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To cite this article: Philip Hector & Cindy Kohtala (2021): Experimenting with sustainability education: the case of a student-driven campus initiative in Finland, Local Environment, DOI: 10.1080/13549839.2021.1891033

To link to this article: https://doi.org/10.1080/13549839.2021.1891033

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Published online: 24 Feb 2021.

Article views: 124

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Experimenting with sustainability education: the case of a student-driven campus initiative in Finland

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ABSTRACT
Experiments are deemed not only useful, but necessary in sustainability transformation to enhance local decision-making. This is especially apparent in Finland where national government programmes and city administrations promote sustainability experimentation and bottom-up initiatives in the interest of equitable participation. At the same time, universities are expected to respond to societal calls for major infrastructural transformations, while neoliberal principles shift responsibility from authorities to individual citizens. This paper examines the case of a student-driven sustainable campus initiative called “Test Site” in a university committed formally to sustainability education. The students questioned whether sustainability should be taught in air-conditioned classrooms, what topics were socially just and worth pursuing, and rather sought material engagement, creative exploration and autonomy. Invested faculty members were dependent on demonstrations and proof of impact, or at least convincing visuals, to sustain the initiative. The outcome of experimenting most valued by the students however was the material-based social learning on how to self-organise. The meaning of such “minor” experiments thus becomes muddled, involving local, situated power dynamics among university management, faculty and students and what is regarded as useful space and activity for learning. The case illustrates how an experimental site partly removed from university constraints rendered explorations of self-organising participants as valuable yet depended on visible proofs to justify this very exploration as worthwhile. Even within a neoliberal and highly hierarchical governance structure, some participants are able to make small gains to pursue socially just solutions.

ARTICLE HISTORY
Received 11 August 2020
Accepted 10 February 2021

KEYWORDS
Grassroots experiments; sustainable campus; social learning; self-organising

Introduction
On our campus, in a green outdoor space beyond the neat facades, there is a dedicated space for student-led experimentation, a collection of semi-finished small structures and prototypes related to, for example, renewable energy. In the context of local sustainability experiments, universities have a curious role to play. For one, experiments and labs have traceable roots in scientific research traditions (Leadbeater 2014), for which universities act as guardians and upon which they lean to claim the legitimacy of their sustainability expertise. At the same time, universities should educate their students to come up with novel solutions for complex problem settings, where they would need to provide the necessary playful space for exploration (König and Evans 2013). Unsurprisingly, the modality of
experimentation as a form of learning appears across universities globally, by virtue of terminology such as living labs, hackathons or similar projects organised by the institution. However, there are also lesser-known student-run sustainability experiments that operate as much as (or more as) local community action than university research or teaching. These initiatives present challenges that arise when formal and informal learning cultures and differing expectations meet in a common experiment.

In this paper, we focus on a university in a wealthy Nordic context that features “sustainability” prominently in its strategy. We examine a student-driven sustainable campus initiative called the “Test Site”, which emerged when the university brought together all its departments on a single campus in line with interdisciplinary work. The Test Site initiative came out of efforts by a group of students studying in a Master’s programme focusing specifically on sustainability, who felt powerless in what they regarded a theory-laden approach to tackling the climate crisis. It was welcomed by a sustainable campus initiative which had lobbied for more co-creation and the use of living labs on campus. We study this case particularly from the students’ perspective: to understand what meaning their informal experimentation had for their own learning; how their initiative unfolded against the regimen of institutionalised research and teaching practices; and what elements within the formal and informal cultures served to stabilise the otherwise open-ended experiment. The first author regularly engaged in some of the activities organised by the students over two years. Our study thus examines the emergence of a grassroots experiment and its participants’ ongoing negotiation, in the larger context of a culture promoting the benefits of a participatory society.

