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2023

Document Version:
Publisher's PDF, also known as Version of record

Learning outcomes - A driver for sustainability? A case study from the NextFood project

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Abstract

Purpose: By examining the local practices and social relations underlying the use of learning outcomes in the context of higher sustainable agriculture education, the paper aims to demonstrate the capacity of learning outcomes as a driver for sustainability.

Methodology: Interviews with educators from Greece, Sweden, and Denmark and a workshop with students constitute the empirical material used in this study.

Findings: The paper shows what happens when learning outcomes, being standardized institutional entities, enter messy educational practices, where they are picked up, challenged, adapted, and used. These findings demonstrate how learning outcomes are intimately tied to the social organization of the practices in and through which those learning outcomes are being written, presented, read, oriented to, and enacted.

Practical Implications: Tackling the content of learning outcomes is insufficient. To realize their capacity to steer higher agricultural education towards sustainability, the social relations tying students, teachers, and other educational actors must also be considered.

Theoretical Implications: The paper takes on a constructivist approach, demonstrating learning outcomes as relational entities.

Originality: The study presents a novel view of learning outcomes as embedded in and generative of social organization in the context of higher sustainable agriculture education.

Keywords: learning outcomes, skills, sustainability, agricultural education, community performance, social learning

Introduction

Education directed to the agri-food sector has experienced (at least) two major changes. Firstly, the sustainability dimensions of food and agriculture were brought to the forefront after the millennial turn. The European Union has played an active role in this regard, for instance with Horizon 2020, the EU Framework for Research and Innovation, and the EUs more recent initiatives, Horizon Europe and the Farm to Fork part of the Green Deal. All these deal with supporting the transformation of the agri-food sector, with education as an important tool. This has furthermore been pushed by the UN through the launch of the Decade of Education for Sustainable Development in 2005 and as an SDG goal: Education for sustainable development and global citizenship.

Secondly, as all actors in higher education, universities offering agri-food programmes were pushed to define the outcomes of education in terms of transferable skills. The definition and application of *learning outcomes* became a cornerstone of the streamlining of higher education in Europe, known as the Bologna process. Learning outcomes are intended to be a standardized framework for defining the knowledge, skills and abilities individual students should possess and can demonstrate upon completion of a course or other learning experiences. The effects of the implementation of the Bologna process was that for many courses and programs, not only subject-specific learning outcomes but also the generic skills that a student was expected to acquire had to be defined and the curricula revised to teach them (Kehm 2010).

Not merely a new educational framework, learning outcomes have also been considered a possible tool for shifting the agri-food sector towards sustainability. Tilbury et al (2005, 15) emphasise, for instance, that "[c]urriculum change offers the opportunity to embed principles of learning for sustainability such that all students can address sustainability."

Moreover, according to Svanström et al (2008, 340), "[e]ducation will play a crucial role in [society's] adaptation towards sustainable development." For this to happen, they argue, inter alia

> It is urgent to define new appropriate goals of higher education in terms of learning outcomes (LO's) for students […] And once we have done that, we must make sure that our organizational structures, program curricula, course syllabi, and teaching and learning methods effectively address the LOs as well as other goals in HEIs.

Several challenges for education to be a driver for sustainable development have been noted in the literature. For example, Reid and Petocz (2006) found that sustainability and teaching tend to be seen by university teachers as separate entities with little appreciation of the role of university teachers in promoting sustainability. According to Clugston (2002, 13), for higher education to play a crucial role in building the knowledge, skills, and values for a sustainable future, it is necessary that curricula are developed based on concepts related to sustainability, rather than the traditional set of concepts associated with each discipline. In this line, Sibbel (2009, 68) argues for the need that curricula offer experiences which develop "graduate attributes of self-efficacy, capacity for effective advocacy and interdisciplinary collaboration", in addition to raising awareness of "social and moral responsibilities associated with professional practice". Similarly, Sørensen et al (2021) argue that agri-food students need to be provided the opportunities to develop "skills that encourage a perspective that moves beyond generic discipline-based skills and instead builds on heterogeneity, inclusion, and use of different actors' knowledge, practices, and experiences, and the ability to respond and be proactive in a constantly changing world." (ibid, 1)

Reviews of existing literature regarding education for sustainable development (UNESCO 2018; Wiek, Withycombe, and Redman 2011) point to the following competences as key educational goals: critical thinking, systems thinking, anticipatory competency, normative competency, strategic competency, collaboration competency, self-awareness competency, and integrated problem-solving competency. Other studies (Brekken et al. 2018; Hansen et al. 2019; Sørensen et al. 2021; Valley et al. 2008) have specified sets of skills necessary for a sustainable transition in agri-food systems, including openness to change, navigating within different knowledge systems, acting as change agents by planning and managing for change, and building learning communities.

