states that it is the beginning of experiential learning. Instead of abstract conceptualisation, the course started with reflective observation and students are of the opinion that some people are naturally good at this competency, while for others, they have to train themselves. The reflective sessions conducted during the course was a good learning arena to familiarise with the new technique. They have defined reflection as "involving in and understanding a situation', and as a deep step 'by which you deliberately classify the information that you see and grab the nuances of data stored in the brain' or 'the competency of deliberately recollecting the experiences" (Learner Document, 2019). Some have related reflection to 'self-reflective capability' as is explained in the social cognitive theory. Students have made a distinction with reflexing in daily life and reflection as a competence and opines that understanding this as a skill was new to everyone.

Learning from experiences is possible only with reflection and it essentially involve thoughts relating to 'what should' or 'could be'. It is said that as observation, reflection is also affected by factors such as 'emotional, physical, cultural or aesthetic aspects and the inner thoughts and convictions our mind nurtures'. So, it is important to minimise the impact of these factors to have a good reflection. This requires being 'multi perspective and sharing reflections in group'.

Reflection sessions has helped students to 'leave their background' and 'urged to analyse', which enabled them to look at phenomena 'systematically in a very different way than they were used to'. Students have reported that they started to 'do self-reflection even in daily chores' and this has helped in 'finding better solutions. Students felt that they have learned the basics of systematic, structured reflection and will practice it lifelong. General reflections on how particular interactive sessions or activity made an impact on the student and how it helped him/her to improvise their confidence and skills/ opened up a research area forms another aspect of reflection. Some other reflections relate to self-criticism by which students themselves raised questions like ‘am I really human/ socially active or what is my contribution to society’. Also, students shared reflections relating to incidents/activities in which they become emotional or passionate with particular activity that created a deep sensibility in them.

To critically analyse the student reflections on this competency, it is revealed that most of the opinions are very personal and it is seen that students get emotionally attached to particular ‘reflections’, and this naturally leads to disproportionate importance attached to reflections.

c. Participation:

The competence of participation is mostly related by students to **field trip/field work** done during the course. And it is written that ‘field visit was one of the main instructional techniques that facilitators used in the course’ (Learner document. 2019), highlighting the field visit conducted before sending students as a group for field work at selected farms. It is noted that ‘any field experience has an implicit focus on having a clear and preordained foundation of theory that is utilised to formulate questions before a field work is done’. And it is opined that compared to classroom learning, field work can bring in ‘realistic elements’ and can develop ‘innate interests of students’ and thus is a promising learning arena and defines the process as ‘learning by doing’. And to students, it ‘deepens the understanding related to the subject and answers doubts’, unlike in lecturing. However, cognitive ability and academic background and perspectives of individuals are highlighted as the major factors that effects the participation and students always tried to fine-tune with these factors.

Participatory excises requires that student’s understanding that ‘any kind of solution to issues relating to framing, without adequate primary study is not a sustainable solution’, and should have a strong belief that ‘research and development not only happens in the university, but a major part is happening in farms (field)’. It is opined that some of the participants has ‘idiosyncratic world views’ and ‘unpredictable’ nature, and dealing with these is essential in participatory exercise and field work is the best arena to practise this. Knowing each other’s backgrounds, tendencies and philosophy (of the group members) effected the level of participation at field. Some of the students have linked the participation with other competencies, like better participation can actually improve the dialoguing and visioning.

Participation is one activity that created a larger impact on students. It is revealed that ‘direct interaction with farmers helps to remove the prejudices’, especially when done as a group activity as ‘opinions from different disciplines are assimilated’ and an opportunity is ensured ‘to understand new things related to other disciplines’ and is a ‘possible way to get divergent knowledge’. In addition, the activity left an impression in students that ‘farmers have the best knowledge’, and participation is the best way to ‘derive practical solutions to issues related to sustainability’, since it allows to see ‘all activities very close’ and provides to ‘being a part of the process’ and ‘to act together to bring about a change’ and thus ‘gives strength to face challenges’. Students through participation ‘understand the complexity’ of farming systems and ‘empathise with other stakeholders (especially farmers) and thus, ‘cherish the ability of other stakeholders to work, (of farmers, grassroot level organization such as local self-governments) and acknowledges various alternative models such as ‘cooperative farming’. It allows students to experience farming ‘with all senses’ and hearing farmer’s talks in the middle of the farm is very ‘informative’, and improves memory. The competence gives students a sense of empowerment ‘to be the game changer’ and makes them satisfied.

Only few students have linked their participatory excise with agroecological transition in farms. And one student has linked the participation with identifying principles of agroecology in the farm he/she visited and has tried to develop the ‘local model’ of agroecological farm, which was the core aim of the exercise at all. It was stated that the idea is that ‘to address complexity in agricultural systems, policy systems should be informed by holistic research that captures all ecological interconnections of the process- which include viewing farming as an ecosystem that accounts for biological process (and limitations) as well as a social component that recognises the economic and cultural inputs to the system. Instead, most of the students were focused with the bird’s eye view where they talked about empathising with farmer and having a sense of individual empowerment.

d. Dialoguing:

Dialogue has been understood by students as a competence to have so as to make **participation**, **group learning and interactive sessions** effective and some of the students have written about **the role of facilitation** in polishing the skill of dialogue. All the narrations related how dialogue helped in entering into good rapport with other stakeholders as well as group members and experts. Students are at different ladders of communication and improvised better; some said they were debating all the time and started to practice dialogue, and to others who knew the skill of discussion developed it further. With regard to dialogue, they played different roles like ‘being an initiator, good listener, clarifier, and opinion seeker’.

To all students, the single factor that helped them to learn the art of dialoguing was ‘to learn to listen to others’ and understanding the fact that ‘agreeing to other’s viewpoints never reduce the faith in your thoughts’. Here changing the ‘dominant attitude’ is mostly needed. Similarly, a clear understanding between the difference among debate and dialogue can improve the skill. Many students have opined that seeing how the other group members/ facilitators dialogue was an inspiration to learn the competence. And, some students found it very difficult to ‘not to argue’ and thought they may not be able to dialogue in a proper way.

Dialogue mobilise wisdom and brings out ‘the knowledge from experiences’ and helps to understand that ‘opinions of others are also valid’. It ‘deepens thinking, patience, and ‘expands the horizons of knowledge’, ‘reduces the ego’, ‘increases confidence and convictions’ and makes each person a ‘good listener, who listen without thinking about what to replay’. It is a competency much ‘needed in daily life as a social being’ and the ‘democratic way of proceeding with conversation’.

e. Visionary Thinking:

Visionary thinking has been explained in three ways:

Visioning exercise in classroom and with farmer: this was a new learning arena for students and they practiced visioning. To students visioning is a ‘more flexible way to deal with an uncertain world’ and it gives ‘broad outlines’ of the strategy so that when the unexpected happens, organisations/persons can adapt- it can learn'. Thus, visioning is understood as competence by which 'change' can be easily 'accommodated' and a way to 'harness the future possibilities'.

Visionary thinking needs 'an understanding of the limitations and resources already existing' and this is what that make visions 'feasible, useful, credible and authentic'.

'Visons can actually motivate every person to do things that they never could do' (Leaner Document, 2019) and the visioning exercise helped students to 'develop a vision for society along with career vision.' Students have identified 'lack of vision among educated persons' as the root cause for persons co-opting with the existing systems and so, feels that having a vision is the 'starting point of change'. It encouraged students 'to dream' and 'to be imaginative' and 'aspire freely'. It also provided students with 'motivation for present action' as there was this image of future envisioned state and to understand the strengths, weaknesses, opportunities and threats.

Visionary thinking related to agroecological transition/action learning:

Visionary thinking related to agroecological transition is not stated by many students, some of the students were able to enlarge the canvas and see beyond 'individual/joint visions' and connect it with the approach the course was referring to. It was stated that 'a truly implementable policy, that is sustainable, requires a different way of looking at research and analysis' and there are 'other pathways to higher learning'. They understand the threat of industrial agriculture and resultant changes in food systems and raise caution about needed change in socio-political landscape in their native countries (raised by an international student). Some envisions their role as a change maker in bringing about the desired change in society.

Other than this, students have identified logical reasoning, creative thought, communication skills, cognitive skills as skills needed for action learning. And it is opined that along with acquiring knowledge, improving skills is also important.

Thus, competencies in itself act as a learning arena, where instead of hearing a lecture and acquire knowledge, students practice and adds on to knowledge creation.

Facilitation by students:

Facilitation is defined as the ability to 'enable others to cultivate the other five competences' (Content analysis Instructions) and can be defined as "helping each other to learn and in doing so, learning themselves" (Topping 1998). In this regard it is written that 'the benefits I have gained from this initial experience in to agroecology will be compounded when I return to my own socio-political landscape in US" (Learner Document 2019) and the student expects that the newly earned competencies can be experimented there as well. Another student hopes that 'the improvement in my attitude and skills, can transfer to my friends and to the community in which I work' and it is opined that 'the concept of agroecology, if practiced can be an answer to long-lasting questions related to unsustainable agriculture in the state'.

Transformative Learning :

The learning experience narrated by students shows that for them, the course was a transformative one. It is seen from the learner document that the starting point towards transformative learning is to understand the diversity. To them **understanding diversity** itself was a learning process. Most of the students have written about multidisciplinary of their peer and **different character traits** of students, highlighting the **diversity icebreaker test** and **personality tests**. Also, many have written about the **diversity in stakeholders, techniques, arenas, tools and thinking** and were carried by the idea of 'making possible unity in diversity'. It is stated that 'first time in our life we saw heterogenous students, heterogenous in- disciplines, ideas, articulation and even in political ideology" (Learner Document. 2019). It was felt as 'from single intelligence to collective intelligence' and students states that absence of heterogeneity is the reason for failure in policies.

