

Evaluation of student reflective documents in agroecology education: a qualitative analysis of experiential learning

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Abstract

Agroecology student learner documents facilitate self-evaluation by students in a course on farming and food systems. Students reflect on their roles in learning in classroom, discussions, field teamwork, and stakeholder meetings. A database of documents from 13 years of courses and more than 200 students provides opportunity for qualitative analysis and interpretation of core consistencies and meanings from their writings. We use this systematic evaluation of learner documents to better understand the educational process as viewed by our students, and to design and improve learning activities in the classroom and in the field. It is especially important to focus on their interactions with stakeholders, find out what they learn from these encounters, and see how the field projects can be modified to create an enhanced learning environment. One goal is to help students acquire and practice communication skills that will be useful in their thesis projects as well as in future life work.

Introduction

This paper describes an evaluation of experiential learning in agroecology, based on analysis of learning outcomes as described by students in their individual Learner (Reflection) Documents. Galt et al. (2013) highlighted the importance of reflective essays in reinforcing experiential learning. Each fall semester since 2000, students in an agroecology course in farming and food systems at the Norwegian University of Life Sciences (UMB) have submitted a self-evaluation of their learning as well as the teaching process. Their Learner Document is based on a log the students write about their experiences in the field, including interactions with stakeholders on farms and in communities, and lectures and discussion sessions with students and facilitators in and out of the classroom. Together with practical aspects described in the log is an in-depth reflection by each student on the learning process. While the students work in teams of four to six people to produce a Client (Stakeholder) Document, in cooperation with their stakeholders in the farming and food system, the Learner Document is written individually and reflects their personal learning experience.

Material and methods in an Agroecology Course

The Norwegian University of Life Sciences offers a two-year Master of Science in Agroecology (<http://www.umb.no/study-options/article/master-of-science-in-agroecology>) that attracts students from around the world, all concerned about long-term sustainability of agriculture and food systems. Agroecology: Action Learning in Farming and Food Systems is a full-time, sixteen-week, 30 ECTS course during the first semester of the master's degree. The goal of this course is to develop knowledge, skills and attitudes enabling students to deal with complex situations in agricultural and food systems development (Lieblein et al., 2012). This means that they should not only acquire theoretical knowledge about agroecosystems, but also gain experience with methodology and tools for describing, analysing, and improving them.

The pedagogical basis of the programme is experiential learning with situations "out there" placed in the centre—not as examples of theory but as starting points for the learning process, where theory and experiences will be linked. We thereby aim at bridging the frequently experienced gap between knowing and doing by initiating the learning process using phenomenology, where we begin on the farm and in the food system and the key issues emerge from the experience (Francis et al., 2012).

The ability to relate discipline-specific knowledge (theory) to the cases "out there" is a key requirement, both for understanding the present situation and for proposing improvements. However, agroecosystems are complex, and the challenges they contain do not conform to disciplinary boundaries. The learning process

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thus requires a systemic approach to capture the totality of a complex situation and in which integration of several disciplines is essential to understand the whole system.

The dynamic and complex nature of agroecosystems and their environments requires that those involved in development of sustainable farming and food systems become capable of and motivated for continual renewal and life-long learning. Therefore, learning to learn and learning toward the future are central goals in the agroecology course. In a culture of curiosity, the students' goal is not to uncover answers already known by the teachers but to engage in a joint exploration process together with the facilitators and people in the cases being investigated.

The intended competency profile of graduates in agroecology therefore includes the capacity to achieve the following:

- Knowledge of farming and food systems
- Ability to link real-life situations and theory
- Skill and comfort in using appropriate methods
- Confidence in handling complexity and change
- Competent communication and facilitation skills
- Potential for autonomous and life-long learning

Students work in groups, with each group assigned to an ongoing project in Norway that deals with sustainability of farming and food. The case study encompasses the entire food system, including a farm interested in major changes in the farm operation. The task of the project work is an extensive analysis of the current and desired future of farming and food systems. This implies working with a farmer to develop a farm conversion plan and with other community stakeholders to develop the food system in the region/municipality.

The students prepare two group reports or Client Documents, one for the farmer and one for the food system stakeholders. Focus is on what the stakeholders could consider as scenarios to achieve their future vision developed during the systems inquiry. In addition each student prepares an individual report, the Learner Document. As the project work is the core of the course, the students include in the Learner Document a condensed version of the Client Document. An important goal of the project work is to improve their ability to link the concrete and practical situations experienced during the project work with theoretical knowledge, and the reflection document is their opportunity to demonstrate such ability. The students' empirical material from the fieldwork, as well as from the entire course, is analysed and discussed in relation to current knowledge in the area. It is important for this analysis that they have carefully logged the experiences and facts that will be the basis for their discussion and reflection.