There is plenty of research that addresses the sustainability challenges facing contemporary agri-food systems and the role of agri-food education in meeting those challenges (Clark et al. 2013; Francis et al. 2011; Jordan et al. 2014; Valley et al. 2018). These studies promote the idea that, if learning outcomes (and more broadly curricula) are designed with "sustainability principles" in mind, and if the teaching materials and methods are set in place to implement them, then education can play a key role in delivering a next generation of sustainability-minded professionals. What this literature does not tackle, however, are the practices and social relations that underline the use of learning outcomes in education. What happens when learning outcomes enter messy educational practices, where they are picked up, challenged, adapted, and used? To what extent do learning outcomes influence relations between students and between students and teachers, and in what ways? In addressing these questions, the article aims to elaborate on the capacity of learning outcomes to steer agri-food education towards sustainability.

Critical Literature Review and Theoretical Angle

Caspersen et al (2017, 8) argue against the conception of learning outcomes as "standalone artefacts or 'teacher-proof' devices that structure the teaching and learning processes" (2017, 16), as also argued in other studies (Erikson and Erikson, 2019; Kubiak et al., 2020) Instead, they propose that learning outcomes should be developed and understood with an intuitive flair for local variation. Only by understanding how local processes open up for adaptation can educational reforms (such as the introduction of learning outcomes) make an impact at the ground level. In a similar vein, Kubiak et al (2020) distinguish between LOs-as-intended, LOs-as-enacted and LOs-as-experienced, arguing that there are differences between the intentions with which the LOs are designed, the practices through which they are taught, and the learner subjectivities and contexts through which they are experienced. Furthermore, they argue that LOs are by design open to interpretations, as they should meet the needs and expectations of a range of stakeholders, such as students, teachers, university management, current or future employers, and policy makers (Kubiak et al., 2020).

These studies thereby shift the focus from the content of learning outcomes to the local educational environments in which they are being used. Addressing the latter concern, Brooks et al (2014, 730) explored how students use learning outcomes as part of the educational process. Their study revealed that learning outcomes played a role as guides for course syllabuses, but also as tools that students used when revising their work. It follows for Brooks et al that learning outcomes help to "focus students on the learning they should be engaging in". At the same time, learning outcomes were often not sufficiently clear to students, and many struggled to understand, based on the learning outcomes, the depth of learning required. In contrast, Kubiak et al. (2020) found in their study of HE-based continuing professional education that learners did not find the learning outcomes unclear or

difficult to understand, but that they did not always correspond with their own learning interests which primarily guided their learning.

In a recent study, Fandos-Herrera et al (2023) show that students' personality also plays an important role in the perceived achievements of learning outcomes. They found that the perception was different if the students were assigned with a discussant or a discussed role in the classroom. These findings are largely consistent with Drew (1998), who argues for context-sensitive learning outcomes, reflecting situations, local vocabularies, and values.

Moving onto the educator perspective, Dobbins et al (2016) propose that, amongst academics, opinions about the purpose of learning outcomes can vary, and educators do not necessarily relate to just one idea concerning the purpose of learning outcomes. Instead, "they may see the value of learning outcomes for student-centred learning, and so enact them according to their views about this learning approach" (ibid). At the same time, educators "may recognise the institutional, or accountability, purposes learning outcomes can serve and enact them within this implicit framework also." (ibid), something also raised by Kubiak et al. (2020). Aamodt, Frølich and Stensaker (2018) furthermore found that educators' position and field impacts how they use (or do not use) learning outcomes to guide their teaching and assessment practices.

Hussey and Smith (2002) argue that "there is some obvious use in specifying what aspects of the content of a subject students will be expected to learn and what general kinds of skills and capacities they will be expected to display" (2002, 232). However, according to them, the "proper interpretation" of these outcomes must emerge from the context, prevailing activities, and experiences of the students. On their own, learning outcomes are neither precise nor do they specify objectively measurable entities. Hussey and Smith argue that learning outcomes, understood and interpreted in this flexible and practical way, "will not lend themselves to strict auditing, but they may open the way to a better understanding of the

process of education" (ibid). Erikson and Erikson (2019) further unveils the complexity of interpreting learning outcomes through an analysis of critical thinking as a core purpose of higher education and its translation into the learning outcomes framework. They argue that the formulation of learning outcomes relies on implicit understandings of educational purposes beyond disciplinary competence, and that the interpretations inherent in formulating and using learning outcomes necessitates strong communication rather than eliminating such needs through transparency and objectivity. They furthermore argue that not all aims of higher education are measurable, such as achieving life-long learners, and thereby the focus on learning outcomes risk diverting attention away from such aims. Davis and Knight (2023) further remark in this vein that assessing students' learning processes, and not just the accomplishment of learning outcomes, could provide new insights for the design of educational programs.

