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O2/A2 – UNDERSTANDING WHAT KIND OF TOOLS ARE NEEDED TO TEACH LOCAL AND SUSTAINABLE FOOD SYSTEMS

AUSTRIA – FRANCE - ITALY – PORTUGAL - SLOVENIA

SYNTHESIS REPORT

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SCOPE: This document is a synthesis report on the teaching tools needed to teach LSFS in the five countries.

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ACRONYMS AND DEFINITIONS

ACRONYMS	DEFINITION
EducLocalFOOD	Acronym of the project “Teaching local and sustainable food systems”
BOKU	University of Natural Resources and Life Sciences, Wien, Austria
CEZ/BN	Zootechnic and animal science training center/ National sheep center of Rambouillet, France
LSFS	Local Sustainable Food Systems
OEP	European Landscape Observatory Italy (Osservatorio Europeo del Paesaggio),
UM	University of Maribor, Slovenia
UL	University of Lisboa, Portugal
AVET	Agrarian Vocational Education and Training

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INTRODUCTION

Background

Considering planetary boundaries¹ loss of biodiversity², land system change³, biochemical flows, and climate change⁴ are at increasing and high risk. Moreover, malnutrition at the same time as the excessive weight responsible for obesity⁵ are recognised. In addition, unequal access to land and other natural resources⁶, the prevailing poverty among peasants⁷ and the concentration of richness and power by large food multinationals is clear⁸. Current global food systems contribute to these impacts⁹ and bring about the urgent need to reshape food systems in a sustainable way¹⁰, including bring food back into its socio-cultural and physical territorial context, i.e., localizing it¹¹. Local Sustainable Food Systems (LSFS) are at the crossroads of socio-economic and environmental potential impacts' mitigation issues, e.g., peasants' poverty reduction, local and national food security as well as access to healthier food and healthier ecosystems. LSFS can favour increased farm incomes, bringing together needs of producers and consumers, encourage rural development and local economies, while recognizing the value of small and medium-scale farm work.

Sustainable agriculture at local scale can contribute to reduce environmental footprint of food production and transport (when transports are optimized)¹² and protect local and relevant ecosystems benefiting also local cultural food, when considered as *“economically viable, ecologically safe, socially fair and humane. On the one hand, it contributes to the sustainability of the territory in which it is based through the multifunctionality of its activities and, on the other hand, to the provision of global environmental services (fight against climate change, air quality, food security, etc.)”*¹³. In Europe, there is the gap of adequate guidelines and training on LSFS for vocational training. Moreover, this plays a key role for the awareness and empowerment of producers, consumers and all the other value chain intervenient.

The main purpose of the *EducLocalFOOD* ERASMUS + project is to contribute to the improvement of existing Agricultural Vocational Education and Training (AVET) programs as to the content as well as to the quality of training/ education in itself, i.e., the pedagogical approaches and tools.

The **aim of the *EducLocalFOOD* project** is to contribute to professionalize and support teachers and trainers working in vocational agricultural education and training, whether at secondary level or at professional higher education courses, through the identification of the most suited approaches, and the building of pedagogical tools on LSFS. The approach integrates AVET teachers' participation as to tools and approach definition and pilot testing in AVET schools.

Three types of working reports are products of the *EducLocalFOOD* project: a Diagnosis of LSFS in each partner country and their comparative analysis (Output 1 – O1); a Diagnosis of innovative pedagogical

¹ Rockström et al (28), 2009

² IPBES, 2018; MEA, 2005

³ D'Odorico & Ravi, 2016

⁴ IPCC, 2014

⁵ FAO et al, 2018

⁶ UN-Women & OHCHR, 2012

⁷ Rapsomanikis, 2015

⁸ Constance, 2016

⁹ Hallmann et al., 2017; Sánchez-Bayo & Wyckhuys, 2019

¹⁰ Allen & Prospero, 2016

¹¹ Wiskerke, 2009

¹² ADEME, 2016

¹³ Zahm.F, 2015

practices in each partner country (Output 2 - Activity 1 / O2-A1) and; the comparative analysis of innovative pedagogical practices in a Synthesis report (Output 2 - Activity 2 / O2-A2). The present report refers to the O2-A2.

At the end of the project a training Toolkit will be built, based on the findings of those diagnoses, on the discussions and work at the International Teacher Training Meetings 1, 2 and 3 as well as based on the results of the testing of the pilot Toolkit. The tools within the Toolkit, as just mentioned, will be tested and assessed among educators in real situation with the students and the resulting assessment will be integrated in the end product of the project. The training Toolkit will be freely available from the *EducLocalFOOD* project's website.

The present report is organized in following parts. The *Introduction* presents the *EducLocalFOOD* project, the methodology followed to produce the findings here reported and the definition of innovative pedagogical tools considered. The *Agrarian Vocational Educational and Training National Structures* will be next described as it gives the context in which these pedagogical tools are to be introduced. The following chapter is dedicated to present the results gathered by each country from the exploratory research previously described in the national O2-A2 reports. Finally, a Discussion is held, situating the results in the framework of pedagogical tools previously presented in the introduction followed by the Conclusion.

Objectives and Approach

Education Systems put elements in place, creating and supporting, or not, the conditions for what can emerge in each school and from each teacher. As some partners pointed, the *Education Systems'* structure does not allow (or/and limit?) the necessary innovation to occur.

A few elements considered necessary to better understand the Agrarian Vocational Education and Training ¹⁴system in each country will be described in Annexe I. These elements are the kind of AVET provision existing and who provides it, in which school level and for which age range. Also, the general characteristics of the AVET offer, its length and in how many schools of the country. Finally, who is responsible for the *curricula* and in what way or not they include Sustainability Food Systems and LSFS related topics.

This document now is focused in defining AVET teachers' demands for LSFS approaches/materials. Its aim is to suggest tools for teaching LSFS in AVET. It was built upon the findings gathered by each country, presented in the O2-A2 national reports, which procedures followed a previously agreed methodology for the data collection and adapted to each partners context field.

Each partner conducted literature review, grey literature analysis and a focus group, or several individual interviews, with a sample of teachers, which varied according to each partner.

The focus group and individual interviews had the following aims:

- to identify the understanding of the present AVET teachers on LSFS (definition, description and best practices);
- to know how the present AVET teachers teach the topics of LSFS in their context and whether they consider them innovative and replicable;
- to identify the pedagogical approach and materials needed regarding LSFS.

After the focus group (for whom of the partners that did it), a questionnaire built by the consortium was applied to the teachers national sample. Different criteria were predefined to choose each sample. Mostly convenience criteria were applied.

¹⁴ Some elements are missing from the Italian AVET system.

The *Austrian* partner included 19 teachers from 15 different AVET schools (from seven out of nine federal countries in Austria). The *Slovenian* partner included four teachers and five students of biotechnical schools in the fields of agriculture, food industry, entrepreneurship and nature protection. The *Italian* partner chose its sample (how many?) from Italian AVET Schools/Training Centres.

The *French* and the *Portuguese* partners did not do focus-group and chose for individual semi-directive interviews to the teachers. The first partner built its sample of seven teachers through a process of selection according to specific criteria in order to assure: relevant experiences and interested teachers on LSFS and; teachers that taught areas concerned with LSFS, assuring the diversity of knowledge areas and of teaching experiences. The partner from Portugal identified two teachers in a Higher Education Institution offering a Higher Education Professional Course on Organic Farming, also involved in LSFS's matters, who were asked to define the sample. They selected six other colleagues from the same institution to be interviewed chosen accordingly the same criteria applied by French partner.