What we look for in the Learner Documents is the degree to which they use agroecological perspectives and terms to describe the farming and food systems' structure and functioning (what), the process of farm and food systems analysis and transition planning (how), and the goals and values involved (why). Further we assess whether they are able to critically examine both concepts and methods and how these were used in their particular case study. Finally, do they reflect on their personal experience from the systems inquiry, including communication with the stakeholders and fellow group members, and its role in their learning?

This analysis is based on the Learner Documents submitted over a period of 13 years. From the beginning of the program in 2000, the course consisted of two parts: a course on Farming System, followed by a course on Food System. During the years from 2000 to 2008, the students wrote a Client Document and a Learner Document pertaining to each course. From these years there are 270 Learner Documents (139 from the Farming System, and 131 from the Food System Course). In 2009 it was decided to merge the two courses into one, embracing both Farming and Food System. From 2009 to 2012, the students wrote a Client Document for the Farming System, and a Client Document for the Food System, but one Learner Document for the whole semester. From these last four years there are 86 Learner Documents.

Table 1: Table of Learner Documents for Analysis

Learner Documents	Farming system	Food System	Farming and Food System	Total # Learner Documents
2000-2008	139	131		270
2009-2012			86	86
2000-2012	139	131	86	356

The Learner Documents are mostly between 15 and 45 pages long, while a few reach beyond 80 pages. With a low estimate of what is relevant text, this body of information includes at least 10.000 pages. This relatively large volume of text is being explored through a systematic classification process, in order to analyse the content. We code the material by identifying themes in the text, and our main themes are the ones related to the course goals, namely reflection, observation, visioning, dialogue and participation. These themes are further divided into sub-codes, as a way of structuring our data and to be able to capture the full richness of the material.

Coding themes with examples of their sub-codes are as follows:

1. Reflection

Students indicate understanding of the structure and function of farming and food systems, display systems thinking by discussing complexity, holism, and how the parts are related to the whole. They link theory to real life situations, and link experience to their personal development. Students are analytical with an etic or 'outsider' approach.

2. Observation

Students show that they have the competence to create a rich picture of a situation or a problem, and to carefully examine situations before drawing conclusions.

3. Visioning

Students reveal the capacity to go beyond existing thought patterns, a willingness to take risks, and are not inhibited by a fear of failing.

4. Dialogue

Students demonstrate 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, and exhibit writing skills.

5. Participation

Students recognize values and goal conflicts, dare to act, and are empathically engaged.

Results and discussion

Although we are still early in the analytical process, we observe that student descriptions indicate a rich and extensive volume of text on the learning experience from their points of view. Some trends that can be mentioned are:

Many students express that they are excited with the fieldwork based on cases, and describe how they will remember what they learned in this setting, working alongside their peers and interacting with stakeholders in the farming and food systems. For many this was their first learning experience starting out in the field, and then later to explore theory as needed in their specific case. This eased the understanding of abstract theories, and helped give lived examples to pin them on. At the same time, this linking of real life experiences to theory is weak among some students. Such as shift in the starting point for learning can be described, with reference to Aristotle in the *Nicomachean Ethics* (Bostock, 2000), as a shift from theoretical knowledge (theology, natural sciences and mathematics) to practical knowledge (called *Praxis* by Aristotle). The practical knowledge is activated and developed when dealing with unique cases, and it is different from theoretical knowledge (Lieblein et al., 2012).

The extent to which students are able to reflect on their own learning experience also varies, from eloquent descriptions of the cognitive process of thinking about thinking, to those that are almost purely descriptive of

the activities undertaken during the course. Some admitted being overwhelmed when realizing the complexity of a food system, and how this makes changes seem challenging. At the same time this realization indicates an understanding of systems, relationships between the whole and the parts, and resistance to change.

There are numerous interesting reflections of learning from interactions within the group. Some learn from initial frustrations and are able to create productive cooperation, while others seem to use those difficulties as an explanation for how they performed in the course. Several indicate the feeling of being ready to take on the world. After this experience of working in an environment of multiple perspectives dealing with complex problems, they feel confidence in communicating with stakeholders and well prepared to take on other challenging tasks.

On the whole, experiential learning based on the students' own solving of real-life cases proves to be a meaningful and valuable experience. The knowledge acquired through bridging the academic study of farming and food systems with their own lived experience is not easily replaced—hopefully only through careful and critical evaluation.

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