In different ways, these authors point to the importance of the local practices and social interactions surrounding the use of learning outcomes in education. This article explores how articulating, drawing on, and referring to learning outcomes is socially organized in local settings in three European countries. To address this, we use as theoretical angle the concept of "community performance" developed by Science and Technology Studies (STS) scholar Steve Woolgar (1991).

Woolgar uses the term "community performance" to refer to an analytic tactic which consists of showing how verbal or written accounts make available arrangements of characters and relations between them. In line with Woolgar and Cooper (1999, 439), "the structure of the [account] makes available an arrangement of identities and expectations, and it is these characteristics to which readers [or listeners] can orient in making sense of the account". Reading and listening, in this version of discourse analysis, primarily involves attention to the configuration of actions and interpretations performed by the account.

We use Woolgar's concept to show how various statements and uses of learning outcomes by teachers and students are implicated in performances of community. This focus aligns with Stasz (2001), who argues for a sociocultural perspective on skilling. According to Stasz, this perspective shifts the focus from the individual to interactive systems. The social settings in which skilling takes place, argues Stasz, is an integral part of skilling and not just the surrounding context for it. Thus, the actors of the setting, the organisation of the work, the physical and symbolic systems that comprise the work, etc., together constitute what counts as skill in that specific setting.

Materials and methods

We draw on empirical material gathered ethnographically from three settings – agri-food and sustainability education programmes in Greece, Sweden, and Denmark. We examined these settings during the NextFood project (https://www.nextfood-project.eu/), as part of a work package developing an inventory of skills needed for future sustainable agri-food system professionals (WP 1). The aim of the inventory of skills was to identify the key skills and competencies needed in the transition to more resilient agri-food and forestry systems and review how current science, education and training systems in EU Member States, as well as countries in Africa, Asia and South America , catered for these.

The work with the inventory of skills included a literature review, focus groups and interviews with professionals, practitioners and academics in the agri-food and forestry systems and a questionnaire. Further, the work package drafted roadmaps for the improvement of curricula, learning methods and long-term interaction between education, science and actors in the agrifood system. The authors conducted both desk research and qualitative empirical research, connected to the 13 educational cases in the project.

The analysis in this paper is based on three types of material selected from the extensive ethnographic fieldwork tied to the work package. In combination, they provide examples of how learning outcomes are socially organized in local settings. Our first set of materials consists of the study plans of the programs, where the formal specification of learning outcomes is done. The study plans have been collected and analyzed for the three programs where students and educators were active at the times of the interviews and focus groups (see below). During the focus group, the study plan was also used as a source of reference during the discussion.

Further to gain insight into the complexities of skilling in these settings we did semi-structured interviews with educators from Greece, Sweden, and Denmark. The focus of the interviews was understanding how learning outcomes were interpreted and used by the people who dealt with them and who in different ways were accountable to them. In other words, we wanted to gain a sense of the social life of the written learning outcomes, as well as a sense of actors' individual perceptions of skills and skilling in relation to the learning outcomes as they knew them. In total, we did 4 online interviews with educators in Greece and Sweden, each lasting around 1 hour, and 2 written interviews with educators in Denmark.

Educator	**Type of education institution**	**Main teaching subject**	**Level**
Hans, Denmark	University	Sustainability transitions and Environmental Planning	Bachelor and master

Magnus, Denmark	University	Sustainability transitions and Environmental Planning	Bachelor and master level
George, Greece	College	Soil science	Bachelor
Christos, Greece	College	Marketing for the food industry	Bachelor
Penelope, Greece	College	Agricultural finance	Bachelor
Ludvig, Sweden	Agricultural university	Food studies, Landscape architecture and Urban Sustainable development.	Bachelor and master level

Table 1. Informants

To get the students' perspective on skilling and learning outcomes, we organised a focus group. The focus group was comprised of five students, enrolled in a Masters level sustainable food and landscape course at the Swedish University of Agricultural Sciences (SLU), in Sweden. The focus group was conducted online on Zoom and lasted 1 hour and 30 minutes. It was audio-recorded, with the permission of the participants. The students, as well as the educators interviewed, are anonymized.