Throughout this paper, we draw on understandings of experiments and sustainability knowledge production from urban environmentalism, sustainability transitions and environmental governance, and literature on sustainable campuses to situate this case, from our position in Science & Technology Studies (STS). Experimenting locally through material engagement has not only become part and parcel of sustainability transitions and planning research but is often even understood as a panacea to reduce existing carbon footprints (cf. Evans and Karvonen 2014). However, what is less discussed is how such experiments emerge as a useful opportunity that unites different participating groups with distinct value sets and expectations about the common experiment, explicitly or implicitly (Durose et al. 2017). Participants can consist of more or less formal and informal groupings with differing “logics” of practices, rules and values, who interact and negotiate in different temporal and material scales (Hess 2016). For instance, as part of neoliberal knowledge production, sustainability experiments often need to yield visible impact, while for other civil society collaborators, the power to self-produce relevant local knowledge is of greater importance (Hodson and Marvin 2017). It is therefore in the everyday interactions between participants and their material surroundings that competing logics come to the forefront and need to be reconciled: participants co-produce meaning for themselves to justify their participation, and this has implications for commitment and how experimentation is sustained. When experimentation unfolds on a university campus as community action, there are also implications regarding young people’s right to claim what learnings (and learning methods) they deem important for just sustainability transitions.

In the next section, we will first discuss experimentation and experimental governance and then map the role of universities in creating sustainability knowledge as discussed in the literature. Following this, in the methods section we provide more context to the case at hand and describe how we conducted the research. In the results section, we discuss two main issues arising from our examination of the Test Site, namely the different outcomes of experiments and its attractiveness as a modality, before we reflect upon these findings in the discussion section and finally present conclusions.

**Literature review**

**The lure of experimental culture**

In Finland, the country in which the initiative in this study is located, the previous and current cabinets have placed a “culture of experimentation” at the centre of the government programme
(Heiskanen et al. 2017; Antikainen et al. 2019); it is now standard to explore with technologies and ways to organise society in order to find means to draw in relevant social groups. In times where austerity politics require a reduction of public spending, there is certainly demand for quick solutions (Hodson and Marvin 2017). Simultaneously, Helsinki citizens also show interest in the playful contestations of community-based “Do-It-Yourself urbanism” (Iveson 2013), in examples such as Restaurant Day, Cleaning Day or urban gardening (Seppälä 2012; Berglund 2016; Bujdosó 2019), which all carry discourses related to everyday sustainability and environmentalism. Experiments and experimentation oriented to sustainability transformation thus take different forms and are examined by researchers in different ways (Sengers et al. 2016; Weiland et al. 2017).

In the sustainability transitions literature, experimentation is examined as grassroots activity operating in protected niches with potential to impact the mainstream (Weiland et al. 2017). From this perspective, Sengers and colleagues define an experiment as an “inclusive, practice-based and challenge-led initiative designed to promote system innovation through social learning under conditions of deep uncertainty and ambiguity” (Sengers et al. 2016, 11). Heiskanen et al. (2017) have noted how the modality of piloting, experimenting or testing serves a variety of different learning purposes, distinguishing between techno-scientific or cognitive learning and situated learning. While the first category largely centres around what works where and how it can be improved in a specific context, the second category brings forward questions of how to promote or inspire and finally build new capacities and practices (Heiskanen et al. 2017). In this regard, Antikainen, Alhola, and Jääskeläinen (2017) have highlighted the importance of people who can recruit others to move beyond existing practices and keep them committed even when signs of success are not forthcoming. Furthermore, there is a logic of scaling and exporting in urban experimentation which Evans and colleagues have emphasised as the charm of experiments: the belief that it can be scaled across the city or further, diminishing the complexity of social change within solid, local power relations (Evans, Karvonen, and Raven 2016).

When experimentation emerges from the bottom up as community action, and not in the form of piloting or testing a hypothesis, grassroots actors are seen to materialise alternatives for enacting “sustainability” (Smith, Fressoli, and Thomas 2014; Schlosberg and Coles 2016; Berglund and Kohtala 2020). While some grassroots initiatives challenge the mainstream, others work to maintain or adapt the status quo (Jensen et al. 2018). In our Test Site case, as we will elaborate further below, the students organised their initiative in a decentralised and self-governed manner. Thus, we will refer to their undertaking as “grassroots experiments”, even though they differ from other initiatives by social activists, such as community gardening, in terms of duration and objectives (Seyfang and Smith 2007; Bulkeley and Broto 2013; Wendler 2016).

Many grassroots experiments are open-ended processes: starting from local needs and sites to engage actors in an ongoing problem negotiation (Seyfang and Smith 2007; Wendler 2016). Firstly, this open-ended approach invites others to participate and challenge existing power structures and sanctioned practices, resembling the ideals of various insurgent social movements (Smith, Fressoli, and Thomas 2014; Hess 2016). The invitation also has a very material notion if we take into account how unfinished settings – as often found in community gardens or other activist urban DIY projects – attract people to continue, adapt and therefore to participate (Wendler 2016). Importantly, who participates in these experimental initiatives, and especially how, varies, from committed activist innovators to recruiters to brokers. These fluid roles and relations are created and re-created by actors within an experimentalist group and between group members and other institutional social worlds (Diani and McAdam 2003; McCall 2003).

