

The roles of training and research

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Embracing an ecology of food has implications for the worlds of training and research. Changes are already under way, in terms of both the subjects addressed and the way in which this is done. We share a few avenues for reflection on these changes.

The food systems of tomorrow will be built and governed by the students of today. While much reflection and many initiatives are emerging around sustainability training, there is a pressing demand for this trend to accelerate, particularly from students themselves (Lebard, 2021). The challenge is twofold: to provide training in the resolution of sustainability problems and to train differently, since resolving these problems requires approaches different from those that have prevailed until now. In this sense, we can say that there is a need for a training transformation and therefore a need to transform training for transformation.

Towards a transformation of training for sustainable food systems

Several studies have recently investigated the issue of training for transition – in the broad sense of an ecological and social transition – in higher education. The Transition Campus, created in 2018 by a collective of lecturer-researchers, entrepreneurs and students, is a training centre as well as a research laboratory working ‘on new pedagogical practices for teaching complex thinking and processes of systemic change’. Following the commissioning of a study by the French Ministry of Higher Education and Research in 2019, this laboratory coordinated a group to ‘carry out interdisciplinary work to develop a shared

knowledge and skill base to which all undergraduate students should have access'. The result of this work (Renouard et al., 2020) establishes a 'pathway' involving different 'points of entry' available to private citizens, individual students or teaching programmes: 'acquiring a systemic view in order to inhabit a common world (*oikos*); discernment and decision-making for collective life (*ethos*); measuring, regulating and governing (*nomos*); interpreting, critiquing and imagining (*logos*); collectively rising to the challenges at stake (*praxis*); and reconnecting with oneself, with others and with nature (*dynamis*)'.

Even more recently, at the request of the same ministry, Jean Jouzel and Luc Abadie (2020) submitted a report detailing the measures to be taken to 'ensure that, within a short space of time, 100% of students who complete an undergraduate degree will have received training on the challenges, pathways and tools of the ecological transition'. This will also involve establishing a skills matrix – which is currently being defined – in consultation with higher education institutions.

What challenges must courses dedicated to the transformation of food systems tackle? The Advanced M.Sc[®] in 'Innovation and Policies for Sustainable Food' (MS IPAD)¹ can serve as an example. It was created in 2011 by L'Institut Agro Montpellier and the French Agricultural Research Centre for International Development (*Centre de coopération internationale en recherche agronomique pour le développement*, CIRAD) in close collaboration with the UNESCO Chair in World Food Systems. As a 'post-master' or 'post-engineering degree' course, it aims to train senior managers who will go on to work in companies, non-profits, consulting firms, support organizations, local authorities, ministries or international organizations to transform food systems. To this end, several choices have shaped this training course:

- Since its creation, it has been open to students and professionals with diverse backgrounds and experience who are not necessarily from agronomic fields, so as to maintain the interdisciplinary and intersectoral dialogue necessary for the food transition throughout the course. Graduates must be able to act as innovation pilots by facilitating and coordinating heterogeneous systems of actors.
- It constantly seeks to articulate scales from the local to the global, from territorialized citizen initiatives to international coordination efforts, including local food policies and especially urban food policies.

¹ <https://www.institut-agro-montpellier.fr/ipad>

- It emphasizes the need for a detailed understanding of context (at different scales) and for appropriating impact assessment methods (by seeking to aggregate the different dimensions of sustainability).
- Finally, it leaves as much room as possible for group work, participation and debate among peers and with the lecturers, as well as within the alumni community, and for acquiring communication skills.

In parallel, since 2011, the UNESCO Chair in World Food Systems has been running an annual seminar on contemporary food issues open to all students. This seminar was created at the request of the course convenors of the Montpellier Master's programmes to provide highly specialized students with a general framework regarding food system sustainability and to give meaning to their training. The seminar is now attended by students from about ten different master's programmes in agronomy, economics, political and social sciences, genetics, food technology, architecture and urban planning and related disciplines.