Results

All interviewed educators reported that they were introducing the learning outcomes to students at the start of a class or a module. Hans (teacher, Denmark) describes that he presents the learning outcomes defined in the study plan to the students in the beginning of a course::

> Question: Could you describe how you introduce students to the learning outcomes?
> Hans: If I am responsible for the whole activity or a larger, designated part of an activity I start out with an introduction about content, structure, purpose, learning outcomes and expectations. Also, whenever relevant and possible – and if I remember to do so, I start individual classes or supervision processes with an introduction including expected or intended learning outcomes of today and related expectations.

The account enacts a teacher who can take being "responsible for the whole activity or a larger, designated part of an activity" as a cue for "start[ing] out with an introduction about content, structure, purpose, learning outcomes, and expectations". Moreover, the teacher is elaborated as capable of judging the relevance of such an introduction, for instance as part of individual classes, where time and the size of the material to be covered may play as limiting factors.

But an introduction involves, not only those who introduce but also those to whom something is being introduced. When we asked Hans to describe the questions that students asked in this context regarding the learning outcomes, he said they posed none. George

(teacher, Greece), who reported a similar experience, provides his perspective on the use of the study plan in education:

> We show them what the title of the course is, the objectives, the learning outcomes, and then talk about the assessments. We usually spend more time on the assessments than the learning outcomes. I mean we just go through the learning outcomes, what we expect of them, and then we ask them to go and read them. We do not spend too much time explaining the learning outcomes in detail. I assume they are self-explanatory. I just mention them.
> Interviewer: Do students usually ask questions and raise concerns?
> George: Not really. That's why we don't really go more in depth. They seem to, I think it's the Greek system. They start in the Greek system, they don't really question things. They take things for granted. So, we try to encourage more questions, but they would just sit there and listen. And if they ask questions, then I can go more in depth. Usually, they accept the learning outcomes as they are and move on. They might have questions about the exam or the assessment, not the learning outcomes.

Ludvig shared a similar view about students. They usually do not ask questions about learning outcomes or skills during the introduction. He said, it is "too much information to take in at the same time, which makes it difficult for students to reflect and ask about learning outcomes."

For George, as well as the other two teachers from Greece covered in this study, Christos and Penelope, learning outcomes are "self-explanatory". We take this as suggesting that their meaning is directly available from just reading the learning outcomes; that they are not the

kind of statements that require that students ask questions to be understood. Interestingly, such assertions are opposite to Caspersen et al's (2017, 16) argument that the meaning of learning outcomes becomes apparent "only… after one has acquired the knowledge designated by the [learning outcomes] themselves".

Looking at the list of skills specified for a course in the Greek programme, we may consider how the latter could be a case here too. Consider this learning outcome:

> By the end of the module students should be able to:
> 1) Illustrate the influences of the external environment on organisational structures and processes and how they will affect success or failure.

This formulation is supposed to be useful to students (Adam 2008; Kehm 2010), orienting them to what is expected of them in, say, the process of delivering their assignments. But it is useful if the students already at the point of reading them have an operating understanding of such concepts as "the external environment", "organisational structures and processes", and organisational "success or failure".

So not only is skilling textually oriented and mediated, it also is conceptually dependent. Students might be able to speak about the ways in which a farm, for example, is affected by, say, political decisions, the climate, diseases, farming practices, buyer's behaviour, etc. This, however, does not automatically mean that those students are able to speak about those things as "the influence of the external environment" on the farm. "External environment" is a theoretical construct borrowed from management literature that students learn in the educational process. In that process, namely, the students learn to name and correctly describe what they might already know how to do. The learning outcomes, then, are "self-explanatory" only for those who manage the conceptual vocabulary used in their formulation.

Ludvig explains how the introduction of a new main field of study – food studies – allowed for some freedom and creativity in the formulation of learning outcomes. There were no scripts to follow, as in agricultural sciences or landscape architecture, which are also taught at the university. A challenge, however, was that there were no students to enrol in the formulation, because the program had not started yet. The formulation was thus dependent on teacher's experiences and skills, not on the students.

Our analysis is hitherto consistent with Hussey and Smith's (2002) critique. Since, at the start of the programme, students lack the conceptual vocabulary necessary to read the learning outcome, the latter fails to inform them on what is expected of them. Of course, the force of such a critique depends on assumptions regarding the use of learning outcomes. As George's description above of students' dynamics on the first day of class suggests, students display little interest regarding the learning outcomes. They do not ask questions about them then, but also, he doubts that they ever refer to the learning outcomes during their education.

Hans (teacher) makes a similar observation, in the context of Danish sustainability education:

> Interviewer: Do you believe that students use the learning outcomes?
> Hans: No, it is not evident to me that that is the case. I think they are mainly used by evaluators, examiners, and co-examiners, or by censors.