Understanding diversity has helped students to initiate **self-directed learning**. Many students felt that the course 'made them to 'think freely without prejudice' and they realised that "learning is a continuous process'; it cannot be confined into class room; it has to be internalised and learner is responsible for their own learning" (Learner Document, 2019). The course 'provided possibilities for diagnosing learning needs, goals and understanding strength and weakness of students'- learning should not be dependent up on external triggers rather it should be self-directed and self-motivated. This equips the students to **be lifelong learners**. It is stated that "I realise the transformation that has happened to me as a learner, I now realise that learning is not a lone time affair, rather, it should be a lifelong one." (Learner Document, 2019)

And for students this change in the mind set to be self-directed and lifelong learners has made the **transformative learning** experience for students and it has been explained by students using the Kolb Learning cycle.

To students, the six levels- Remembering, Understanding, Applying, Analysing, Evaluating, Creating can be used to structure the learning objectives, lessons, and assessments of the course. The course 'ignite the untrodden paths I must look for a wider vision before leaping towards a conclusion' and to them 'learning is more about getting wider and more clear view of the subject, rather than writing a short essay for 8 or 12 marks'. Students enjoyed 'full fun of learning' and 'the bigger risk of unlearning everything systematically organized so far in my shelf of knowledge'. Students cherish the activities and states that 'we could go to the field, observe what is happening, dialogue with the stakeholders, understand their issues, participate in activities, reflect on our observations, vision a future and draw action plans to achieve the future' and they feel that 'action learning student in agroecology has a task to establish a mid – field where the stakeholder outside of university could meet with students. Through this integration, the three, the student, teacher and farmers would learn from each other as they collaborate on improving unique and complex situation.

There were very personal comments of which some are highlighted;

'I felt an organic connection with society, so I feel that this course will be the first step towards transforming me into a responsible citizen'

I joined the course and it changed the way I think, the way I approach particular issues of social importance and I deal with other people.

'Most productive days in my life and there was this urge created in the mind to continue the work I do in a more powerful way.'

However, this transformation that they feel at the individual level or as a student is not reflected from the point of view of agroecological transition. Only few of them were able to scientifically examine the process and connect it with the intended shift, relating to learning and research. The cycles that Kolb speaks of has been sighted by many students, but, then again, context specific comments of ‘how and what makes the shift’ at the micro level is missing.

Reliability/validity

The coding was done by only one personnel. (as the software is installed in only one computer and we are working from home) So that an intercoder check was not possible. This may affect the reliability of coding.

3.12.4 Cycle report

Cycle 1:

Kerala case completed the Planning and Implementation phases,

We have analysed the learner documents (using Nvivo), and the transcript of Focus Group on Institutional factors and documents of Planning workshop. The comments from students (at beginning and end of the course), self-assessment rubric, reflection documents of facilitators are to be analysed. (which can be included in the final report)

Of the activities in the two phases, most useful and inspiring was the data analysis conducted of the documents generated in the two phases, which we haven’t done before. We learned to use the software NVivo and it was the most useful thing. The results of analysis are quite inspiring as it shows that our efforts to bring about some changes are touching the students.

The process of data analysis was very challenging. One challenge we faced was many of the documents were hand written and this makes analysis in software difficult. We are not able to complete the cycle 1, as we have to do the reflection workshop, which is postponed due to covid 19 pandemic.

Lessons learned include the practical tip that data collection has to be done in digitised mode. Formats and questions have to be prepared well before starting the course. Also, more learning arenas, teaching aids, resources have to be introduced into the course.

APPENDIX

Agroecological/ Sustainability

			Research questions -Key words from analysis			
Variables	**Code Category**	**Sub Codes**	**How they Adapt? Approach**	**What it Requires? Process**	**What it gives? Outcome**	**What is missing? Challenges**
Knowledge creation	Agroecological/ Sustainability		‘Science, Practice and Movement’ ‘India’s ancient agricultural practices’ ‘first-hand information regarding the issues of farmers’ ‘use of locally adapted crops’ ‘poverty reduction’ ‘government policies promoting organic agriculture’ ‘need to respect experiential learning of farmers that is time tested’	‘attitude to recognise the gaining interest worldwide’ ‘recognize that to ensure sustainability, holistic approaches and multidisciplinary is needed’ ‘superior to other approaches in ensuring sustainability’	‘realities of agriculture’ ‘appreciate and respect the knowledge of farmers’ ‘to be in tune with nature’ ‘deeper understanding’	Inability in connecting to practical issues

Competencies

Variables	Code Category	Sub Codes	How they Adapt? Approach	What it Requires? Process	What it gives? Outcome	What is missing? Challenges
Learning Arenas Assessment Techniques	Competencies	Observation	‘observation and its features’ ‘Transect walk’ ‘inherent human skill’ ‘sensory rich learning’ ‘observation sessions’ ‘what is there’	‘non-biased and non-judgemental’ ‘remove the presumptions’ ‘to maintain objectivity before judgement’ ‘focus on openness’ ‘the inclusion of details’ ‘imagination’ ‘creativity’ ‘dampening of subjective impulses’ ‘focus’ ‘concentration’ ‘presence of mind’ ‘active involvement’ ‘patience’ ‘timing’ ‘planning’ ‘require use of all senses’ ‘systematically practiced’	‘pleasant surprise’ ‘thinking capability and knowledge of environment’ ‘started to observe many things that they have observed never before’ ‘holistic understanding towards everything’	Prudent interpretation of observation

		Reflection	‘reflection’ ‘reflection sessions’ ‘reflective observation’ ‘involving in and understanding a situation’ ‘deliberately classify the information that you see and grab the nuances of data stored in the brain’ ‘the competency of deliberately recollecting the experiences’ ‘self-reflective capability’	‘what should’ ‘could be’ ‘restricting -emotional, physical, cultural or aesthetic aspects and the inner thoughts and convictions our mind nurtures’ ‘multi perspective and sharing reflections in group’	‘leave their background’ ‘urge to analyse’ ‘systematically in a very different way than they were used to’ ‘do self-reflection even in daily chores’ ‘finding better solutions’ ‘questions of self-assessment- am I really human/ socially active or what is my contribution to society’	

		Visionary thinking	Visioning exercise in classroom and with farmer: ‘more flexible way to deal with an uncertain world’ ‘broad outlines’ ‘can learn’ ‘change’ ‘accommodated’ ‘harness the future possibilities’ Visionary thinking related to agroecological transition/action learning: ‘see beyond individual/ joint visions’ ‘a truly implementable policy, that is sustainable, requires a different way of looking at research and analysis’ and there are ‘other pathways to higher learning’	‘An understanding of the limitations and resources already have’ ‘feasible, useful, credible and authentic’	‘Visons can actually motivate every person to do things that they never they could do’ ‘develop a vision for society along with career vision.’ ‘lack of vision among educated persons’ ‘starting point of change’ ‘to dream’ ‘to be imaginative’ ‘aspire freely’ ‘motivation for present action’	Disconnect with agroecological visions

		Participation	‘main instructional technique that facilitators used in the course’ ‘any field experience has an implicit focus on having a clear and preordained foundation of theory that is utilised to formulate questions before a field work is done’ ‘realistic elements’ ‘innate interests of students’ ‘learning by doing’ ‘deepens the understanding related to the subject and answers doubts’ ‘all senses’	‘any kind of solution to issues relating to framing, without adequate primary study is not a sustainable solution’ ‘research and development not only happen in the university, but a major part is happening in farms (field)’ ‘idiosyncratic world views’ ‘unpredictable’	‘direct interaction with farmers helps to removes the prejudices’ ‘opinions from different disciplines are assimilated’ ‘to understand new things related to other disciplines’ ‘possible way to get divergent knowledge’ ‘farmers has the best knowledge’ ‘derive practical solutions to issues related to sustainability’ ‘all activities very close’ ‘being a part of the process’ ‘act together to bring about a change’ ‘gives strength to face challenges’ ‘understand the complexity’ ‘empathise’ ‘cherish the ability’ ‘cooperative farming’ ‘with all senses’ ‘informative’ ‘to be the game changer’	‘absence of local model’ ‘to address complexity’ ‘bird’s eye view’

		Dialogue	‘being an initiator, good listener, clarifier, and opinion seeker’ Multidimensional	‘to learn to listen to others’ ‘agreeing to other’s viewpoints never reduce the faith in your thoughts’ ‘dominant attitude’ ‘not to argue’	‘mobilise wisdom’ ‘the knowledge from experiences’ ‘opinions of others are also valid’ ‘deepens thinking, patience’ ‘expands the horizons of knowledge’ ‘reduces the ego’ ‘increases confidence and convictions’ ‘good listener, who listen without thinking about what to replay’ ‘needed in daily life as a social being’ ‘democratic way of proceeding with conversation’	
		Facilitation Students	‘enable others to cultivate the other five competences’ ‘helping each other to learn and in doing so, learning themselves’ ‘student became a mentor for others’	‘the improvement in my attitude and skills, can transfer to my friends and to the community in which I work’ ‘answer to long-lasting question's related to unsustainable agriculture in the state’		
		Facilitation Teachers	-	-	-	-

Action Learning Tools

Variables	Code Category	Sub Codes	How they Adapt? Approach	What it Requires? Process	What it gives? Outcome	What is missing? Challenges
Learning Resources Teaching Aids Peer learning	Tools	Holistic Approach/ Multidimensional Thinking	‘course changed the way of thinking’		‘the fact that not only scientific aspects but social, economic as well as political aspects are also having a great influence on the agri-food system’	
		Peer learning	‘learning methods so far practiced seem to be less competitive and productive compared to the new method of peer learning’ ‘collaborative learning’ ‘unlearning’ ‘peers can understand more easily than a teacher does’ ‘tell us a solution that they have already experimented’ ‘conscious grouping’ ‘there was a combined effort to make use of every one’s strength and make use of each of our weakness’ ‘discussion on dividing the work’		‘good team work is the key to success, when time and resource are limited’ ‘feel the energy of the group’ ‘urge to contribute to group’ ‘communication’ ‘cooperation’ ‘sense of interdisciplinary understanding’ ‘holistically’ ‘as they were allowed to discuss what they find necessary at each point of time’ ‘change in attitude’ ‘situational improvements or synthesis of opinions’	