Then, a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis, aiming at identifying the needs for LSFS teaching in each country, was used to treat the data collected in the literature and in the field by the focus group and the survey. The SWOT analysis was a useful tool to put the results into perspective and underpin the thinking about pedagogical needs in teaching tools. To use such an analysis, questions were determined that lead to position the identified factors in each one of the 4 categories: strengths, weaknesses, opportunities and threats. Thus, the strengths of the practices corresponded to the inherent characteristics of the pedagogical practices, which enable the reaching of the learning objectives for LSFS teaching understood in O2-A1. Conversely, the weaknesses of the pedagogical practices were considered as the inner factors, which conduct to the failure of teaching a crosscutting and live issue as LSFS. Then, the opportunities corresponded to the positive and external factors, which help the development of LSFS teaching and reinforce the pedagogical practices now and further, while the threats were the external factors, which can break the development of LSFS teaching or the understanding of the thematic by students. By combining the identified several strengths, weaknesses, opportunities and threats, the results have highlighted the needs for LSFS teaching in each country.

Finally, a Teachers' Training Meeting (TTM₁), the first of three previewed in the *EducLocalFOOD* project, took place where two teachers working with each national team presented; what in their view are considered the needed tools to teach LSFS in the AVET system. In addition to the above-mentioned data, these results will also be brought forward.

Concepts

From the national reports synthesized in the O2-A1 Synthesis document presenting the *Innovative Pedagogical Practices* in each partner country, *innovation*, *pedagogic approaches* and *pedagogic tools* were defined, which will be retrieved in the following paragraphs. These concepts will aid the present report to shed light to the presented results as well as to discuss them.

In the field of pedagogy, **innovation** includes the changing and renovation or improvement of relationships, culture, perspectives, models and teaching practices. In this way, **pedagogic innovation** can be defined as a new way or tool that enables the transmission and acquisition of new knowledge or skills in a more effective way. **Pedagogic approaches** can be considered a theoretical basis for the planning and implementation of education. To this end, the pedagogical approaches consider and define the relationship between the content, the learner and the teacher"¹⁵, which determines the

¹⁵ Houssaye, 1988

planning and implementing of teaching & learning activities. **Pedagogic tools** can be understood as means through which teachers share information and guide learning (Lužnik, Davidović, Vovk Korže, 2019(a)).

The above-mentioned Synthesis Report O2-A1 identified a set of approaches and tools, presented below, from the literature and from the ones used by the teachers in the partner countries to perform innovative forms of education. **Three theoretical approaches** were identified as transversal to all the reports, with one of them being particularized in two other sub-approaches by their centrality in the national reports. In addition, **all or most of the partners mentioned four concrete pedagogical tools**. Following, these approaches and tools are enumerated as well as the page where its definition can be found in the O2-A1 Synthesis report, available at the *EducLocalFOOD* website.

APPROACHES

1. Transdisciplinarity (p. 22)
2. System approach (p. 24)
3. Active learning (p. 26)
 - experiential learning (p. 29)
 - problem-based learning (p. 32)

TOOLS

1. Digital tools (p. 34)
2. Fieldwork (p. 37)
3. Case studies (p. 38)
4. Project work (p. 40)



NEEDS IN TEACHING TOOLS AND APPROACHES IN THE FIVE PARTNERS COUNTRIES

This chapter intends to analyse and organize the data produced and presented in the national O2-A1 - *Innovative Pedagogical Practices in AVET and O2-A2 - What Kind of Teaching Tools are Needed to Teach LSFS* reports.

Data presented, as described earlier, includes data from SWOT analysis that identify the needs in teaching tools felt by the group of teachers inquired. It will also be presented the data collected during the session of the first International Teachers Training Meeting (TTM1), where the two VET teachers of each national team answered to the question; *What are Your Needs to Teach LSFS?*

Systems thinking require a new way of looking at data (Capra and Luisi, 2004). Figure 3 is a Spray diagram, also called mind map, a tool to dispose information, showing the connections between the different ideas. This type of diagram was chosen for the possibility of representing ideas connected around a central theme (Crowe et al, 2012).

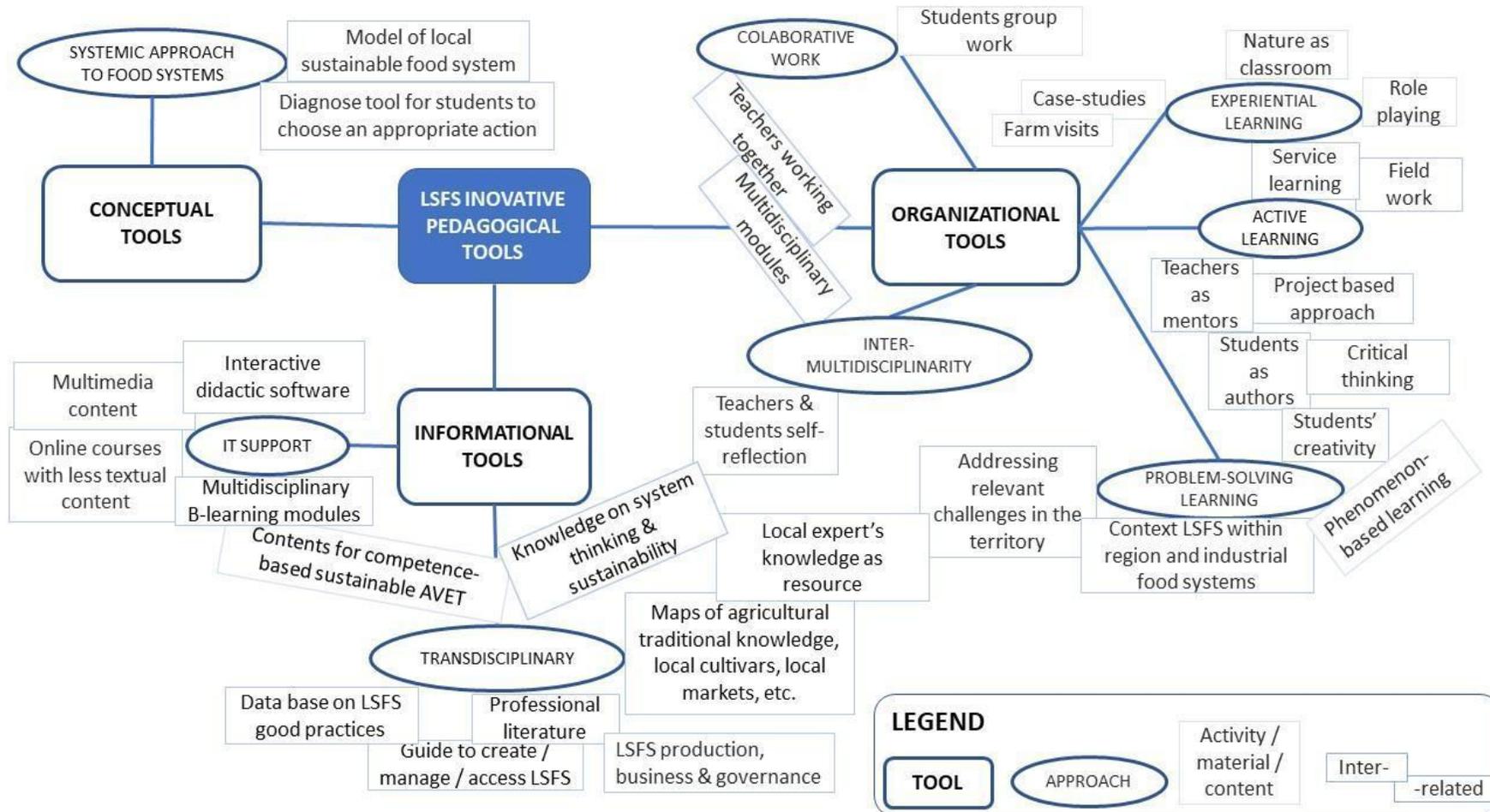
Figure 3 organizes the data in three different levels /categories: the first level of the **types of tools**; the second level of the **pedagogical approaches** and the third level of the concrete **activities and materials** teachers can organize and build. Figure 3 organizes the data considering the specific approaches, activities and materials teachers identified as useful to teach LSFS's.