In the specification of the learning outcome a community is performed of readers who know what terms such as "external environment", "organizational structures and processes", and organizational "success or failure" mean, i.e., a community of readers who know how these terms can correctly be used in this educational and professional setting. Through asserting that he "assumes that [the learning outcomes] are self-explanatory", George enacts his membership in such a community. The key issue, then, is <u>not</u> simply that certain words are

used in the writing of the learning outcome that students do not understand and do not know how to use at the start of the course. The issue, rather, is that the learning outcome, through the words used for its statement, establishes *that someone already knows*.

There is thus an additional layer of complexity here that needs to be acknowledged for understanding the social dynamics behind learning outcomes. Namely, readers who do not understand and do not know how to use these terms are enacted as non- (or not-yet-) members of the community.[1]

In the above interview excerpt, George describes "asking questions" as something that students should do. But asking questions, for instance regarding what the above given learning outcome means, displays their non-membership in the community enacted in and through the learning outcome. So, while George interprets the lack of questions regarding the learning outcomes as evidence for students lacking critical thinking skills, our analysis indicates that this can also be approached as an issue of typical non-member behaviour. Namely, non-members do not go about displaying their non-membership to others, especially when there are stakes involved, as is the case in the above-described "first day of class" scene.

Contrasting George's and Hans's interpretation of students' behaviour, the students in our focus group demonstrated a capability to meaningfully discuss learning outcomes. They agreed that some of the concepts used in the learning outcomes could be understood better if students already had knowledge of those concepts. At the same time, however, they also understood vagueness as having a certain value for the learning process. For example, one of

1 At the same time, not all educators enrolled in the community will agree on the interpretation of such words and formulations, thus this is constantly negotiated in social situations such as exams.

the students said that learning outcomes "should be vague" because this allows for flexibility in how they can be implemented practically by the student. A student-centred learning could be hindered if the learning outcomes were too specific.

Not all students were convinced about the usefulness of learning outcomes in learning. Comments such as "they all look the same", "not really useful", and "could be more specific" were shared during the discussion when the question "How do you use learning outcomes in your work?" was asked.[2] Despite these negative attitudes, students discussed numerous ways they employed learning outcomes in their educational processes.

Some students used their learning outcomes as a guidance, to make sure that they have not "missed something" when preparing for an exam. One student said: "I do look at them when I have an assignment that's supposed to be graded". Some thought they were like a "compass" that could be used in the beginning of a course to find a direction in the studies. Similarly, another student read the learning outcomes for "context" in relation to which to form expectations about the course. Some of the students even mentioned copy-pasting the learning outcomes into their assignments while in progress, to thus be able to check if they are fulfilling the assessment criteria.

Important to our analysis, one student said he consulted the learning outcomes when he was not satisfied with the content of a course. When he thought things were questionable, or he did not agree on the relevance of an ongoing course, he first went through the learning outcomes to see if he might have missed to see the relevance of the course content. Only then would he raise complaints to the responsible teacher. In such situations, learning outcomes

2 Others were more positive. One said that twenty years ago, when she started her education, she had "learning goals". With this basis, she said, "the approach" of learning outcomes was "familiar" to her. Another student could discuss learning outcomes as a manifestation of a shift in educational ideology. He said he had learned this in the context of a pedagogy course. During the discussion, he emphasised the importance of being able to differentiate between "learning outcomes" and "learning goals".

serve to hold teachers accountable and even to evaluate their performance as educators. This enables the students to destabilize communal relations described above, and instead enacts a situation where students can be knowledgeable members of such a community.

Addressing Learning Outcomes at Different Educational Levels

In a higher educational context, formulating skills as learning outcomes involves text-mediated work. It consists of following official guidelines, referring to (or even copying) earlier formulations. The guidelines define what can be expected from students in terms of skills given an educational level.

Ludvig describes how the formulation of skills differs between the Bachelor and Master levels. He says: "You can't expect bachelor students to have knowledge to build upon to the same extent as Master students." A challenge for the new Master programme in Food and Lansdscape was that the background of the students was diverse, both in terms of disciplines and traditions of education. Skills such as 'synthesize' and 'critically assess' mean different things for different students. This is challenging not least when it comes to the grading of such skills. Since educational programs with a sustainability focus often accept students from different backgrounds and aim to give "holistic" perspectives, this may be specifically challenging in the work to formulate learning outcomes for sustainability.

Hans further points to the complexities of formulating appropriate learning outcomes:

> Hans: On the macro-level, [the learning outcomes are] typically defined in the course or project description following guidelines or descriptions in the study programme. However, on the micro-level, for a specific lecture, the learning outcomes are seldom defined upfront. In such cases, my preferred approach – if I

> have the time and resources to initiate a profound design process – is a backwards design, or back casting approach, starting from the macro-level learning outcomes and other pre-defined boundary conditions and goals and moving backwards, setting milestones on the way, and using these milestones to guide the definitions of learning outcomes along the way.