		Rich pictures/ Mind maps	‘illustrates the richness and complexity of a situation’ ‘contains detailed traits’ ‘represent the interconnectivity within and between system elements’ ‘colourful’ ‘memorable diagram’ ‘put ideas down in any order, as soon as they pop up in the head, not constrained by thinking in order’	‘it is useful to understand the main elements and relationships that need to be considered when intervening to create some improvement’ ‘visionary image of the subject	‘helps in combining each one’s observation in the group’ ‘provide an internal reflection for the individual group members’ ‘stimulates the innate abilities in us, helps to reduce our ego by making us to draw without thinking’	
		SSM	‘systematic approach for tackling real world issues’ ‘complexity and uncertainty’ ‘purpose exploring approach’	‘training to think in whole’ ‘working in groups’ ‘engaged in dialogue’ ‘participated in farm activities	‘effective problem-solving tool’ ‘superior’	

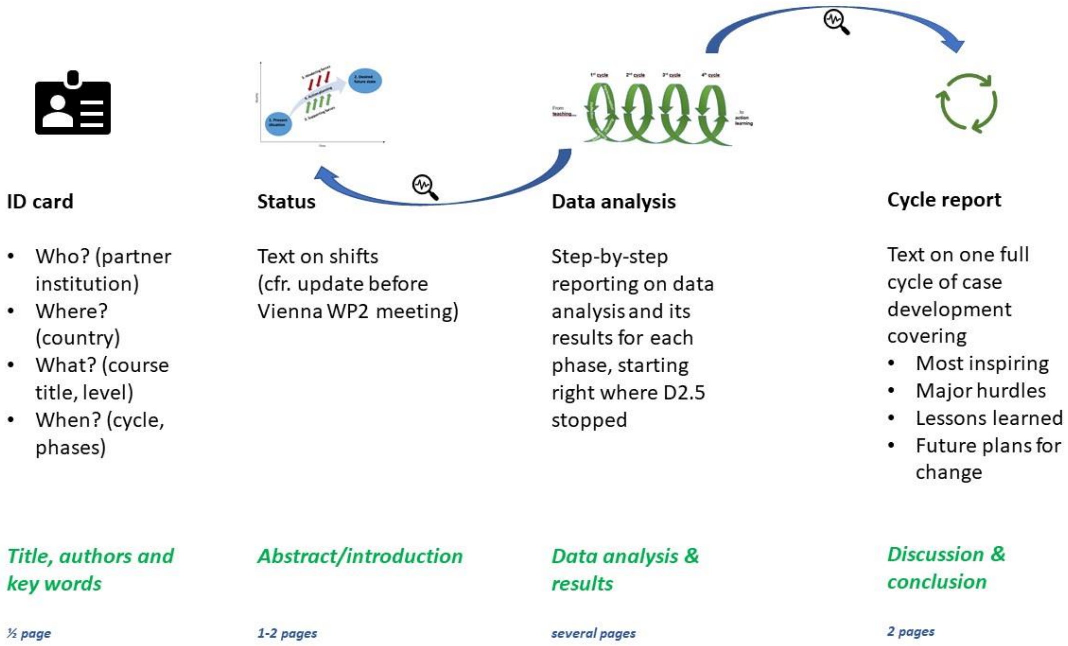
Appendices

Appendix 1 – Template for case development report

In order to be able to write the second annual case development report (D2.6), input from each case is crucial. By filling in this template, we ensure a streamlined reporting on case development from each case in accordance with the protocol and the manual.

Instructions for filling in the template

This year we are asking the cases to report on four areas of case development: “ID card”, “Status”, “Data analysis” and “Cycle report” (figure 1). All cases should report on all case development activities that have happened after the last activity reported in the previous case development report (M14).



ID card

- Who? (partner institution)
- Where? (country)
- What? (course title, level)
- When? (cycle, phases)

Title, authors and key words

½ page

Status

Text on shifts (cfr. update before Vienna WP2 meeting)

Abstract/introduction

1-2 pages

Data analysis

Step-by-step reporting on data analysis and its results for each phase, starting right where D2.5 stopped

Data analysis & results

several pages

Cycle report

Text on one full cycle of case development covering

- Most inspiring
- Major hurdles
- Lessons learned
- Future plans for change

Discussion & conclusion

2 pages

Figure 1: Diagram showing the structure of the second yearly case development report in the Nextfood project.

For this report, it is expected that the case responsibles include outcomes of data analysis in their report. Please scrutinise the research protocol and the instructions for data analysis. Before writing this report, it is essential that all data are anonymised.

Appendix 2 – Instructions for analysis of text data

Instructions for data analysis – Text

Version 2.0

As mentioned in the Research Protocol (D2.1), rigorous data collection and analysis is paramount to the success of the action research in the Nextfood project. In order to ensure consistent data collection, the Research Protocol provides instructions on how to collect data from the activities performed when following the Manual for Case Development (D2.2). Once the data have been collected, they need to be analysed in a consistent and rigorous manner in order to allow for fact-based improvement of each case and for cross-case comparisons. Our aim is therefore to provide you with clear instructions on how to analyse the data that you are collecting throughout the activities in your case.

With the instructions provided in this document we aim to support you in analysing the data that you have collected in the form of text or that can easily be turned into text. We have developed these instructions for you to analyse text qualitatively through the method of Content Analysis. This is a well-established method which we will guide you through one step at a time. You don’t have to be experienced in qualitative research to work with this document, but you should be acquainted with the Nextfood approach.

Given that Content Analysis is the method we are using, let’s start with looking at what that method is all about.

Content analysis requires (1) starting with research questions that you want to find answers to; (2) creating a set of codes for categorizing the text; (3) applying those codes systematically to a set of texts; (4) testing the reliability of coders when more than one applies the codes to a set of texts; (5) creating a unit-of-analysis-by-variable matrix from the texts and codes; and (6) analysing that matrix […] (based on Bernard 2006)

1) The research questions in the Nextfood project are situated at two levels: 1)The students’ learning and experiences in the new learning landscape, and 2) The process of changing the learning landscape (the course activities) towards the full-fledged Nextfood approach. (re. the areas of shift)
2) We have already created a set of codes for themes in the research questions based on the Nextfood model, the so-called coding tree.
3) In this document we will describe how to apply those codes systematically to your data that are or can easily be converted into text.
4) We will also describe how you can do an intercoder check in which you test the reliability of several coders.
5) We will describe how to cluster data and create units of analysis, potentially using qualitative data analysis software.
6) We will explain you how to analyse those units qualitatively.

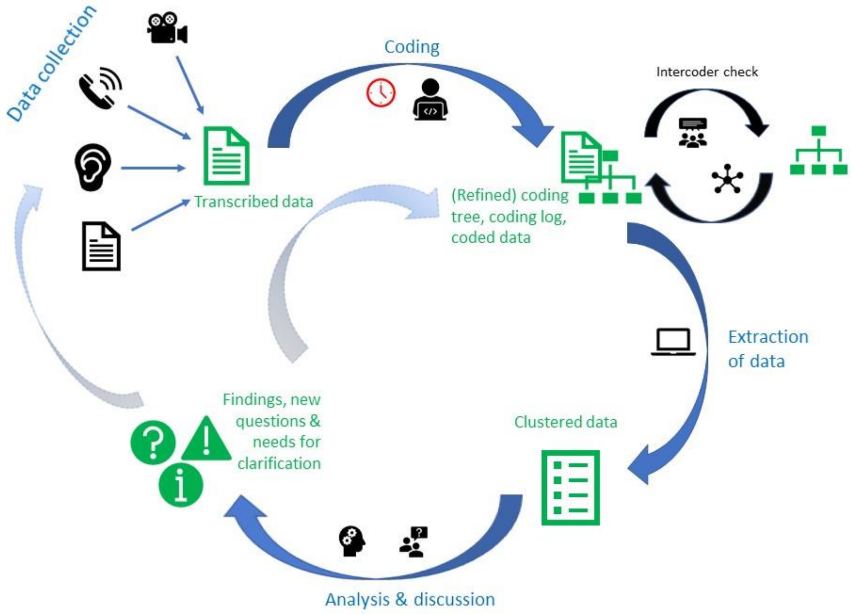


Figure 2 Overview figure

Figure 1 shows the different steps that we will guide you through in this document. Starting in the upper left side of the figure and following the arrows clockwise, this document will guide you through the following steps: You have collected the data and should make them ready for analysis first. This means that you should **transcribe** some of the data. You should then **code** your data. Be aware that this is a time consuming and concentration demanding process! Moreover, coding your data includes doing **intercoder check(s)** if several persons are coding, which is also a tedious task. Once coded, you should **cluster** your data through several **extraction** processes. Next, you can start **analysing** your data, which means looking at what your data indicates thanks to the coding and clustering you have done. The analysis leads to an understanding of the meaning of the data and at this stage you are ready to write the Case Development Report.

This document will guide you through these different steps. Each step is represented in a section that starts with a visual representation of that step as well as a box that mentions who is best suited to conduct the step and what material to start and end with. Then, each section describes what you should do based on examples from the NMBU case and with reference to previous Nextfood deliverables and scientific literature when necessary.