This figure represents the “big picture” of the results of the inquiry to the teachers presented in the O2-A2 national reports. Also, the relationships existing between elements from each level/category as well as across, shows how the systemic/analytical view is useful to understand the data.

Data was organized following an inductive strategy using the different **types of tools** follow the proposal in the French National Report: a *conceptual* tool, an *informational* tool and an *organizational* tool. The first relates to defining a concept for a LSFS. The second identifies specific information related to the topic. The third identifies how teachers can organize their pedagogical work or how students can organize/ manage their project while professionals, in order to answer to a concrete challenge.

The suggested **approaches and pedagogical tools** in the O2-A1 Synthesis report: *Systems' approach; Transdisciplinarity; Active Learning; Experiential Learning; and Problem-based Learning*. It was also grouped by deducing categories from the data itself: *Collaborative work; Inter-Multidisciplinarity and IT Support*.

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As to the pedagogical approaches, the choice of isolating *Collaborative Work* derives from its double dimension, i.e., between students and between teachers. While most of teachers of the different countries mentioned group work among students, French teachers highlighted the importance of teachers from the different disciplines getting together to work and build multi and interdisciplinary teaching modules. *Transdisciplinarity* appears separated from *inter-multidisciplinarity* so to stress the dialogue between the schools and the territory. On the other hand, teachers have often mentioned inter and multidisciplinary and not *Transdisciplinarity*. *IT supports* was also put on the second level as the teachers' answers have detailed very concrete digital materials.

While some important relationships between tools, approaches and activities are obvious and don't need complementary explanation (e.g. students as authors and critical thinking), some need further explanation and others are not present, due to the limitations of the figure, as presented bellow.

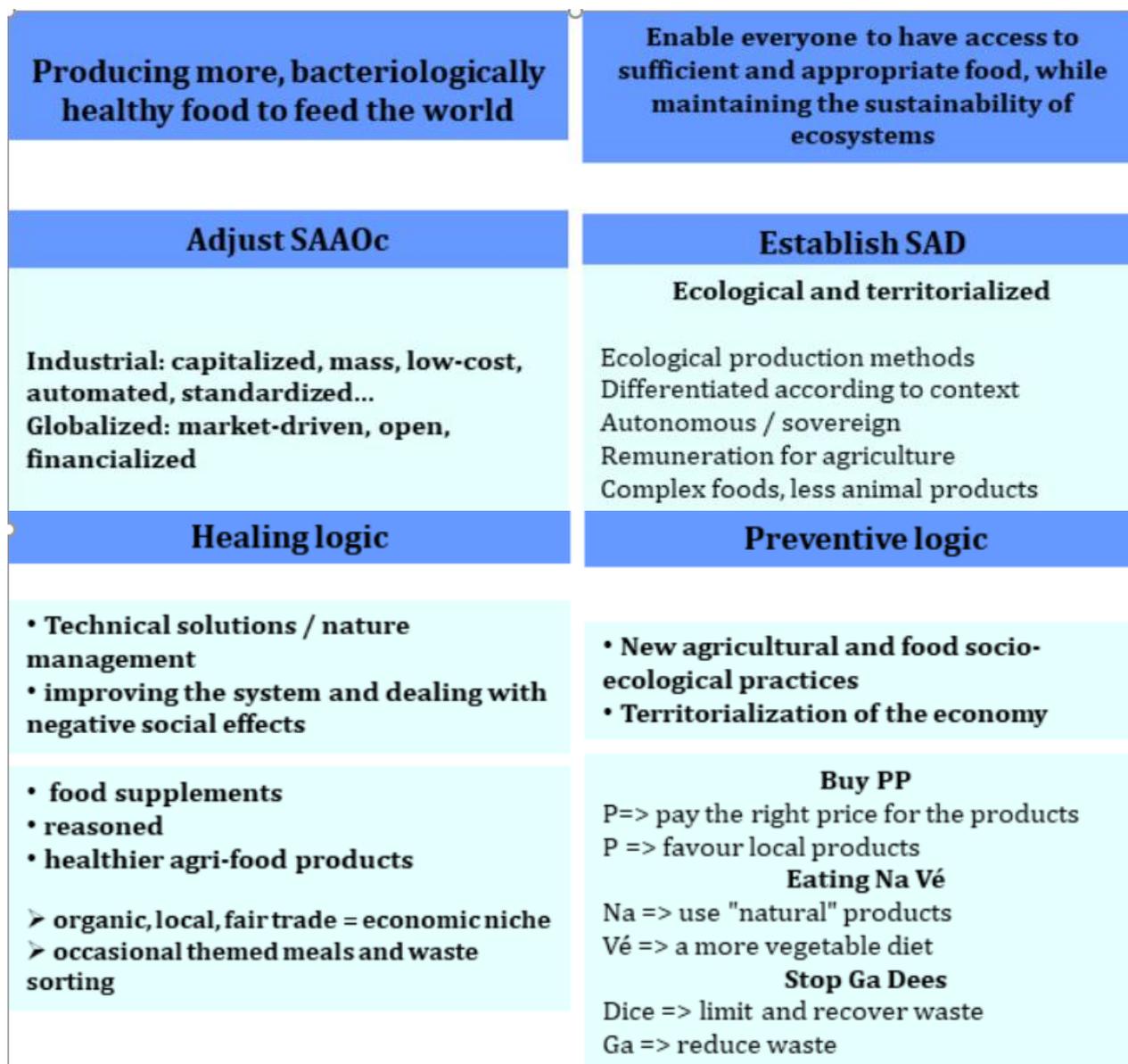
One relationship not so obvious is the *teachers' and students' self-reflection* and *inter- and multidisciplinary*. In fact, Austrian teachers mentioned how the need and novelty of an inter- and multidisciplinary approaches, due to the complexity of system thinking and sustainability knowledge, needs the space for reflection upon practices and situations, so the new can arise. And not only this space needs to exist but the *cooperation among teachers* is essential so *multidisciplinary teaching modules* can be built.

One of the relations needed to be pointed but not present in the figure is between the *systemic approach* and; *transdisciplinarity*, *local expert' knowledge as a resource*, *addressing of local relevant challenges*, *problem-solving learning* and *case-studies*. As pointed in the O2-A1 Synthesis, systemic thinking is intimately related with *Transdisciplinarity*, which evolves the recognition of other knowledge systems beyond academic disciplines, namely the expert's knowledge from the territory. These are essential to address the local relevant challenges while the *case-studies* are used as illustration of the problem to be solved in the learning situation.

Also mentioned at the O2-A1 Synthesis, *problem-solving learning* and *experiential learning* are both forms of *active learning*. Therefore, the items put under active learning are common to the other two.

Another connection present in the data but not in the diagram is between *contents for sustainable and competence-based AVET*, *knowledge on (...) sustainability* and *active learning*. As described in the O2-A1 Synthesis, active learning is competence-based.