The citation implies that learning outcomes also relate to a different kind of level than academic years, namely 'macro' and 'micro'. "Macro" are the formal, written learning outcomes that define what skills should be obtained through the course/program. However, these do not explicate the process through which the learning is to happen. Thus, operationalizing the learning outcomes into bits of learning situations (i.e., the "micro" level) that together caters for the 'macro' level is to be done by the teacher(s).[3]

For students, the practical explication of the connection between the macro and micro level signals the quality of the course.

> Jessica (student): I feel that sometimes, and when I think that the quality is quite high, is when a lecturer or a teacher actually uses learning outcomes, it sort of frames the content of the education with the learning outcomes as a foundation. So "today we are going to look into this and it's because of… And when we are done today I expect you to know more about… or have learned…" something specific.

What is more, leaning outcomes give students a sense of "structure". Referring to the recently

3 However, time and resources are important factors in how macro-level learning outcomes comes to be a coordinating factor in this work.

concluded course in food planning, one student said:

> Gunter (student): In other courses, for example in economics, the course structure is pretty much the same as the book structure which is by an international author. Then you don't need to add a structure, because you have the structure from the beginning. But when you have this kind of course, where you have a lot of guest lecturers and you try to squeeze in twenty different perspectives, in two months, I think it will be positive for the students with some more structure.

The excerpt enacts learning outcomes as a framing device, which, when used in daily practice signals the quality of the education to students. Following the guidelines in the process of designing learning outcomes is a social process, involving multiple parties in the broader educational setting. The sociality of this process is also assumed by students. For instance, the students in our focus group assumed that the learning outcomes are created by the teachers running a course, on a course-by-course basis. They thought that this involved a "handful" of people, not a single teacher. More specifically, they assumed it was the teachers who they met during the course that designed the learning outcomes. The students also suspected that, once the teachers came up with a set of learning outcomes, these would go through a "formal" approval process. They thought this process was "complicated", involving higher levels in the university. Some of the students thought that the process even went beyond the university to yet higher levels, involving other educational actors in the system.

According to Hussey and Smith (2002), the way levels are enacted through learning outcomes distorts "the real process". One of the interviewed teachers made a related remark:

> George: […] it makes some sense, but I personally find it's too restrictive, because you might want to have a first-year course that has a little more critical thinking, but they assume they have not developed that critical thinking yet. On the other hand, there might be a course on, for example, the third year that's more about learning actual information – not about critical thinking. For example, if you do soil science, if you have it in the second year, then you want them to learn a lot of physics and chemistry of soil. It's not about critically evaluating that. […] So, it's a bit strange sometimes that as you go up the levels you are not supposed to learn information but only integrating existing information, but we offer some of the courses later and they involve basic information that you must learn. So, we try to keep up with their system, but I find it a bit restrictive.

As the above excerpt shows, George is making and appreciating a difference between module-in-description and module-in-practice. At the same time, what we find interesting in this excerpt is how George manages that difference. Note, for example, how George contrasts the *assumption* about critical thinking skills in relation to educational level with his *knowledge* of how the programme is being organized and what forms of learning it involves. Note also how he frames the college's relationship to the formal requirements (i.e., "their system") as *keeping up*, rather than applying, submitting to, or implementing.

In spite of his critique of the formal system, George does not question the relation between learning outcomes and the obtained skills. He grants learning outcomes an almost deterministic role where they define what learning happens in practice: "you might want to have a first-year course that has a little more critical thinking*",* thus critical thinking is enacted as a choice of the teachers/coordinators and how they formally or informally phrase learning outcomes.

Accountable skills: Learning Outcomes as a Basis for Critical Thinking

While the educators we interviewed acknowledged that grades normally reflected their perception of students' skills, they also acknowledged that students can be skilled in ways that do not get them good grades:

> Interviewer: Could you think of an example when a student who seemed very skilled during educational activities got a bad grade?
> George: Not really, because students who are, I mean, they might be skilled in doing like some hard skills – preparing a field and planting stuff and collecting data, but not being able to analyse them. That might be one case. There may be students who are really good at doing a lot of the physical work, they may be farmers themselves, they have a really good understanding of the experiential aspect of starting a new cultivation, crop, and doing things like that, but they lack on ability to collect and analyse data and interpret them.