Contents

TRANSCRIPTION: Preparing your data for analysis

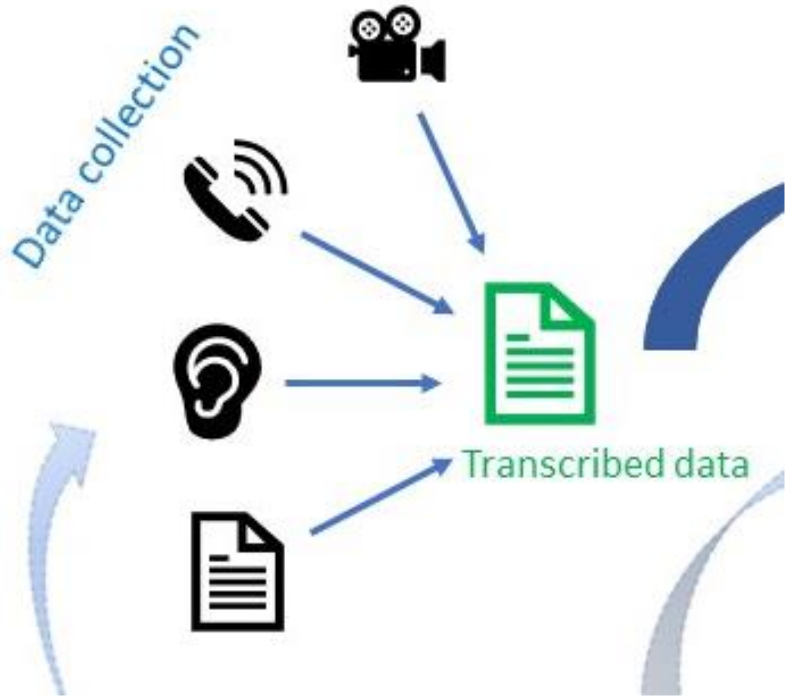


Figure 2: Visualisation of the transcription phase of data analysis (excerpt from fig. 1)

WHO?	Anyone (who can read and write, is meticulous and able to translate to English if necessary)
START WITH	Data in the form of text files, video files, audio files
END WITH	Data in the form of anonymised text, filed in line with the guidelines

Transcription is the process of turning your audio recordings/assignment responses/notes/video recordings or other raw data into a text document that you can further code. If your data already is in the form of a text document, this step is mainly about anonymity, storing and possibly translation. During this process you should anonymise the data, and store the data using the correct structuring syntax (in line with Nextfood's D6.2: Data Management Plan). Preferably you should also translate the data during this process. However, if you have very large data sets, which would make the translation time-consuming, or if you are worried that during translating you lose a lot of the content, you may also opt to transcribe and code in your local language and only translate those parts that you would like to use as quotes when describing your results.

Transcription begins by creating a new text document and naming it using the syntax explained in the box below. To do that there are several structuring decisions you have to make regarding naming the datasets, subsets etc.

Explanation of the naming system and rationale

From D6.2 p.11:
"WPNumber_TaskNumber_PartnerName_DataSubset_DatasetName_Version_DateofStorage”

To accommodate for the multiple similar datasets that will be made throughout the cycles in the cases, we decided to add a naming category, which makes our naming system follow this structure:

WPNumber_TaskNumber_PartnerName_**CycleYear**_DataSubset_DatasetName_Version_DateofStorage"

Rationale:
WPNumber = WP2 because that is where the cases have funds in the project

TaskNumber = T2.2 because that is where the case development reports stem from

PartnerName = NMBU

CycleYear = 2019 because that is the year the course ran.

DataSubset = Exercise 1 because it is the subset of the dataset gathered.

DatasetName = Beginning of semester because it is the dataset which includes the particular data file

Additionally, you have to make an identification key that links the participant’s[4] name with an anonymized code. This identification key must not be kept together with the transcribed data. As a suggestion, you print out a list of all the participants, assign a randomized code to each participant and circulate the list physically among only those who will do the transcription work. Do not share this key online, even amongst the team. Thereafter, you should start the transcription by writing short and descriptive meta-information for instance like this:

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[4] In this document, we use the term ‘participant’ for all persons from which this project generates data, to name a few: students, teachers, stakeholders, participants in focus group discussions.

Content: End-of-semester interview regarding learning outcomes

When/where: NMBU 2019

Data type: Audio recording

Interviewer: Åsmund Steiro

Transcriber: Åsmund Steiro

Participant-ID: 390

Structure: I: Interviewer
P: Participant

Now you are ready to transcribe the contents. There is no need to write down all the “uuh”s and “eeehm”s, but the transcribed data should stay close to the wording of the participants. It is however not necessary to transcribe everything that is being said in a conversation. If a part of the interview is clearly not relevant for the further analysis, it is better to not spend time transcribing and coding it. For instance, if the interview digresses and the two people start talking about the recent weather patterns, it’s appropriate to mark the transcription with a timestamp of when the digression started and ended and then indicate the contents of the digression with a short description. For instance, you may write “13:30-15:30: [Talked about the weather]”. While transcribing, any information that might compromise the identity of the participant must be anonymised. For example, if a student reveals their hometown, age, their name, a classmate’s name or any other identifying information the transcriber should substitute the identifying text with for instance [age] or [name of classmate]. If you decide to translate non-English information to English, you may find it most convenient to do that while transcribing instead of in two separate operations. If the transcriber is uncertain about a translation, s/he should include the original phrase and the interpretation, indicated by [square brackets] where necessary.

The most classic type of transcription is writing down word by word the contents of an audio recording. However simple that task sounds, it should not be taken lightly as it is very time consuming. If you have a lot of data that needs to be transcribed, you should consider hiring extra help from for example a graduate student as the task does not require much knowledge of the project.

If you decide not to transcribe your data, or if your data are already in English, you should nevertheless anonymise the data.

CODING: Structuring your data

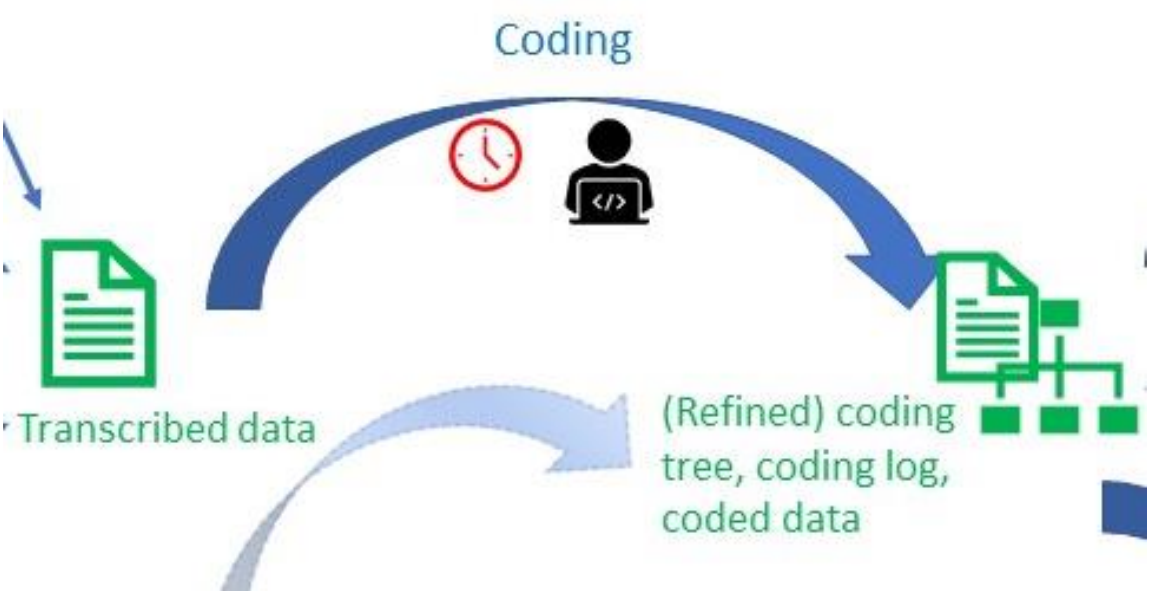

Figure 3: Visualisation of the coding phase of data analysis (excerpt from fig. 1)

WHO?	Researchers who are familiar with the Nextfood approach (case leaders)
START WITH	Data in the form of anonymised text, filed in line with the guidelines
END WITH	Data coded individually by one or several coders,

Coding individually using a predefined coding tree

After having collected and prepared your data comes the task of sieving out what is interesting in the data. This is essentially what coding is. We have developed a coding tree (figure 4) that every case should use as a sieve. In practice, this means that you read through data and select parts of the text and tag it with a code if that text is related to that particular code. Examples of coding below will make this clear. Coding is a time-consuming task and requires good understanding of the research questions and the Nextfood approach and we therefore believe it is best if researchers familiar with this (i.e. case responsibles) carry out this task.

The coding tree has been developed to structure the data. More specifically, to structure the data in a way that makes it easier to answer the research questions that we ask ourselves during the implementation phase of the case work. You might remember those questions from the research protocol (D2.1). We also repeat them below. As stated in the introduction of this document, we're investigating these questions at two levels: 1) The students' learning and experiences in the new learning landscape, and 2) The process of changing the learning landscape (the course activities) towards the full-fledged Nextfood approach.

At this point in time, we focus on the first level since that is the level to which the material we are coding now is related. Indeed, we are now coding data that were generated by students. The second level will be dealt with in the analysis of the planning/reflection workshops.

More specifically, the questions we're looking to answer by analysing data from the implementation phase is (from the research protocol, p. 11):

How do students experience such a learning process in terms of

- *how they adapt?*
- *what it requires from them?*
- *what it gives them?*
- *what is missing?*

How and to what extent do various educational activities enhance the students' abilities to deal with 'the challenge of the whole', including to take or facilitate informed action, and the competences considered necessary for doing so (observation, reflection, dialogue, participation and visioning)?

The first questions are best answered by using a data-driven approach where we explore how learners describe experiences with the "new learning landscape". Conversely, the second question should be answered by a more concept-driven approach where we look for instances where the learners describe how and to what extent various educational activities have helped them develop the six core competences.