As an example of a conceptual model of a LSFS, Gaborieau & Peltier (2011) recovered the proposal of Abel Coindoz & Égreteau (2008) shown below. This kind of tool was identified to address the fact that teachers show only partial information about LSFS, not considering a systemic approach.



Key: SAAOc – (from French) Occidental Agro-food system; SAD - (from French) Sustainable Food System

Figure 2 - - An example of conceptual tools - Two ways to pose and respond to the current food challenge (Adapted from Abel Coindoz & Égreteau, in Gaborieau & Peltier, 2011).

Figure 3 disposes the aims and problems addressed by each type of tool. It is then clear the rationale behind the choices.



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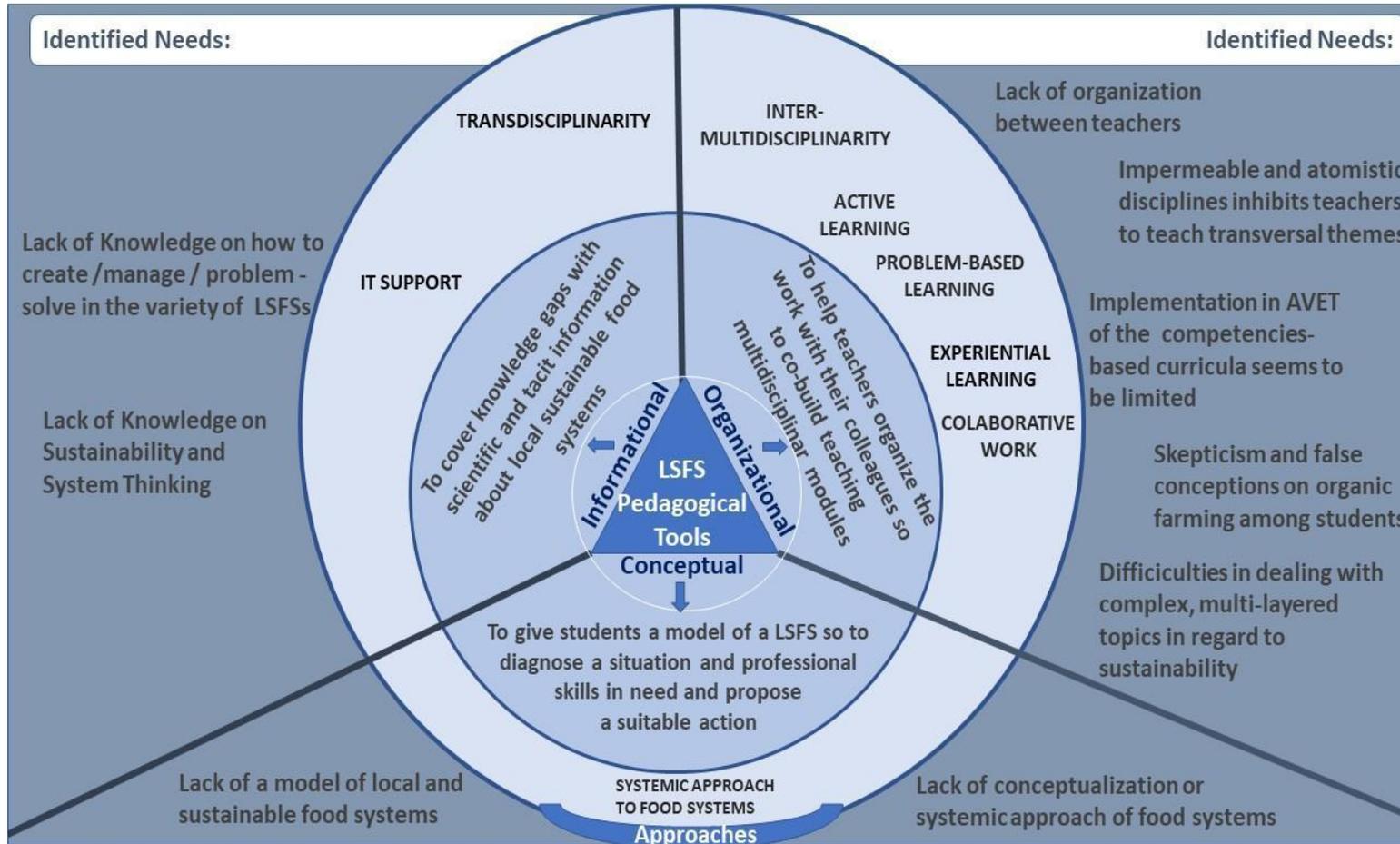


Figure 3 - Main results of the SWOT analysis: needs, aims, types of tools and pedagogical approaches (author's design).

Considering the three types of pedagogical tools at the central circle, there is the intermediate circle defining the aim of each type, and in the outer circle the pedagogical approach considered suitable to address the correspondent aim. In the external area corresponding to each type of tool it is the identified needs by the teachers.

The *systemic approach* to food systems is here considered in its ability to set the analysis point of view, and therefore gives support in the definition of one or various types of conceptual models of LSFS.

Transdisciplinarity is here representing the recognition of the different systems of knowledge, whether academic, indigenous, from local practitioners, and other. This explains why it is called to answer to the need of the knowledge gap.

Considering a systems approach and the transdisciplinary knowledge, the other pedagogical approaches come directly in aid of teachers to address the identified needs. Teachers need to organize differently among themselves in order to plan inter-multidisciplinary teaching modules, that use active, experiential and problem-based learning. No note that cooperation is not only considered among teachers and among students but also and most importantly, between teachers and students, as described further.

One word on *evaluation*. None but one partner mentioned *evaluation*. The Slovenian teachers pointed the great importance, although neglected, of testing acquired knowledge. Once again, *evaluation* is seen as testing knowledge, and the question about assessing competences is not posed.

DISCUSSION

The previous section diagrams' showed not only the elements collected during the inquiry to the teachers, but also the relationships we could establish between them. One missing connection was the interdependency between the tools themselves.

Figure 6 recovers the main results earlier shown but organized in a different way. This diagram intends to present the relationship between the three types of tools. Considering a *Conceptual model* of LSFS, the related *information body* is then identified and built, drawn from that model. Inquired teachers in the national reports have particularly mentioned the *systems approach* as the base to understanding and teaching about food systems, and therefore we can find it at the base of the triangle. The *Conceptual model* at the centre is also defined according to the *systemic approach*, as we have seen earlier. *Transdisciplinarity*, *IT Support* and *Phenomenon-Based Learning* take here the position of giving the form to the pedagogical action. The use of dotted lines simbolizes how all the elements are interconnected and interdependent.

Transdisciplinarity, embodying not only the *inter- and multidisciplinary* but also the dialogue between disciplines and non-academic knowledge, is one corner stone.