Towards connective research

Just as training is evolving, so, too, is research, both in its aims and in its working methods. Recent reflection on how to build a 'science of sustainability' provides interesting insights to grasp this evolution. Based on an analysis of 1,129 publications that claim to belong to the discipline, Julien Blanco and Clémence Moreau (2021) identify three founding pillars of sustainability science: understanding socio-ecosystems and their dynamics; co-constructing knowledge across disciplines and with stakeholders; and achieving transformation by embracing sustainability science's inherent commitment to transforming the relationship between humans and their environment. In their defence of a science of sustainability, four researchers and directors from the Research Institute for Development (*Institut de recherche pour le développement*, IRD) also set out ways of 'researching differently' (Verdier et al., 2020). Based on these perspectives and linking them with proposals for an ecology of food systems, we suggest the term 'connective research' to capture current developments in the world of research.

As part of the drive to contribute to the transformation of food systems, research programmes geared towards solving problems are multiplying. This is what institutions such as CIRAD call 'targeted research'. While these programmes recognize the value of more fundamental research, they differ from the exploration of scientific disciplines. However, some projects targeted at resolving specific problems still struggle to obtain funding if they cannot guarantee to

enhance the international competitiveness of the teams proposing them, a competitiveness that mainly hinges on progress on academic scientific fronts. Building and running targeted research programmes means embracing advocacy research (Chapter 10), the aim of which is no longer simply to grow knowledge for its own sake but to solve a problem. The broad issue of interest to the science of sustainability, as proposed by Olivier Dangles at the IRD, is the development of societies within a circular band delimited by ‘planetary boundaries’ (Rockström et al., 2009) on one side and the social floor ‘made up of the basic needs and minimum determinants of well-being that should enable all to lead a dignified life’ on the other. These two boundaries define the doughnut-shaped ‘safe and just space’ within which humanity could flourish (Raworth, 2012).

Such a targeted research perspective requires connecting researchers with other actors (Chapter 9). The complexity of the problems to be solved and the need to take into account the effects of possible solutions on different dimensions of sustainability call for the mobilization of different disciplines. This is what the ‘Urbal’ method, which identifies the effects of food innovations on the different dimensions of sustainability, strives to do (see Box 21.1). While pluridisciplinarity often provides a starting point, articulating the results from different disciplines paves the way for interdisciplinarity (see Box 21.2 below on pluridisciplinarity,

Box 21.1 Pluridisciplinarity, multidisciplinary, interdisciplinarity and transdisciplinarity

Pluridisciplinarity and multidisciplinary: equivalent concepts that denote the juxtaposition of disciplinary approaches without any particular drive to foster interaction between these approaches. Many research projects that are split into work packages – each of which is specific to a particular discipline – are pluridisciplinary or multidisciplinary projects: each project team publishes in its own discipline’s journals. In fact, this is what is required by the research evaluation institutions that determine which journals are legitimate in each discipline.

Interdisciplinarity: interaction between disciplines. It requires methodological and conceptual dialogue between disciplines in order to strive to develop an original perspective on reality. Physical chemistry, socio-economics and agro-economics are examples of interdisciplinary fields.

Transdisciplinarity: an approach that goes beyond disciplines and attempts to develop a new form of analysis with its own methods.

Box 21.2 Example of an interdisciplinary and participatory approach: The Urbal method

Urbal, which has been developing since 2018, is a participatory method for monitoring and evaluating the impacts of food innovations on all dimensions of sustainability. It was designed by a pluridisciplinary team involving CIRAD and the UNESCO Chair in World Food Systems in Montpellier, the Està think tank in Milan and Wilfrid Laurier University in Waterloo, Canada. It is inspired by both the causal model approach to nutritional problems (Beghin, 2002) and the ImpresS method developed by CIRAD (Barret et al., 2017). This method was initially tested on fifteen food innovations in ten countries around the world, all in urban areas, which provide fertile ground for social innovations given the concentration of sustainability issues in cities.