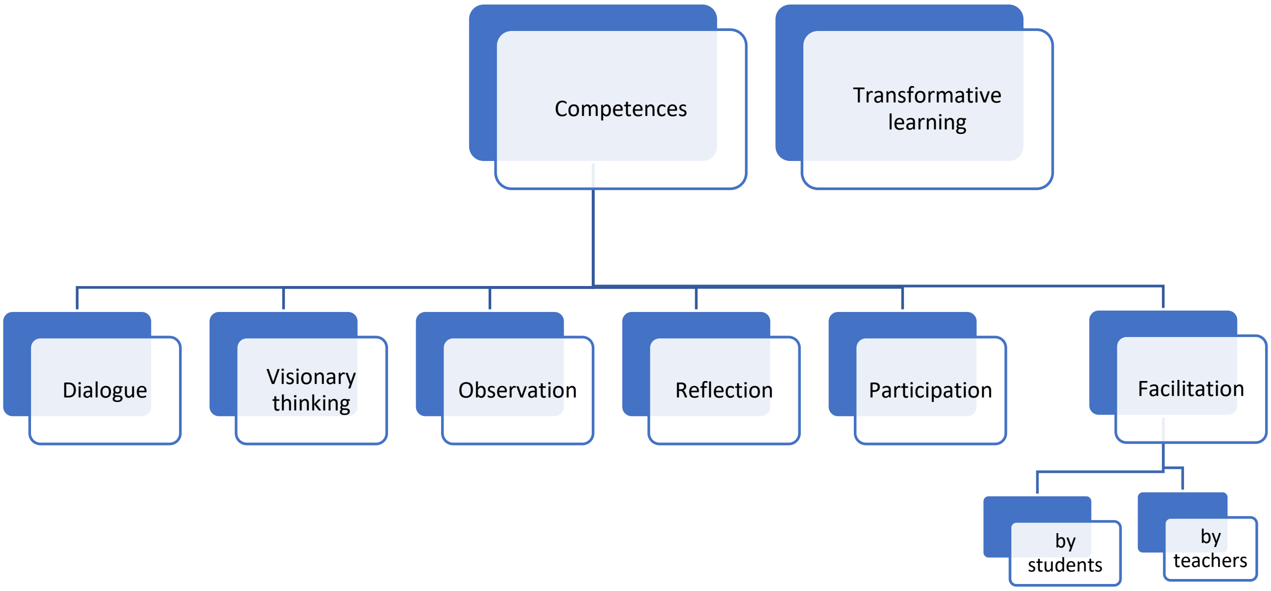

Figure 4: The coding tree

As shown in the figure above, the coding tree begins with two branches: competences and transformative learning. Competences then branches further into the six core competences that we have placed a heavy emphasis on in WP2. Finally, the competence facilitation branches into students and teachers to distinguish between facilitation done by students and by teachers. These ten codes are the primary codes to be used when coding the text data, however, we encourage each case to add additional codes if you feel it is necessary. Be advised that for each additional code added, the task of coding becomes more challenging as the coder has to consider a larger number of themes to look for in the text data.

Qualitative data analysis programs can make this job easier. In the NMBU case, we use NVIVO 12 Pro (QSR International 2019) and we recommend all cases to use this software too because that will make it easy to share coded data and do cross-case comparisons. Throughout the rest of this chapter we will explain how the codes in the coding tree should be assigned to the data you have collected and prepared for coding.

How to use the coding tree

There are two categories of formulations from your transcribed data regarding competences that should trigger coding them; (1) where participants describe **their own** actions or experiences related to competence development during, or in relation to the course; (2) where participants describe **others'** actions or experiences related to competence development during or in relation to the course. Sometimes the participants explicitly mention the competence they or others developed, and then it is easy to know which competence to code for. However, often participants describe actions or experiences where they developed competences without explicitly referring to the competence. In such cases, you should try to assign a suitable competence code based on the definitions and examples in the following sub-sections.

The competences are pre-defined concepts that we instruct you to code for, while “transformative learning” is a more data-driven code where we encourage you to not feel constrained by the theoretical concept of “transformative learning”. For an explanation of how to use the code “transformative learning”, see the sub-section below (p.14)

Depending on the data type you are coding, you will probably find more of certain types of statements. For instance, when coding reflection documents where students are describing their learning process, you should look for text where students describe actions that relate to developing competence(s) or transformative learning that took place during the course or when they refer to such actions when describing their own future plans. You should not code text where students describe actions that took place before the course. After all, you are coding the reflection documents to gain insights into how competence development and transformative learning happens **during** or **because of** the course. However, when coding students’ answers to the questions that you ask them at the start of the course, you should also code text where students describe actions that took place before the course because that’s the only thing students can refer to at that point in time and you code those answers precisely because you want to gain insight into their evolution over time (by comparing their answers before, in the middle and after the course, as well as comparing those answers with what they write in their reflection documents)

Be aware that you can also code “negative examples” where participants describe a failure to develop the competences or expresses the need for an increased level of competence development at a certain point in time, during a specific activity, or in general. (See examples 3 and X below.)

Let’s look into examples for how to use the different codes in the coding tree.

Competences includes the six core competences of the Nextfood project, but also all other competences that do not have an explicit code in this coding tree. The definition proposed by Wiek et al (2011, p. 2014, referring to others) is useful in that regard:

We employ in this article the definition of competence as a functionally linked complex of knowledge, skills, and attitudes that enable successful task performance and problem solving (cf. Spady 1994; Baartman et al. 2007).

A competence is thus not synonymous with a skill. To be competent, one has to combine knowledge, skills and attitudes to enable successful task performance. And in this context, the successful task performance is related to improving the sustainability of our future farming and food systems. When coding for competences, we encourage you to keep this important distinction between skills and competences in mind. It may become clearer to you by reading the examples below.

This particular code (**competences**) should be applied to text where competences in line with this definition are mentioned, and are not captured by either of the six core competences of Nextfood. In other words, you should use this code when you have the impression the text describes competence development, but you cannot put your finger on which competence exactly. Let’s move on to see how we intend to code the six core competences.

Participation is defined in D2.1 and D3.1 as follows:

Participation 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.

By "in the field" we mean any learning arena outside the traditional academic arenas. For instance, this could be participation in farming/forestry operations, participatory classroom sessions, stakeholder workshops, or other forms of systems inquiries. See example 4 below.

Further (D3.1, p. 15),

"participation can be interpreted as a transformative process focused on making a difference, as opposed to accepting status quo."

Therefore, it is not enough to simply be present in the learning arena. In this context, participation refers to interactions with the stakeholders with the aim of changing the system. We'll provide some examples to demonstrate how we should use this code:

Example 1: **participation and reflection**

Participant: *"First, both caseworks were safe experimental spaces that offered good examples of how participation helps build trust between people who do not know each other but are brought to work together towards a higher purpose. They also allowed me to assess and reflect on the value of participatory inquiry processes as we conducted them."*

The participant is describing that the caseworks, which are essential parts of the course, enabled her/him to improve their competence in participation and reflection. In this example there is a clear causal suggestion from the participant. It is clear from this quote that it was the situation in the caseworks that enabled her/him to improve their level of competence mastery. This is exactly the information we are after in coding the reflection documents and a clear example of the first category: the participant describes her/his own experiences during the course where competences were developed.

Example 2a: **Participation**

Participant:

"At the first two schools, we were only able to speak with administrators, and didn't really get an idea of the canteen managers' point of view. The third school provided us the opportunity to do so, and this canteen manager turned out to be the greatest well of knowledge. We realized from our interview with the canteen manager at the third school that canteen managers seem to be the main catalyst for success in this project. Implementation of the goal runs through them. Therefore, we attempted to set up more meetings with the other managers, eventually being able to speak with one more. The school interviews were vital to our understanding of the system, and of our role in it. After these interviews, our group had a pretty good understanding of how to move forward and the project became clearer. However, that is not to say that the system itself became clearer, only our role in changing it."

Example 2b: **Participation**

Participant:

"Participation on both farms included potato harvesting, cleaning out the barn, pulling up electric fences and changing tractor tyres. This work allowed for an appreciation of the typical daily scenarios of the farmers. This took place over several hours which gave us the opportunity as a group to talk quite constructively about what the situation was here on each of the farms."

Explanation

Example 3: **“negative example” of participation**

Participant*:*

“When we came back for the visioning workshop on our second visit on the field, we presented our rich picture to the participants and asked them for feedback. This way, our data, interpretations and conclusions could be tested by field actors who could challenge our findings and point out discrepancy. However, most of the stakeholders we interviewed to analyse the food system and construct our overview of it where not those who were present at the workshop. So we could not really make sure we were representing the initial participants’ view.”

Visionary thinking is defined in D2.1 and D3.1 as follows:

Visioning 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. Being able to engage a group in creating a shared vision can heighten the possibility for breakthrough solutions and unite and provide the link between diverse people, interests and activities.

When applying this code you should look for instances where participants describe actions related to envisioning a desired future for a system they are interacting with. This may for instance be co-developing a plan for farm improvement with a farmer. However, it is important that the desired future is not just a quick-fix to a technical problem, but that it has an element of activating insight, imagination and connecting with values. The term should not be conflated with problem-solving as visionary thinking encourages thinking about a desired future and not focusing on the problems.

Example 4: **Visionary thinking**

Participant: *“I was thoroughly impressed with the farmers abilities to get into the visioning session that we held with them. Initially we did not think it would be appropriate or possible to convince them to feel ‘safe’ in closing their eyes and imagining. We were keen to give it a go and I led the script with helpful support from the rest of the group. It was beneficial for the group members to also take part in the session and help with further idea generation and probing as we tried to then get the thoughts on a mind map.”*

Explanation

Observation is defined in D2.1 and D3.1 as follows:

Observation 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.

Furthermore, to be a good observer you have to be aware of your potential biases. For instance, if a student with crop science background visits a farm, s/he will have a bias towards observing the crops at the farm. The good observer is aware of those biases and doesn't try to ignore those perspectives, but rather seeks to look beyond as well. When applying this code you should look for instances where this mode of exploration is described in relation to the case activities.

Example 5: **Observation**

Participant: *"After the observation of a situation, we were asked to draw a rich picture; it was something I had never tried before. Drawing a rich picture is a group exercise that helps to understand the complexity of an entire situation by the illustration of different perspectives. The main idea is to think holistically about what we've seen and try not to structure. It's about understanding relationships and connections without representing the organization of the system. It was difficult for me not to give structure to our rich picture. However, I understood, step by step that structure does not mean cohesion and that it's possible to represent a messy situation in a clear way."*

Reflection is defined in D2.1 and D3.1 as follows:

Reflection is a 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.

The key to coding for reflection is to look for instances where the participants describe improving their abilities to reflect or that they practiced the ability of reflection. For instance, phrases similar to "this experience made me realize the value of connecting the insights from concrete experiences and theory". We're not looking to code reflections per se. So if a participant is stating that “As I am a person who needs frequent feedback to do well, the amount of peer-feedback was very beneficial for me.”, the statement itself is a reflection, but should not be coded for reflection as it does not describe how the participant improved their abilities of reflection. It should also be noted that reflection is not the same as feedback or evaluation.