“since the 1980’s some agroecologists have been valued and sought to better understand the experiential agroecological knowledge of farmers as a necessary component to develop a more sustainable agriculture. (...) This empirical information, based on observation and practice, and which also integrates cultural aspects, was viewed as a source of knowledge to conceptualize and apply agroecology. (...) This approach is based on a platform for knowledge exchange and collaboration under conditions of mutual respect among cultures and knowledge systems.” (Mendez et al, 2015, p. 5)

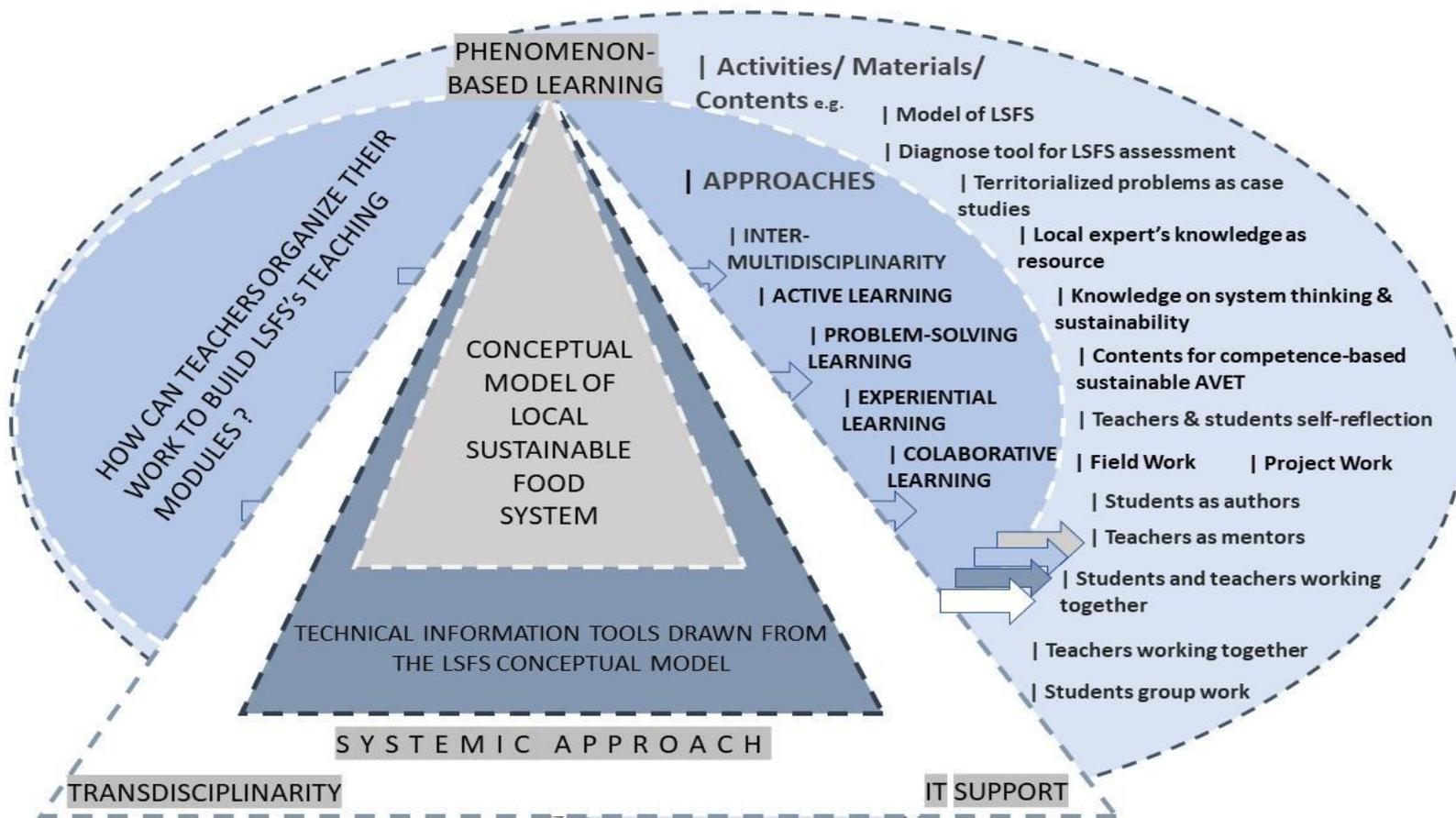
“Indigenous knowledge systems and peasants’ rationale gain unprecedented significance within this new agro ecological paradigm. (...). Some elements of this knowledge are now regarded as crucial to guide sustainable agricultural development. (Altieri, 1998)”.

To produce differently is imperative to teach differently. So new ways to organize the pedagogic work mean new ways to organize the teacher’s work, so to address the *transdisciplinarity* dimension, expressed in the dynamics and interrelationships present in the systemic approach to food system.



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Figure 4 - Relationship among types of tools and pedagogical approaches and selected concrete activities, materials and contents (author's design).



IT support comes as another corner stone by the possibility it brings of supporting active learning, positioning students as *authors* and *researchers* in cooperation. It is also involved in great enthusiasm among teachers and students and is receiving great support from governments to fulfil the learning society (European Parliament, 2000). According to Blewett (2016) digital learning follows four new pedagogical orientations, shifting traditional pedagogy into a new direction:

- from using content to creating content, digital pedagogy, not only offers ready-used information but allows also the creation of new content.
- from content to conversation, digital pedagogy creates the conditions that facilitate the dialogue and the co-learning.
- from correct to correction, digital pedagogy allows the permanent revision and update of information.
- from control to chaos, digital pedagogy allows the unfamiliar chaos created as a learning situation to reveal patterns and new possibilities of problem-solving.

So how can teachers organize themselves to build LSFS's teaching modules?

According to Østergaard et al. (2010) most of the elements presented in the earlier section, which were identified by the teachers, are considered in a Phenomenon-Based Learning, which is, e.g., shaping the MSc in Agroecology in the Norwegian University of Life Sciences.

*“A phenomenological perspective on students learning agroecology is relevant for three reasons. First, it prepares students for a broad and receptive **appreciation of the whole system**, thus complementing more narrow, concept-based education. Second, it explicitly emphasizes the **training of relevant skills and competencies**, integrated with ethics and values, thus complementing the students' cognitive competencies. And third, it **promotes the action aspect of learning and teaching**, thus bridging the gap between theoretical knowledge and **knowledge-based actions in real life situations**”. (p. 27)*

Although at referring to a higher education graduation it is possible to draw lessons to inspire AVET. Specifically because this approach is competence-based. The mentioned course has had to propose a different structure from the classical faculty course which implied a new organization among teachers towards a cooperative, inter- and transdisciplinary structure to foster learning for students, teachers and stakeholders, having as a main aim to support students to put knowledge into action (Lieblein et al., 2007 cited by Østergaard et al., 2010).

It is a two-year programme with different elements: it includes a course on Farming Systems and Food Systems components and an individually designed part between teachers and students, starting on the farm and the community serving as the open-ended case-study. This experience becomes the context for further discussion and learning, through lectures, facilitated plenary discussions and group work. There is a group of core teachers that supports the students' learning and the linkage with the discipline teachers, who are called to fill in the knowledge gaps that students bring after the immersion time in the case study.

This new course structure and role of teachers' demands new expertise, mainly from the core teachers, such as facilitation skills, group dynamics and conflict negotiation. Not only to facilitate the dialogue among and with students but also to frame the discipline teachers in an inter- and mostly in a transdisciplinary way of teaching.

In one way, phenomenology is the act of constant **reflection** on the present experience. Phenomenon-based learning arose as an alternative, by putting attention to what is taught, whether natural phenomenon or a specific subject, the connection between the students and their learning and the teacher's own learning and self-reflection (Østergaard et al., 2008 cited by Østergaard et al., 2010).

“Learning by acting in the world is thus a process of reflecting on actions, as they appear in one’s own experience, and their links to theory, which is a prerequisite for transforming knowledge into action” (Østergaard et al., 2010, p. 29).

It is clear that in a teachers-centered learning, problem-solving is leading to already known answers, aiming at reproducing the teachers’s knowledge. Rather, addressing “open-ended” problems can spark student’s creativity and authorship.

The goal of student learning (both individually and in groups) is not to uncover answers already known by the teachers; instead, teachers and students will engage in a joint process to learn about complex, ambiguous situations (Francis et al., 2001 cited by Østergaard et al., 2010).