The purpose of Urbal is to help the bearers of innovations, as well as the policymakers and donors in a position to support them, to better understand, anticipate and evaluate the innovations' impacts – in other words, their relatively long-term effects. Urbal is based on an evaluation framework that is designed to require minimal resources (human, time and financial resources). It is built on the concept of 'impact pathways'. It is qualitative in the sense that its objective is not to quantify impacts but to identify impact pathways and develop cognitive maps to represent these pathways – namely the causal chains linking activities (what the innovations do in concrete terms) to their consequences. It is necessary to distinguish between direct effects (products or outputs), medium-term effects (results or outcomes) and longer-term effects (impacts) and to identify the conditions for the transition between each stage. The necessary and facilitating conditions for success, as well as obstacles and hindrances, can then be identified. The final impacts relate to the different dimensions of sustainability. Urbal considers five of these dimensions: economic, environmental, socio-cultural, nutritional health and food security, and governance.

The method is organized in three stages. The first draws on interviews, the analysis of available documentation and a review of the scientific literature. It consists of describing the innovation by retracing its history, mapping its stakeholders and precisely identifying its innovative activities that produce change. The next stage is dedicated to running a multi-actor participatory workshop to collectively identify the main impacts and their pathways. This is followed by an analysis of the data collected to refine and elaborate on them. In the third stage, a new participatory workshop or meeting is run to present, validate and discuss the identified impact pathways. This third stage may place more or less emphasis on a particular key function of Urbal – namely

informing the strategy of the innovation, promoting it, networking it, sharing the experience associated with it, informing decision-making regarding support for the innovation or preparing a quantified evaluation of its impacts. In fact, this last key function constitutes a fourth possible step: the use of Urbal as a basis for a quantitative evaluation, using the method to select indicators among the large number of existing options or to develop specific ones.

Urbal is therefore presented as an alternative to quantitative evaluation methods. It is easily implementable by social innovators who often have limited resources at their disposal. The knowledge produced is collective. The general idea is that the diversity of stakeholder views and experiences, as well as their comparison, makes it possible to grasp the full range of impacts. By resituating these diverse impacts in relation to the different dimensions of sustainability, the method sheds light on the synergies between different dimensions or, on the contrary, the conflicts between them, thereby revealing the necessary trade-offs or prioritizations of the different activities. The participatory dimension of Urbal also ensures the evaluation's social relevance, giving it a political dimension: it allows for collective decision-making surrounding the production of knowledge on impacts, and the knowledge produced is shared within a collective brought together through the implementation of Urbal and within a wider community of practice through the open-access sharing of the results (under a Creative Commons licence). By encouraging the sharing of experiences across innovations and the construction of shared knowledge, Urbal is useful for scaling up innovations (Chapter 19). It also facilitates this process by informing decision-making regarding political support (local authorities) or financial support (donors, investors) for innovations (Valette et al., 2020).

multidisciplinarity, interdisciplinarity and transdisciplinarity). The latter fosters dialogue from the very conception of a research programme in order to achieve a cross-pollination of disciplines or, even further, a transdisciplinarity that would attempt to transcend the disciplines. Interdisciplinary spaces surrounding research on food systems vary from one country to the next. Anglosphere countries are developing food studies based on the model of cultural studies, whereas the French have prioritized perspectives that are open to interdisciplinarity but still anchored in a discipline, for example, socio-anthropology (Poulain, 2017).

Practising interdisciplinarity is easier said than done. The research evaluation environment tends to give greater value to academic excellence arising from the exploration of research areas within one's own discipline than from dialogue between disciplines. Since 2011, the UNESCO Chair in World Food Systems has been striving to organize spaces to facilitate such exchange. To this end,

it sets up research projects involving several disciplines (e.g. the Foodscapes project) and encourages their interaction on various occasions such as during discussions on research results or the drafting of documents to translate these results into recommended actions (see the ‘So What?’ policy brief series). Knowledge is also articulated through events – such as the one organized every year on a theme relating to contemporary food issues – which bring together scientific voices from several disciplines along with professional and artistic perspectives. The Chair is also careful to ensure that researchers who are less visible in the scientific community have a voice. These are scientists working with fewer resources or with less access to funding, networks or publications. In this respect, the symposia organized on the theme of ‘eating in the city’ (*Manger en ville*) have given African, Latin American and Asian researchers the opportunity to develop a ‘Global South’ perspective on the issue of food acculturation linked to urbanization (Soula et al., 2020).