Example 6: **observation and reflection**

Participant: *"Drawing a rich picture with the group helped me to practice my observation competence. The aim of the rich picture was to draw all the observations and information made during the working day and interviews. I found that exercise challenging because it forced me to just draw what I observed, the challenge was in that I was quickly jumping into system analysis without exploring all the observation phase. Thanks to this exercise I understood that if I want to have an overview of a whole complex situation, I need to take the time to observe before I jump to system thinking and other conceptualization reasoning. I also think that this understanding was part of being an autonomous learner thanks to the reflection I had about that experience. "*

Explanation

Dialogue is defined in D2.1 and D3.1 as follows:

Dialogue is a process which helps us notice the nature of our thinking. Dialogue increases our capacity to move into and toward difficult issues in a welcoming fashion. It expands our capacity to listen and to become aware of the piece of the mosaic that might be missing from our own and the collective understanding.

A dialogue is a form of conversation, which as opposed to a debate, is focused on understanding each other, learning from the conversation and gaining a higher understanding than one could have by oneself. People who are good at the competence of engaging in dialogues are able to reflect together in this form of conversation. When you code text for this competence you should look for instances where the participants describe experiences with this type of conversations in relation to the case activities.

Example 7: **dialogue and reflection**

Participant: *Firstly, the dialogue, thanks to the theory I knew what the characteristics of the dialogue were. I observed that in our group there was at some points an unwillingness to be influenced and an absence of active listening as it seemed that we were thinking about an answer while the other person was talking. An example of it was when we tried the talking stick, which was a good idea towards being interrupted by the other members of the group while explaining ideas. It turns out that as soon as the person finished everybody directly wanted to take the parole and have the stick, in that could see the absence of at least a short assimilating phase before answering. It seemed that everybody had already an answer to what was said. Thanks to these observations I experienced that the mindset of the individuals in the group was something very important towards having a good dialogue. "*

Explanation

Facilitation is defined in D3.1 (p.13) as follows:

Facilitation is the ability to enable others to cultivate the other five competences.

Pierce et al. (2000) established a facilitator competency model describing key aspects of what a competent facilitator should be able to do. We recommend that in order to gain a good understanding of what facilitation entails in this context, read the “Pierce paper” in addition to the chapter in D3.1 (p. 21) describing facilitation in education.

Example 9: **facilitation (by students), dialogue, participation, visionary thinking**

Participant: *"When we have been explained the process of how we may conduct our farm case. I had doubts about it, it was very abstract and new for me because of the reason explained above. But once I started doing the visioning session and the action planning session with the farmers, I understood how this approach was powerful. The farmers had ideas about what they wanted to implement in their future. They had the resources as well to make those ideas possible. We just helped them to identify what values were behind those ideas, how to organize them and bridging the abstract world (ideas and not concrete plans) with the real world (making an action plan in order to start implementing those ideas). "*

Explanation

Example 10: **“Negative case” of facilitation (by teachers)**

Participant: *"In addition, lectures and readings provided me with tools that I believe can be very helpful when facing a complex situations. I admit not having consciously made use of all those tools during the group work. Some reasons for that were maybe the presentation of those tools being very little rooted in examples from reality - making it hard to figure out how to actually utilize them - and my reluctance to theory in general."*

Here, the participant is expressing the view that the course content can be helpful. However, the participant goes on to say that the presentation of the course content (i.e., the facilitation) contributed to the participant not fully utilizing the course content. Thus, this is an example where participation by teachers is the right code to use. This is an example of the second category: the participant describes that others (in this case, the teachers)

Transformative learning is defined in D3.1 as follows:

Mezirow (2003) defines transformative learning as “[…] learning that transforms problematic frames of reference–sets of fixed assumptions and expectations (habits of mind, meaning perspectives, mindsets)–to make them more inclusive, discriminating, open, reflective, emotionally able to change”.

And further:

Mezirow and Associates (1990) call transformative learning: “…learning experiences that leave a significant impact on the learner, a paradigm shift that shapes the learner and affects subsequent experiences”.

Example 11: **transformative learning**

Participant: "I think that in August I was more focused on what knowledge I was going to learn, and I think, in addition to other factors (such as poor sleep), that to an extent made it difficult for me to absorb the other aims of this program. But now I appreciate more the value of experience-based learning and reflection. I feel I may some time look back at the two courses and recognise some ways in which it will have impacted my modes of thinking"

Here, the participant is relating back to how her mindset was at the beginning of the semester and see that it has changed through the course. The shift is here from being focused on content to starting to appreciate other forms of learning and being more interested in the processes. Transformative learning is a long process, and is not very likely to be visible within one semester, but elements of a shift in mindsets can be detected, as this example shows. This is an example of the second category where participants

Writing a coding log

While you are coding, you should keep track of what you are doing and why you are doing that. In fact, you should keep such detailed track of your coding process that anyone can take over at any point in time. For example, if you decide at one point to add a code to the coding tree, you should write that down in the coding log along with an explanation of why you took that decision. You should also write down in your log that you decided to take out a certain data source and why (because the participant has withdrawn consent, for example).

If you work with several coders together in your case, you should keep track of what each of you are doing and when, so the others should only check the coding log in order to know where to start from.

Writing a coding log is crucial to enable yourself to check for consistency in your coding, to enable a check for consistency across cases, to avoid doing double work, and to keep track of rigour in the data analysis process.

Examples from the **NMBU coding log**:

2020-01-28

Åsmund: coding

WP2_2.2_NMBU_2019_exercise 1_beginning of semester_student 389_2019-08-21

- While coding, I notice that "systems thinking" comes up many places. Should we add this as a code? Seeing the whole instead of only the parts is repeated as necessary for making the desired change.
- I also question the reliability of the data since the timing of these responses are questionable. The students received these questions in the introductory week to the MSc program where they were introduced to "our" way of interpreting these challenges. Their responses might be quite biased.

2019-01-16

Åsmund and Lutgart: Compared our coding for

WP2_2.2_NMBU_2019_exercise 1_beginning of semester_student 399_2019-08-21

Dissimilarities in coding and what we agreed upon:

"This requires also knowledges especially in problem- and conflict management."

Lutgart had coded as Competence/dialogue and as Competence/facilitation/by students
Åsmund hadn't coded because the student explicitly mentions knowledge only
We agreed that for this dataset, where students do not have much notion yet about competences versus knowledge etc., we can code it with the competences because a student might call this knowledge while s/he is not distinguishing between knowledge and competences yet.

"Thus, we have to link these knowledges with action, in order to make our food-print really relevant and efficient. That is why, we have to bridge the gap between knowing and doing."

We both coded for Competences/participation
Åsmund also coded for Competences because it hints at more competences than participation only.
We agreed to follow Åsmund’s method for the reasoning given above.

INTERCODER CHECK: From multiple coding styles to a converged coding

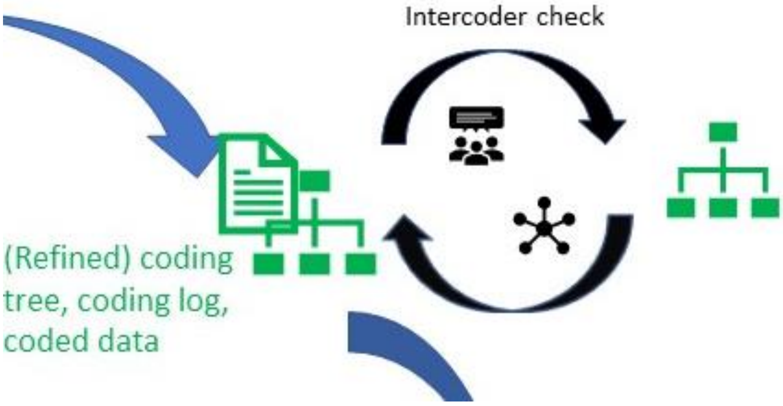

Figure 5: Visualization of the intercoder check phase of data analysis (excerpt from fig. 1)

WHO?	Everyone involved in coding, case leader
START WITH	Data coded individually by several coders, following the provided coding tree
END WITH	Data coded according to a refined and converged coding tree

Checking for **intercoder reliability** means making sure that coders see the same things when they code the same block of text (Bernard 2006). Qualitative data analysis software can help you to calculate how much two coders are in agreement through a statistic test called **Cohen's kappa**, or *k.* "When *k* is 1.0, there is perfect agreement between coders. When *k* is zero, agreement is what might be expected by chance. When *k* is negative, the observed level of agreement is less than what you'd expect by chance. And when *k* is positive, the observed level of agreement is greater than what you'd expect by chance." (Bernard 2006:513). In this context, it means the following:

K = 1	Perfect! No further refinement is possible!
K = [0.7, 1)	Great! No further refinement in necessary!
K = (0.2, 0.7)	Good! Try to resolve intercoder discrepancies.
K = (0, 0.2]	Oops! Refinement is necessary!!!
K is negative	Oops! You might need to start all over again!!!

You should do intercoder checks until you have reached a *k* of 0.70 or higher.

Examples of resolving intercoder discrepancies from coding log:

2019-01-16

Åsmund and Lutgart: Compared our coding for

WP2_2.2_NMBU_2019_exercise 1_beginning of semester_student 399_2019-08-21

Dissimilarities in coding and what we agreed upon:

"This requires also knowledges especially in problem- and conflict management."

- Lutgart had coded as Competence/dialogue and as Competence/facilitation/by students
- Åsmund hadn't coded because the student explicitly mentions knowledge only

We agreed that for this dataset, where students do not have much notion yet about competences versus knowledge etc., we can code it with the competences because a student might call this knowledge while s/he is not distinguishing between knowledge and competences yet.

"Thus, we have to link these knowledges with action, in order to make our food-print really relevant and efficient. That is why, we have to bridge the gap between knowing and doing."

- We both coded for Competences/participation
- Åsmund also coded for Competences because it hints at more competences than participation only

We agreed to follow Åsmund's method.