The immersion within the context of the **case study** can be the *phenomenon* to reflect upon the lived experience: the real live experiences are not to serve the understanding of disciplines in class but the actual starting and ending point of learning. It is then possible to **connect two knowledge systems** from two different communities: academia and stakeholders.

“The integration of the stakeholders and their competencies is a crucial element of both action learning and phenomenon-based learning” (Østergaard et al., 2010, p. 29).

As teachers in TTM1 have mentioned, there is the need to know *how to build a case study* in order to serve *action learning, real problem-solving and transdisciplinarity*.

Successful **experiential** and **action learning** promotes an open **co-learning** atmosphere where everyone is a participant in defining the issues and seeking alternative solutions for the future. In contrast with traditional class settings based on transmitting information through lectures, experiential and action learning utilizes **multiple sources of information** and interaction among the participants, promoting not just **interdisciplinarity** but **transdisciplinarity** (David and Bell, 2018, p. 4).

CONCLUSION

To conclude, we have seen how inquired teachers in each partner country presented in the national O2-A2 reports and AVET teachers (part of each national *EducLocalFOOD* team) agree with the view found in literature for the need to teach differently, so to support the conversion of conventional agricultural practices into a sustainable and social just food production.

As presented, the five approaches *Systems thinking, Transdisciplinarity and Active learning: experiential learning & problem-based learning* and the four tools *Fieldwork, Case studies, Project work and Digital tools* mentioned have been confirmed as adequate.

Anchored in a *systemic approach* to study agriculture and food consuming a *Concept of "what is a LSFS"* is the vision guiding the future practitioners. A *diagnose tool* conceived to assess what action needs to be taken to make the concept come to reality can support students in choosing the appropriate action. *Inter and Transdisciplinarity, Action learning, Experiential education, collaboration work among teachers, among students and between teachers and students as well as Reflexivity* are key to a new way of learning and able to prepare to deal with *complex wicked problems* such as climate change, loss of biodiversity and social inequality, to name a few.

Open-ended case studies with real life problem situations identified in the territory can give the material to enable students to put knowledge into action. Furthermore, it can accomplish the territorialisation of educational institutions, by putting these academic knowledge centers to serve local *problem-solving as educational situations*, while respecting and valuing other forms of knowledge. It is then needed a **platform for dialogue** among different knowledge systems, so to use the great resource local experts can be.

Digital tools potentiate *students' creativity, authorship and cooperation*. All these elements shifts the traditional education settings and roles, by placing *students as authors and teachers as mentors*, demanding teachers to adopt different attitudes, in the way of more *cooperation among themselves and students*, and in the way of a more reflective attitude.

Phenomenon-based learning seems to be the adequate educational frame to foster transformative agroecology learning (Gimenez & Altieri, 2013) in direction of food sovereignty, for a world with social and ecological justice with empowered citizens usually not heard such as students and peasants.

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ANNEX I - AVET SCHOOL EDUCATION SYSTEM IN THE 5 PARTNERS COUNTRY

AUSTRIA

In Austria , as illustrated by Figure 1 AVET is taught at *Secondary Level II* when pupils are in an age between 14 – 18. In Austria there are several opportunities for students to attend the *School for intermediate Vocational Education*, as illustrated in the next figure. These schools also act as *Part-time Vocational Schools* if the students undergo an *apprenticeship* - dual system, which offers young people, between 15 and 19 years - with a solid vocational training in one of 200 training professions. The *apprenticeship* is the right choice for all those who prefer to follow a practically based programme of training in a workplace, involving in-job training in a company setting. Trainees spend around 20 - 25% of their apprenticeship in the technical or vocational school, where they acquire the theoretical knowledge required in their profession. Students attend *Schools for intermediate Vocational Education* between two to four years, depending on the course’s length.

There are around 96 AVET schools in eight Federal states (Bundesländer; in all federal states of Austria with the exception of the capital, Vienna). Institutionally, the responsibility about the curricula (and so teaching implemented) is also with the federal governments. The University College for Agrarian and Environmental Pedagogy in Vienna supports them and is responsible for education of AVET teachers – both as students after the specific secondary level (as BSc students) or as continuing education for teachers already working at AVET schools.

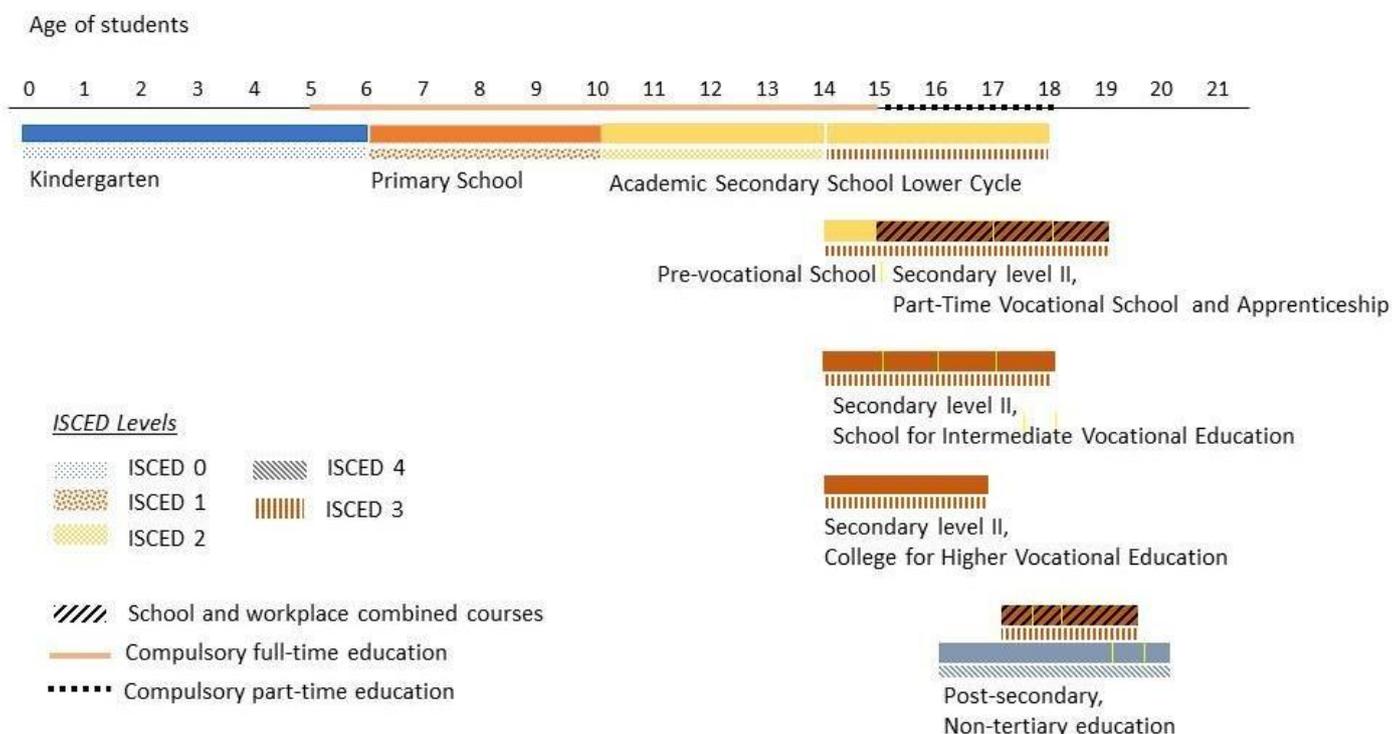


Figure 5 - Austrian VET system (source: author’s design adapted from the EURYDICE schema).