The activities glossed with the term "physical work" are not relatable to established learning outcomes and therefore they are not gradable. In other words, being skilled at those activities does not amount to professional qualifications (i.e., grades) in this educational context. The category "farmer" that George uses in this case encompasses people who can "prepare a field" and "plant stuff", who are "good at doing a lot of the physical work", who have a "good understanding" of cultivation. But the educational programme of which George is a part does not seek to produce "farmers" in that sense only:

> George: Well, we are not teaching farmers. Not just farmers, we are teaching our graduates to be able to run a farm but also manage an operation, a farming business, and be consultants.

The above educational programme strives to produce more-than-just-farmers, which, for George, implies the ability to collect, analyse, and interpret data. In the following excerpt, George elaborates this as an issue of "critical thinking". He says:

> George: I think, for a student, non-skilled is one that has not learned to think critically, doesn't learn to evaluate stuff, who, for example, can read a news item and take everything they tell them for granted – as if that's the way it is. They don't critically evaluate the information they get based on their knowledge, and then try to find out if this is true or not. For example, if you are a farmer, and somebody comes and tells you "Spray this chemical!" or this "very safe preparation on your field", they just go ahead and do it. They don't ask questions.

George described a changing, socially and environmentally complex farming context that emphasizes the need to "think critically". He contrasted this to the habitual modes of farming in the past and to how skills are acquired and transferred in industry. As the socio-environmental context changes, so do the farming skills necessary to operate in it.. George's account of critical thinking differs from the following learning outcome, taken from the programme he leads in Greece.

> Cognitive skills of critical thinking, to perform efficient analysis and synthesis of production

The learning outcome enacts a community of readers who can recognize a performed analysis and synthesis of production as "efficient", and thus, as demonstrating the performers' "cognitive skills of critical thinking". It interpolates students as the performers and teachers as the recognizers, and thus it draws a relationship between them as performers and audience.

It enacts a setting where students arrange a performance, and where teachers see the performance as an example of an "efficient analysis and synthesis of production". Thus, the above learning outcome is an instance in the distribution of roles in this educational setting. At stake is not simply what it says, but how in saying something it produces positions for the actors of the educational setting to play as part of the three-year educational process. The learning outcome performs a social organization which privileges the teacher's views on what is essential for agriculture (in this case critical thinking), while, in this way, backgrounding certain skills (e.g., physical work, handling machinery) and views.

This organisation also may privilege certain students over others. Ludvig, reflecting on how written papers is the dominating form of assessment, says that he thinks that "the written format sometimes hinders the students to showcase their skills." It is both a matter of language skills for the non-native English speakers in a programme taught in English, and the textual format in itself that rewards structure and linkages between texts. This may actually be a challenge for teaching sustainability. As he continues:

> Sustainability is to a large extent about manoeuvring complexity. Sustainability is also rather practical, and therefore difficult to assess from a written paper. It is how the skills are applied outside the classrooms that really matters. (…) People are doing a lot trying to be sustainable, but that is not accounted for in teaching.

Discussion

In this paper local practices and social interactions surrounding the use of learning outcomes in education have been investigated, aiming to demonstrate the capacity of learning outcomes as a potential driver for sustainability. Following Woolgar's concept of comunnity

performance, we have shown that learning outcomes facilitate communal processes by socially distributing knowledge and establishing positions for different educational actors to play out. Paying closer attention to these processes, for example through workshops, can help tackle too quick definitions of local problems (e.g., “lack of critical thinking skills”). Taking a step back in this way provides an opportunity to attend to student existing knowledge and use it as a basis for addressing the knowledge educators wish them to develop.

As addressed in the introduction several studies highlight skills that are particularly relevant for a transition to sustainability, including systems thinking, critical thinking, openness to change, ability to navigate within different knowledge systems, ability to act as change agents, building (life-long) learning communities, etc. These skill sets point towards a high level of reflection over own learning processes, as well as knowledge production, communication, and application of knowledge more broadly. Learning outcomes could support development of such skills if they are actively applied in the teaching situations as tools for reflection on the learning processes, including reflection on the social dynamics of learning outcomes. Thus, the educational activities where learning outcomes are in direct focus can be an asset. As we have seen, such activities add structure to students' learning and provide cohesion, especially in complex course arrangements dealing with multi-faceted issues such as sustainability. We have also seen that students see such activities as expressive of educational quality, which in itself can be taken as a motivational factor.

Since in an educational context qualification formally ties to learning outcomes, some skills become invisible. We saw this in the example from Greece, where being skilled at physical work or managing a machine does not lead to being qualified as "skilled" in terms of getting good grades, and in Sweden, where certain skills in writing may obscure the practical abilities to demonstrate sustainability in practice.