EXTRACTION: Getting a first view on the structuring of your data

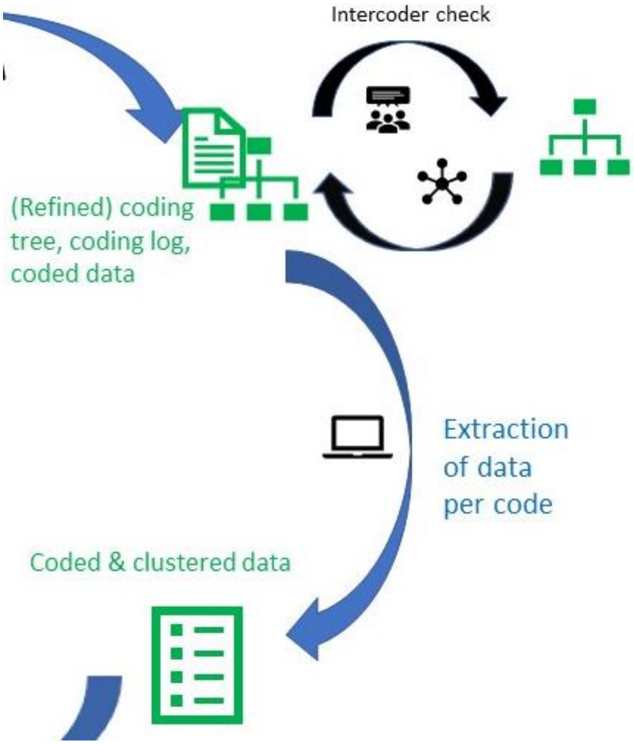
Intercoder check
(Refined) coding tree, coding log, coded data
Extraction of data per code
Coded & clustered data

Figure 6: Visualization of the extraction phase of data analysis (excerpt from fig. 1)

WHO?	The one(s) who will write the case development report
START WITH	Data coded according to the (refined and converged) coding tree
END WITH	Excerpts of text per code, visual representations (e.g. word cloud) etc.

At this stage it is time to start looking at what the coded data indicates. We are now starting to converge towards writing the results of the course cycle that you analysed data from. There are many possible ways to extract insights from the coded material and depending on the amount of data you have, we recommend different approaches. In either case, the first step is to group all the coded data by codes and by data type. If you didn’t make changes to the coding tree, you have 10 codes, which means that per data type (e.g. reflection documents, interviews, exercises), you should have 10 reports, one for each code. You can, of course, opt to ask for only one report for facilitation instead of three (facilitation, facilitation by students, facilitation by teachers).

If you have only a few pages of coded material per code per data source, you shouldn’t do any further grouping. You should then extract all quotes? per competence. (In NVivo, this is done by double-clicking each code/node). You should then proceed to the next step, which is analysis and discussion.

If you have a large amount of data per code, it might be a good idea to use some visualisation tools to help guide your further analysis.

ANALYSIS & DISCUSSION: Asking yourself “what do the data tell us?”

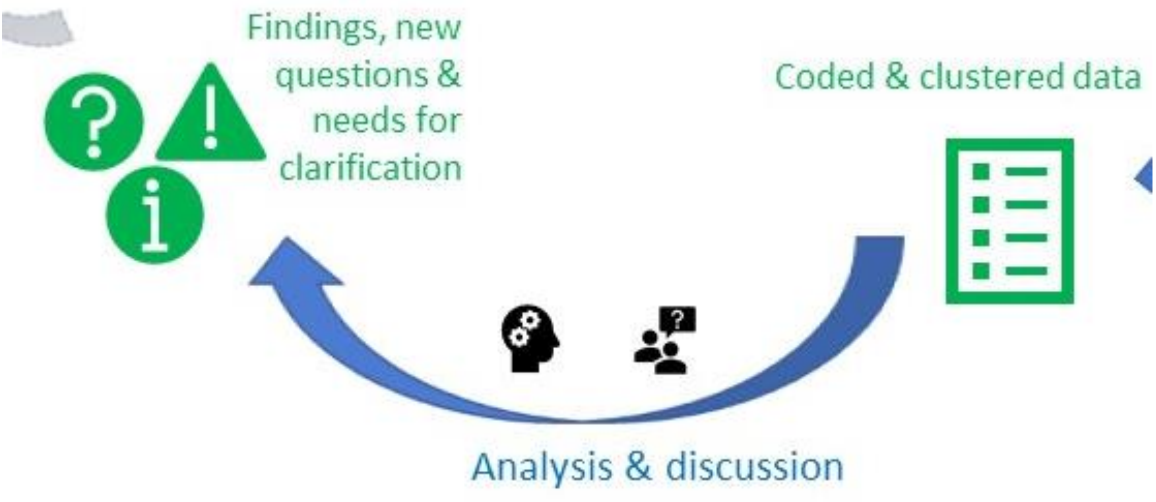

Figure 7: Visualization of the analysis & discussion phase of data analysis (excerpt from fig. 1)

WHO?	1st) Researchers who know the Nextfood approach (case leaders); 2nd)Everyone involved in implementing the Nextfood approach in your case
START WITH	Excerpts of text per code, visual representations (e.g. word cloud),…
END WITH	Preliminary findings, new research (sub)questions, needs for clarifications

You’ve now reached the final step before writing the case development report. It starts by reading through the clustered material and looking for trends, commonalities and discrepancies related to the research questions mentioned in the introduction. It is paramount to spend time and energy on this step and it cannot be left to an algorithm. NVivo and other software has functions for clustering, structuring and visualising the coded data, but as Bernard (2006:519-520, italics in original) points out, “Computer programs do a lot, but in the end, *you* do the analysis; *you* make the connections and formulate hypotheses to test; *you* draw conclusions and point them out to your readers”.

The first step you should take when analysing your coded material is to investigate the outcomes from the different data materials per code. Examples of useful questions to guide your analysis are:

- What components of the course seems connected to transformative learning based on what the students write in their reflection documents?

- How do the students describe competence development throughout the course?
- Which parts of the course are related to the development of which competences?
- How do the responses to the questions compare from the beginning of the semester to the end regarding competence development?
- How can the qualitative data help explain the results from the self-assessment of competences?

The answers to these guiding questions will enable you to start writing section 3 of the case development report where you are asked to answer the broader question of “What do the data indicate? Present your analysis in a structured and clear manner.”.

Throughout this process you will probably also realise ways you could have done either the data analysis or collection differently. This is why we recommend you to not stop after writing the case development report, but to go on to the next and final step in this instruction document.

LEARNING FURTHER: Going back to coding, or collecting new/additional data

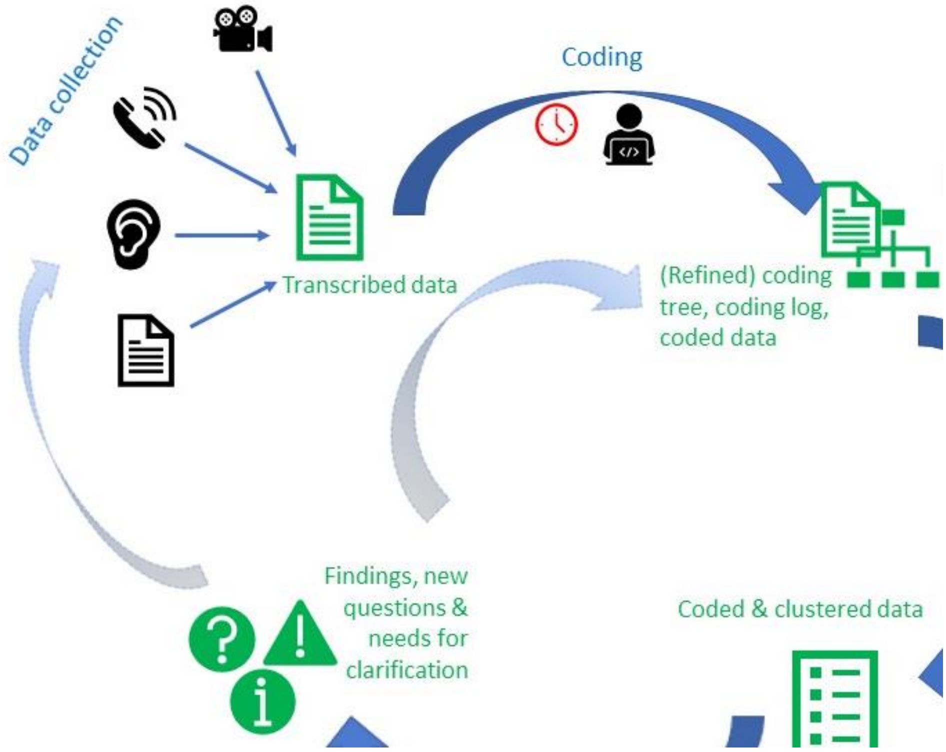
Data collection
Coding
Transcribed data
(Refined) coding tree, coding log, coded data
Findings, new questions & needs for clarification
Coded & clustered data

Figure 8: Visualization of the learning further phase of data analysis (excerpt from fig. 1)

WHO?	The researchers who conducted the data analysis and those who conducted the data collection
START WITH	Overview of the previous analysis and collection process
END WITH	Refined codes/analysis strategy for the data you had and/or new strategy for data collection for next cycle

At the end of a data collection and analysis cycle, it is important to evaluate the process. For some of you, this might have been one of your first attempts at analysing qualitative data and for all of us, this has been the first time following these instructions. So, how can we improve on the process for the next cycle?

We suggest that you take some time to review the process of data collection and data analysis. Ask yourselves the questions:

- How well did we follow the protocol with regards to data collection?
- How can we improve our data collection strategy to benefit our analysis of the case activities?
- How well did we follow the instructions with regards to data analysis?
- How can we improve our data analysis strategy to gain the maximum possible insights out of the data we collected?

Use the answers to these questions as basis for dialogues within your data collection/analysis team to determine the necessary changes you need to make. The sooner you do this after the analysis is done, the better you will remember the important details. And hopefully you have a coding log with many interesting remarks that can be used for this step too (and if not, maybe this can be a point of improvement for next cycle?).

Once you're done with this final step it is time to give yourselves a big round of applause and set your sights for the next round of data collection to begin.

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Appendix 3 – Instructions for analysis of numerical data

Instructions for data analysis – Numerical

Version 1.0

As mentioned in the Research Protocol (D2.1), rigorous data collection and analysis is paramount to the success of the action research in the Nextfood project. In order to ensure consistent data collection, the Research Protocol provides instructions on how to collect data from the activities carried out when following the Manual for Case Development (D2.2). Once the data have been collected, they need to be analysed in a consistent and rigorous manner in order to allow for fact-based improvement of each case and for cross-case comparisons. Our aim is therefore to provide you with clear instructions on how to analyse the data that you are collecting throughout the activities in your case.