In 2014 representatives of all federal states and the University College for Agrarian and Environmental Pedagogy approved the model of competencies as a basis for all new competence-based curricula – The **Green Pedagogy** - in AVET in the federal states in Austria. The introduction of competence-oriented

curricula in AVET is a paradigm shift and represents an innovation at the pedagogical level as it “offers teachers the opportunity to design their teaching according to learning outcomes and not, as in the past, according to content. It is no longer necessary to place the learning material at the centre of the teaching process and to “push through” as many contents as possible, but rather the progress made by the learners is decisive for lesson planning and design.” (Forstner-Ebhart & Haselberger, (6) 2014,) (own translation from German into English).

Based on the educational standards, which are interdisciplinary and multidisciplinary core competencies, that should be acquired through the learning process, the model of competencies describes the overall professional action competence what a graduate of AVET should acquire in a specific profession. Based on this model of competencies, concrete learning examples can be elaborated.

FRANCE

In France, AVET is organized by the General direction of teaching and research (DGER) within the Ministry of Agriculture, Food and Forest. Each curriculum is described in a frame of reference comprising modules and each module corresponds to several learning objectives. It ranges from 16 to 23 years old and is provided by public and private institutions. In the public VET system there is 310 providers, which 96 offer apprenticeship trainings (dual learning).

Figure 2 describes the AVET structure. Vocational highschool is divided into 3 levels before the diploma (named Baccalaureat (BAC)):

- The first level is named “Seconde”;
- The second level is named “Première”;
- The third level (last one) is named “Terminal”. At the end of this year, you take the exam, the BAC.

As shown in , one can be in a vocational “Seconde” and continue to a vocational BAC named “Baccalaureat professionnel” (BAC pro) where one can choose among different specializations: Agri-business management (CGEA), equipment, landscape management and others ... Or be in a “Generale Seconde” and choose between:

- BAC techno, literally “technologic Bac” named Life and agronomic sciences and technology (STAV) in which students choose specialisation such as productions landscape management, equipment, processing or services.
- BAC general: same courses than a general scientific training (not vocational) but you are in a vocation school

Then, can decide to continue studying and choose:

- BTS: Vocational training certificate (2 years of study= BAC+2). Here also it is possible to choose a specialization: Analyse, management and strategy of the farm (ACSE) / Animal production (PA) / Vegetal production (PV) / Agro equipment / others
- DUT: Technologic university diploma with different specializations

With the following 2 diplomas, there is the opportunity to continue to higher education:

- The professional degree (BAC+3) which still belongs to the vocational education or,
- An engineer diploma or another 5-year-study diploma (master degree) which belong to the “superior not vocational education” and which is out of our target (VET school)

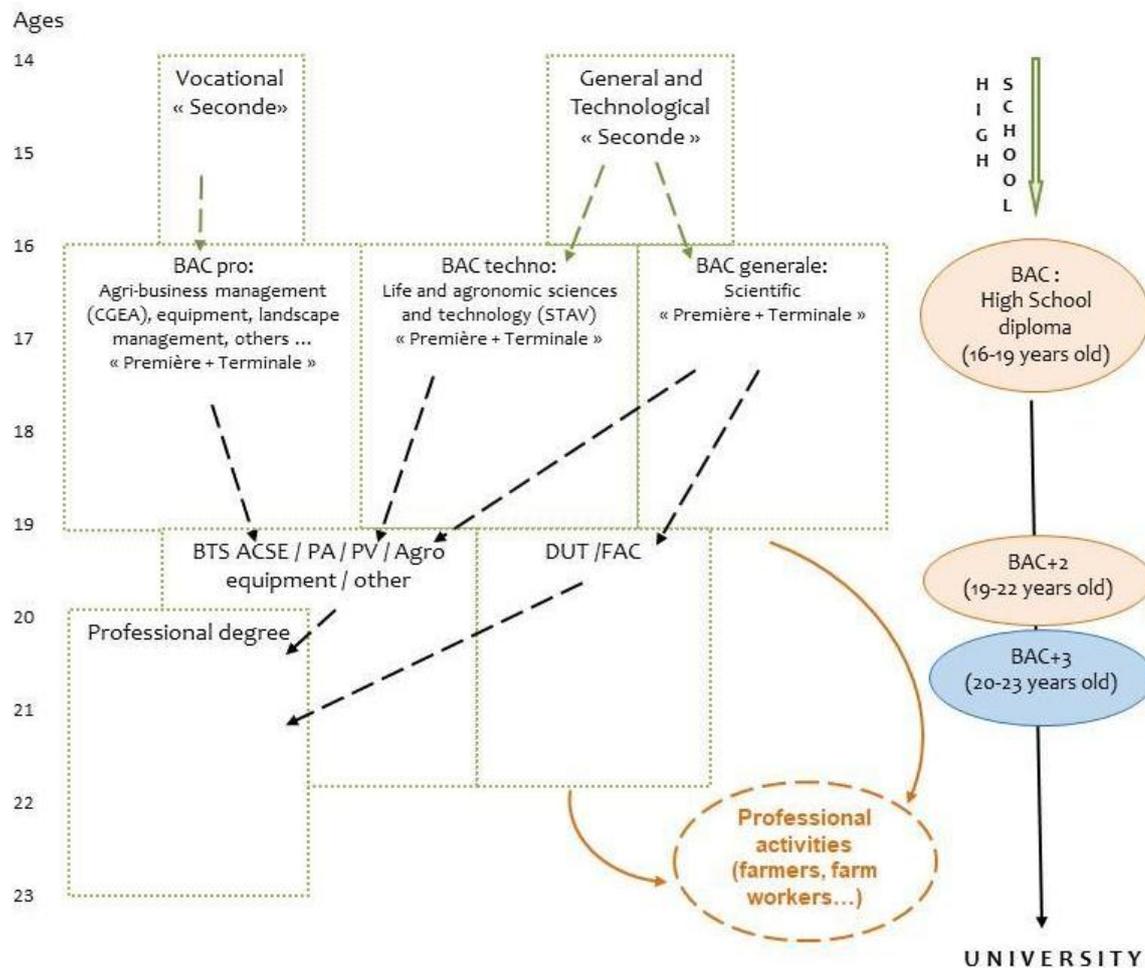


Figure 6 - French VET system (source: author's design adapted from the French National Report).

As a follow-up of the *Loi d'orientation agricole*¹⁶ (1999), the *Loi d'avenir pour l'agriculture et la forêt*¹⁷ (2014) tries to guide agricultural practices towards agro-ecological logics, more than techno-economic logics (Griffon, 2006). The strategical plan of the DGER¹⁸ « teaching to produce differently » (EPA) is thus available in four axes¹⁹. Among these, two may relate to pedagogical innovation: restyle the graduation curriculums and the pedagogical practices; train staff from schools and from professional agricultural training in order to promote sustainability of production systems²⁰. Thus, the agricultural teaching must adjust and valorise multidisciplinary teaching approaches and reinforce the connection between teachers and farms in order to take into account the complexity and the plurality of production systems. To this end, AVET school are accompanied by several systems among which there are animators specialized in a thematic as agroecology, food system, energy, etc... and by entities as the *Bergerie Nationale* through a Training plan for teachers.

¹⁶ Agricultural orientation Law

¹⁷ Avenir Law for agriculture and forest

¹⁸ General Department of Agricultural Education and Research

¹⁹ See <http://www.chlorofil.fr/enseigner-a-produire-autrement/le-plan-enseigner-a-produire-autement.html>.