An issue with Woolgar's "community performance" is the lack of precision regarding the notion of "community" itself. This notion has a variety of definitions, depending on who defines it and the purposes for which it is defined. The results in this paper provide for developing the notion of "community performance". It is interesting, for instance, how the students *presume* an alignment between teachers and administrators regarding the learning outcomes and what they mean, which renders the learning outcomes as non-problematic for the students, thus something they can rely on. It is also interesting how George speaks about "keeping up with the guidelines", which maintains a sense of cohesion despite the disparities and misalignments between the different actors regarding how to distribute the learning outcomes in time.

The empirical material in the article has been limited to three countries and examples included come from not more than a handful of settings. This approach has been chosen in order to leave space for local practices in addition to the quantitative studies conducted in the project. There are limitations to this study in terms of generalizations, and regional and cultural differences are not possible to detect from the material. More extensive studies are required to see the extent to which these findings echo the state of education in general.

However, we claim that the approach chosen has provided a basis for an understanding of the mundane, local, practices and the social relations which are enacted with and through learning outcomes in higher education.

Conclusions

The above findings suggest that learning outcomes have the capacity to steer agricultural education towards sustainability. For this capacity to be fully realized, however, tackling the content of learning outcomes only is insufficient. The literature we addressed in

this paper has mostly focused on the content of learning outcomes, understanding their main purpose as being to inform. However, following Woolgar, we have shown that the use of learning outcomes is intimately tied to the social organization of the practices in and through which those learning outcomes are being written, presented, read, oriented to, and enacted. Thus, in striving towards sustainability with learning outcomes as a key tool, agricultural education must also consider the social relations tying students, teachers, and other educational actors in their local settings of work and interaction.

These findings have practical implications for the design of curricula and teaching. When designing curricula, educators should make space for collective engagements and deliberations regarding learning outcomes. Further, it has policy implications, in particular when it comes to methods for evaluation of teaching. Policy makers should direct attention to the learning situations that arise in relation to learning outcomes, rather than solely basing their assessment on traditional criteria such as tests, reports, etc. The social learning aspects and the ability to apply sustainability skills outside the classrooms should be an integrated part in future evaluation of teaching for sustainability.

Declaration of interests

The authors declare that they have no conflicts of interest.

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Appendix

1. **Learning outcomes workshop**

Intro:
The aim is to contribute to the learning outcomes in the course and to contribute to research about learning outcomes in relation to sustainable development in education in general.
Note: It will be recorded and be part of the Horizon Europe project NextFood, and only to be used for research purposes. By pressing OK to recording, you agree to participate as informant to the research

Learning outcomes of the course, repetition:
After the course, the student should be able to
- Analyse and develop strategies, and apply planning tools, that may contribute to sustainable landscapes at different levels landscape with food as an analytic lens.

- Understand and evaluate how individuals' and organisations' behaviours influences and are influenced by food landscapes.

- Identify how various incentives may influence and contribute to sustainable food landscapes and societies.

Questions for the workshop

1. How do you use learning outcomes in your work?
2. How does LO affect the everyday practices in your everyday life as students?
3. Who do you turn to if you have concerns?
4. Who introduces the LO to you?
5. Do you keep notes of them, discuss with other students, check when you prepare or conduct an exam?
6. The learnings outcomes of this course are centered around sustainability. How would you say that your actual work in the course may contribute to sustainability?

2. **Interview Questions for educators**
    a. As part of an official educational programme, you need to specify the expected skills that students must learn during the programme in the form of "learning outcomes".
        i. How do you decide which skills you need/should include and exclude?
        ii. How much freedom do you have in this process and how do you use it?
    b. Could you describe how you introduce students to the "learning outcomes"?
        i. For example, do you organise a specific class on this, or do you simply expect that students will read the programme description and are able to understand by themselves what is required of them?
        ii. Do you address "skills" specifically as part of this introduction?
        iii. What kinds of questions/concerns do students typically raise during that introduction stage?
    c. How do you make sure that the expected skills are (or have been) addressed through the educational activities?
    d. Do you think that these expected skills, in the form of learning outcomes, reflect the skills that students acquire during educational activities?
    e. Apart from the handbooks, skills are also stated as part of grading criteria.

    i. Do you believe that students use these documents (the handbooks and the grading criteria) ever?
    ii. When, how, and to what end?
    iii. Do you believe that it is important for them to use them and why?
f. To what extent, do you think, existing assessment strategies in the educational programme capture the skills of the students, and in what ways?
    i. Could you come up with examples where it was difficult to define/settle on the grade? How did you end up settling?
g. As a last question, do you believe there are other aspects we have not addressed that will help us understand the role of skills in sustainability education?