With the instructions provided in this document we aim to support you in analysing the data that you have collected as **numerical data**. These are the the **data relating to or expressed as a number or numbers**. Please note that those data are only *expressed* as numbers, they are not numbers *per se*. Therefore, these numerical data cannot be analysed in a purely quantitative way, which some of you might be familiar with. We will explain the types of data and how to analyse them in detail in this document. For now, please bear in mind that “[a]nalysis is the search for patterns in data and for ideas that help explain why those patterns are there in the first place” (Bernard 2018:355).

In this document, we will first have a closer look at what kind of numerical data we have. Are they really numerical after all? Next, we look at how we can analyse the kind of data we have. Finally, we guide you through the analysis we suggest, in a step-by-step manner.

Contents

What kind of numerical data do we have?

In line with the Research Protocol, all cases should collect the following data:

- **Self-assessment of competences (**scale 1-9, representing “novice” up to “expert”**)**
- **Ranking of shifts (flipchart/whiteboard at workshops,** scale 1-10, representing “entirely according to conventional linear education system” up to “entirely according to a transformative and participatory learning model (NF approach)”**)**
- **Course evaluations** (scale 1-7, meaning “worst, inefficient” up to “excellent”)
- **Demographics**
  A. Number of students starting the educational activity (male and female)
  B. Number of students passing the educational activity
  ~~C. Educational background of students (high school, bachelor, master, PhD)~~
  D. Number of students with more than three years of experience in the field/business,
- **(Forthcoming: results of questionnaire for stakeholders,** scale 1-5, representing “I fully disagree” up to “I fully agree”**)**

Apart from the demographics, all these data are **scalings**. “*A scale is a device for assigning units of analysis to categories of [a] variable.* The assignment is usually done with numbers, and questions are used a lot as scaling devices.” Bernard 2018:254, italic in original). It is important to bear in mind that the respondent is the principal source of measurement error in this kind of data collection (Bernard 2018).

For example, in the self-assessment of competences, we can *scale* students per competence according to how they assess themselves for that competence. Thus, students are our “units of analysis”; the five core competences (observation, participation, dialogue, visioning and reflection) are the five variables we want to look into; and each of those variables has nine categories (“novice” up to “expert”).

Furthermore, these are all **single-indicator scales** (Bernard 2018:255), whereby we assign units of analysis to categories of a variable.

For example, in the self-assessment of competences, given that students can choose only one level of competence for each of the five competences, we assign each student per competence to one category of the variable.

Moreover, these data are scalings with scaling devices that produce numbers that have **ordinal properties**. This means that numbers represent words that represent position or rank in a sequential order (Wikipedia: Ordinal numeral).

For example, in the self-assessment of competences, someone who has assigned him/herself to “1=novice” for reflection and to “9=expert” for dialogue, is *less* competent in reflection than in dialogue (according to him/herself). However, we don't know if that person considers him/herself exactly 9 times less competent in reflection than in dialogue because we are working with an ordinal scale.

To sum up:

Our numerical data are scalings, collected using single-indicator scales with scaling devices that have ordinal properties.

How do we analyse those data?

Before we explain the details of how to analyse, let's have a look at the **research questions** again. The research question we would like to answer is:

How and to what extent do various educational activities enhance the students' abilities to deal with 'the challenge of the whole', including to take or facilitate informed action, and the competences considered necessary for doing so (observation, reflection, dialogue, participation and visioning)? (D2.1 Research protocol:11).

For example, based on the self-assessments of competences, we can gain insight into the extent to which a full course enhances students' competences (as assessed by the students themselves), for each of the competences, and averaged out over the entire student group. Please note that we are not interested in comparing between students. Rather, we would like to know if the course has a positive or negative effect on students' competence enhancement on average.

This means that we will do a **bivariate analysis** of the data we have. Most importantly, we would like 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.

For example, when analysing the self-assessments of competences, we will conduct a *t*-test to evaluate per competence whether the average for all students at the start of the course differs from the average for all students at the end of the course. This means that we will do five *t*-tests, one for each competence, whereby we compare the average for that particular competence at the start of the course with the average for that particular competence at the end of the course.

Doing a *t*-test: Comparing two means

First of all, we do a quantified structuring of the data. Then, we will analyse that structuring qualitatively. This means, that we will look at the numbers generated by the *t*-test and think through what they mean.

Bernard (2018:355, box 15.1): Data processing and data analysis:

Most methods for quantitative analysis – things like factor analysis, cluster analysis, regression analysis, and so on – are really methods for data *processing* and for finding patterns in data. Interpreting those patterns- analysing them, in other words-is up to you. Interpretation-telling us what findings mean, linking your findings to the findings of other research-starts with ideas in your head and comes out in words on paper. It's a pretty qualitative exercise.

Quantified structuring of the data

In Microsoft Excel, you can calculate the mean for the whole student group, for each competence, at the beginning of the course, and at the end of the course.

Then, excel can run the ***t*-test** for you.

Next, you can evaluate the **statistical significance** of *t* at different levels of statistical significance.

Statistical significance is expressed as a percentage, and gets the symbol (letter) P. Conventionally, $P < 0.05$ is referred to as 'statistically significant'. This means that your result is significant at a level below 5%, meaning that there is less than 1 in 20 chance that the result is wrong. Likewise, $P < 0.01$ is referred to as 'statistically very significant' (less than 1 in 100 chance), and $P < 0.001$ is referred to as 'statistically highly significant' (less than 1 in 1000 chance of being wrong).

If $P \geq 0.05$, your result is not statistically significant.

Qualitative analysis of the structured data

Now, it is time to look at the results of your *t*-tests and interpret them.

First, you should look for each competence if the difference between the two means is significant at level $P < 0.05$ or even better.

If the difference is **not statistically significant** for a certain competence, you can look into the dataset lying behind to see if there are major 'outliers' that might cause the insignificance. An **outlier** is a special case, for example one individual student whose self-assessment for that competence differs a lot from those of the other students. In that case, you can do a *t*-test for the **medians** for that competence. "The median is the point in a distribution above and below which there are an equal number of scores in a distribution" (Bernard 2006:563) and is less affected by extreme scores than the mean. If there are no outliers, that means your course has not caused a significant change in development of that particular competence in your students on average. This is an important finding! You can now think why that particular competence is not significantly developed in your course and what you would do different in the next cycle of your course to significantly improve the development of that competence. Or, maybe your students had (on average) assessed themselves already at the beginning of the course as experts in that competence and thus, there was very little need or room for further development. Other datasets can set light on your throughs as well.

If the difference is statistically **significant** for a certain competence, that's an important finding as well. Hopefully, the difference is a significant increase in development of a competence, and not a decrease. You can then look at other data sets and develop your own ideas about why your course has caused a significant increase in students' competence development for that particular competence.

ID card

Under the following points, you should briefly describe the essential information about the case. It might be useful to think of this section as writing the keywords for the report.

FILL IN:

Title, level of the course and course language

Host institution(s) and course leader(s)

Timeline of the activities covered in this report

Learner categories and number per category

Status

Under the following points, you should report how your case is developing along the essential shifts in the Nextfood approach (listed below). We suggest that you expand on and revise the descriptions that you wrote in the update prior to the Vienna workshop. It might be useful to think of this section as the abstract/introduction of your report. When expanding and revising your earlier descriptions, please do so based on the Data analysis section of this report. This means that you should try to revise and expand the descriptions based on the rigorous data analysis that you have done so far.

From the case updates ahead of the Vienna workshop we asked you to relate these four questions to each of the six shifts:

1)Describe the steps you have taken and their purpose.

2)What are the indications that these steps are having the desired effect?

3) What obstacles, if any, need to be addressed?

4)What I/we in our team need to learn more about is:

FILL IN:

From lecture hall to a diversity of learning arenas

From lecturing to co- and peer learning

From syllabus to supporting literature/a diversity of learning sources

From textbook to a diversity of teaching aids

From written exam to a diversity of assessment methods

From lecturer to learning facilitator

Data analysis

Under the following points, you should report from the analysed data that you collected during the implementation of the course activities. This section should follow the structure of the revised Research protocol (D2.1: p.12-13), and the analysis of the data should be done in line with its instructions. It might be useful to think of this section as the results and analysis chapter of your report. Please use the following instructions as guidelines for what to write under each data category.

1) Describe how the data was collected, transcribed, coded, clustered and analysed.

2) What does the data indicate? Present your analysis in a structured and clear manner.

3) Please describe any factors that might have affected the validity and reliability of the data.

FILL IN:

First week (day) of the course

Student’s understanding, contributions and expectations

Self-assessment of competences

Mid-course

Student’s understanding, contributions and expectations

Self-assessment of competences

Mid-term course evaluation

Last week (day) of the course

Student’s understanding, contributions and expectations

Self-assessment of competences

Final course evaluation

Students’ final documents

Stakeholder document(s)

Reflection document (individual)

Comments from the main stakeholder in farm, food, or forestry about

The direct usefulness of the student work (process and report)

The quality of the student work (process and report)

Teachers' final documents

Reflection document

Institutional factors affecting higher education

A written report of the focus group interview on institutional factors

Demographics

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

Number of students passing the educational activity

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

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

Cycle report

In this final section we ask you to summarise each of the cycles you have completed. Please describe the planning of the activities, the implementation and the reflection upon the implementation. The description of a full cycle should be approximately one page long. Focus on extracting valuable insights from your experiences. It might be useful to think of this section as the discussion/conclusion of your report.

Please use the following instructions as guidelines for what to write under each phase.

1) Describe what the most useful and inspiring aspects of the phase/activities

2) What were the main obstacles/challenges you encountered?

3) What are the lessons learned from dealing with the challenges?

4) What are your plans for how to move forward into the next cycle?

FILL IN:

Cycle n

Planning

Implementation

Reflection

Cycle (n+1)

Planning

Implementation

Reflection