²⁰ For further information, the reader can refer to Isabelle Gaborieau's work for Euro-EducATES, p.25-28

Despite the DGER's will to approach sustainability in the agricultural teaching by the restyle of curriculums, none of them approach directly or in a systemic way the LSFS. The modules approach LSFS is in a segmented way with focus on food processing, cultural and territorial food or agroecological farming practices.

ITALY

The AVET offer is very high and distributed to all levels of education, from primary schools (with awareness programs included in POF-Programmi Offerta Formativa), in the secondary ones (in particular those that propose agricultural studies), up to university careers and the Masters of Science. In particular, the organic farming is the main driver of many LSFS teaching practices in Italy.

The AVET pedagogical practices in LSFS in Italy are very linked with agro-ecology and organic farming (as described in Report O2-A1 – Innovative pedagogical practices in vocational education and training – Report Italy). We report below some of the most interesting experiences.

The Educational Farms (*fattorie didattiche*), are working farms, most with rural tourist facilities, offering educational activities as part of their normal work. The qualification of Didactic Farm is given by the regional administration. Their educational approach is based on practical activities related to sustainability. Normally the pedagogical sequence provides a description of the context in which the farm is located (also using videos, posters, maps, etc.), a description of the production system used (organic, biodynamic, etc.), laboratories on the preparation of local foods (e.g. bread and pasta made from ancient cultivars), visit to the farmer's shop, tasting of the products.

IFTS – Higher Technical Education for the eco-sustainable management of the regional agro-food chains and of the Eno gastronomic tradition – offers a Level 5 EQF certificate for students from 18 years old. It is a joint training course promoted by the school, university, organic farms, an international network and the local bio-district promoted by school (Cicerone), university (Salerno), organic farms, and International network of Eco Regions. It lasts for 800 h. The aim of the course is to train experts in sustainable management of the territory for the local production

In general, with regard to the current teaching practices in the AVET Italian schools, they include many **contents** characterizing the LSFS, linked to the four fundamental aspects of territorial approach, reduction of the distance between the place of production and the place of consumption, direct contact between producers and consumers, sustainability.

PORTUGAL

Agriculture Education and Training in Portugal takes different forms according to the different target groups. Young people are trained in the *professional schools* from 14 until 23 years old, getting the level 4 / secondary school level certificate, or in the *employment institute's training centers*, from 18 years onwards, which can obtain the level 2 / basic education level or level 4 / secondary school level, whether choosing for the course of *Farm Operator* or *Farm Technician*. Higher education offers the *higher education vocational courses*, which will be under analysis further in this report, from 18 years onwards. This course gives the level 5 certificate and a conclusion diploma without a degree. In total, there are 20 specialised Agriculture Professional Schools.

As any VET course, the AVET consists as an option for those students looking for an alternative to regular academic education leading to higher education. Whether VET courses are delivered by regular secondary schools, professional schools, training centers or higher education institutions, all are distinct from regular education in a strong practice oriented approach and an intentional link with the local

labour markets (Rodrigues et al., 2018). It is visible by the lower number of hours in the study plans dedicated to general and scientific matters and the increased number of hours dedicated to technical matters. Furthermore, all include specific hours dedicated to the in-job-training that vary according to the type of course: *Professional*, *Apprenticeship* or *Education & Training for Youth*. Courses last between three years.

The curriculum is under the responsibility of the National Agency for the Qualifications and Professional Education, under the advisory of the Ministry of Agriculture and Sea. The National Catalogue of Qualifications includes several Training References related to Agricultural and Animal Production, Floriculture and Gardening, Forestry and Hunting, Fisheries (Aquaculture), Food Industries, Environmental Protection, Tourism and Leisure and Handicrafts, which translate into courses of qualification that can be attended in the network of public and private training entities of the National Qualification System (SNQ), naming those providers above mentioned.

Under the scope of our EducLocalFOOD project, the training areas of interest are mostly those corresponding to the training courses in: Agricultural and animal production; Floriculture and gardening; Beekeeping, Forestry and hunting and; Fisheries (as listed on the site of ANQEP, 2019).

As far as agricultural vocational education is concerned, there are several Agricultural and Rural Development Vocational Schools in Portugal, which do not teach any course dedicated exclusively to organic production (Presidência do Conselho de Ministros, 2017).

Although the vocational education and training references in the National Qualifications Catalogue include organic farming training units, it is optional and come in opposition to the dominant agribusiness model taught in the qualification references of the farming technician or operator, where an organic farming specialization could be organized, if a school chooses to. The same is true to the short chain marketing circuits, which does not specify sustainable agriculture practices. Now, there is no AVET course for farming technics or operator specialized in organic farming.

However, the Organic Farming National Strategy previews a specific measure to adequate training and teaching in organic production. It aims at improving the existing training standards for the development of these skills, to build a network of professional training infrastructures and higher education in organic production with certified areas and to promote training with a practical component in vocational educational courses in organic production in the referred infrastructure network (Presidência do Conselho de Ministros, 2017).

SLOVENIA

In Slovenia, the planning and implementation of education is the responsibility of the Ministry of Education, Science and Sport and of the Ministry of Labour, Family, Social Affairs and Equal Opportunities with respect to adult education and training. The Ministry of Agriculture, Forestry and Food (MAFF), in cooperation with sectoral organizations and social partners, addresses issues related to education in the fields of agriculture, forestry, the food industry, fisheries and veterinary medicine. Through the application of various measures, MAFF supports educational institutions in implementing regular and part-time formal education programmes. The transfer of knowledge and innovation, environmental concern and climate change are included as horizontal objectives in all five-priority action areas of the Rural Development Programme 2014-2020 (RDP 2014-2020). As a social partner, MAFF also participates in the creation of vocational and professional education programmes (MAFF, 2019). The Institute of the Republic of Slovenia for Vocational Education and Training (hereinafter: the CPI) is the central national institution in the field of vocational education and training. It is responsible for linking

social partners, and provides support in developmental, research, implementing and systemic processes that contribute to the quality of vocational education and training for the citizens of Slovenia in the context of lifelong learning (CPI, 2019).

All programmes are prepared on the basis of one or more occupational standards, they are modularly structured and competence-based, with an emphasis on connecting general knowledge, theoretical specialist (technical) knowledge, and practical knowledge. The programmes are credit-evaluated and provide an opportunity to obtain national vocational qualifications.

Upon completion of compulsory basic education, pupils – typically aged 15 – have the option of pursuing upper secondary education. This takes two to five years to complete, and it does not entail tuition fees (Eurydice, 2019).

Individuals can pursue vocational and technical upper secondary education through a range of programmes at different levels of difficulty:

- short upper secondary vocational education (2 years)
- upper secondary vocational education (3 years)
- upper secondary technical education (4 years)
- upper secondary vocational-technical education (2 years)
- and vocational course (1 year).

The goal of these programmes is to obtain specific occupational qualifications to enter the labour market or – in the case of four-year programmes – to continue education at the tertiary level.

Educational programmes are based on vocational standards that are prescribed in response to the needs of the labour market. The programmes consist of general subjects, technical modules, practical training and content determined by each school in cooperation with business companies. The vocational-technical and technical programmes conclude with the vocational matura exam, whereas the vocational programmes conclude with an internal final examination (Eurydice, 2019).

It was found that LSFS-related contents are also included in various school projects such as eco-school, UNESCO's school, and healthy school, with the aim of raising awareness and enhancing knowledge among young people and the local population about key environmental and societal challenges (climate change, sustainable development, safety and security in society, access to renewable resources, food security, etc.).