Targeted research also faces the challenge of articulating scientific and professional knowledge. Research projects are increasingly conducted in partnership with food system actors such as politicians, NGOs or companies. Such partnerships not only provide a space to discuss the relevance of particular questions or hypotheses together but also allow for staying on track and responding together to unexpected situations over the course of the project. This involves creating long-term partnerships between scientists and stakeholders that are not limited to the duration of a research project. This allows for the scientific analysis of professional or citizen knowledge and makes room for stakeholders’ and citizens’ critical feedback on the scientific work carried out. This relationship is organized through think tanks such as the International Panel of Experts on Sustainable Food Systems (IPES-Food) or the Institute for Sustainable Development and International Relations (*Institut du développement durable et des relations internationales*, IDDRI), which synthesize expert knowledge to strengthen the argumentation and advocacy skills of actors working to accelerate the transformation of food systems.

Science–society dialogue also involves the relationship between researchers and citizens. Many initiatives to share scientific results with the public exist. The diversification of communication channels has facilitated this dissemination while also enabling the proliferation of false information, which contributes to confusing the issue and discrediting scientific knowledge. But dialogue between the science world and the public can also be fostered by involving citizens in scientific production. The term ‘citizen science’ encompasses this practice along with a range of other methods (Silva et al., 2017). The approach followed to

analyse the data from studies of a specific population can also play a role in legitimizing citizen knowledge. For example, positive deviance analyses, which are beginning to be used in nutrition, consist in identifying the behaviour of 'deviant' individuals within a category of population with similar characteristics who have been able to find solutions to a given problem better than others (Marsh et al., 2004). Research no longer has a monopoly on solutions, and those implemented by citizens become models.

From a targeted research perspective, scientific actors seeking to contribute to the transformation of food systems demonstrate a certain degree of political commitment. Thus, whenever they move beyond the framework of producing research results to provide expertise or share opinions, researchers must be able to demonstrate sufficient reflexivity to maintain the right distance between their research activity and their political positions. A researcher's choice of object of study or methodology is not just informed by a desire to advance knowledge. It also reflects implicit values and societal sensitivities. The social sciences place particular emphasis on critically examining these values and sensitivities so as to ensure objectivity and neutrality of interpretation and to acknowledge the limits of the researcher's position (Grignon, 2015). This reflexivity allows scientists to avoid the influence of intellectual trends and instrumentalization as much as possible.

Lastly, on the point of reflexivity, responsible science must be accountable not only for the usefulness of the knowledge it produces but also for the way in which it produces it. Research can have an environmental cost if we consider the health risks it can impose on societies through the application of its innovations without hindsight and without debate. But it can also have a social cost if we consider the precarious status of young laboratory workers and the misguided academic establishment practices that still exist. Here, too, new practices are developing within universities, schools and laboratories to reconcile the substance and form of teaching and research.

Conclusion

Whether in training or research, many actors are now mobilizing to both tackle the challenges of sustainable food systems and do so differently. Various philosophical or epistemological approaches provide avenues for thinking about these necessary changes. For example, the sustainability sciences seek to articulate knowledge to transform systems and complex approaches (Morin, 1992) and to

study arrangements and combinations. The concept of ‘rhizome’ (Deleuze and Guattari, 1976, 2004) proposes a model to represent organization without subordination between elements. It constitutes a form of resistance to hierarchical models, which the authors consider oppressive. All these approaches show that changing the ways of representing the world is already a way to start changing the world itself.

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