Secondly, the open-ended process allows for evaluating an experiment not only according to the prospected regime change, but also according to the intrinsic benefits it brings to the implicated actors (Seyfang 2010). This includes the different forms of “returns” people (can) expect from experiments. In current austerity logic, resources for urban sustainability are scarce and it often needs to be proven that they are useful, hence an abundance of language related to “impact”, “value”, “resource management” and the like (Lave 2012). When examining an urban greening project by
British Pakistani and Bangladeshi women and their negotiations both with funders and internally, Hinchliffe et al. (2007) emphasised a dual responsibility inherent in experimentation. First, it is necessary for actors like the above-mentioned women to show evidence or to “be seen to be delivering” (279). The second is a responsibility of “otherness”, acknowledging the work other participants need to do in creating the garden or the funding application, and developing patience, for these are processes of cultivation (Hinchliffe et al. 2007). There are thus two rather different functions of experiments: the first is a form of demonstration, which can be used as a reference and as evidence, and the second is a form of more open-ended exploration and learning to work with one another.

**Sustainability knowledge production**

Open-endedness in participation as well as in evaluation reflects questions of justice in current sustainability knowledge production: how open and inclusive transition processes are (Agyeman 2013), whose knowledge claims are circulated and whose interests they serve. May and Perry (2017) put forward an exemplary critique of current knowledge production for sustainability, where they underline that cities and universities as knowledge producers face pressures as to their excellence and competitive edge. Accordingly, through experimentation, cities and universities develop best practices regarding climate change, making them innovative players ready to export solutions. Successful brand positioning along these lines in global competition ensures further resources. Thus, what is done for sustainability is discussed and practised apart from how it is achieved. Against this dominant trend, May and Perry (2017) and other authors call for just urban sustainability: practising forms of collaborative research that take into consideration currently excluded knowledge. While some researchers champion this approach as “co-production” (Bovald 2007; Carrozza 2015; Durose et al. 2017) or transdisciplinary research projects (Felt et al. 2016), others such as Kelty (2017) are more ambivalent about the trend to extend participation. Nevertheless, when considering the tacit knowledge of people involved (Polanyi 1983) – which is not easy to extract, let alone transport elsewhere – there is a pool of possibilities to develop better, more inclusive means for knowledge making for a sustainable society.

While universities push for excellence in sustainability research, they do also engage in sustainability experimentation on campuses (König and Evans 2013), even though such open-ended engagement might run counter to their epistemic research practice (Temper and Del Bene 2016) as well as teaching evaluation. In a global survey of university “sustainable campuses”, Perondi (2020) identified four types of campus sustainability, the first being a Living Lab approach, which creates engagement of students through working on real-life challenges. Secondly, campus sustainability is conceptualised as a form of inclusive well-being, i.e. providing access to disadvantaged members of the community. The third type promotes a reduction of consumption by university personnel and students, through campus tailored, often “smart”, solutions. Finally, the fourth approach promotes sustainability as a core topic within the overall teaching content of the university and thus hopes for a catalyst effect on the university as a whole. A combination of the first and last category, a living lab with educational use, so to say, are community gardens. Laycock Pedersen and Robinson (2018) have focused specifically on University Campus Community Gardens (UCCGs) and emphasised that both the challenges around the transience of students and around defining effective uses for UCCGs as an educational tool should be examined further. These findings underline that within research on campus sustainability, attention should be paid to who has the decision-making power to define what forms of sustainability – and learning about it – are effective and desired. Therefore, in the following we will examine an experiment on campus and focus specifically on the different meanings it had for the participants. In the next section, we contextualise the experiment by introducing the actors and how we conducted research with them.
Materials and methods

Context of the test site

Our case is a site on a Finnish university campus in the greater Helsinki Metropolitan area. As the name of the project “Test Site” already emphasises, it highlights testing and experimenting. The project was initiated from two directions, from students and from university staff. Some of the students had been participating in a course on sustainable development in Africa but began to wonder why they were promoting the use of dry toilets to people abroad and not actually implementing the same technologies at home. It did not seem just to tell people elsewhere to follow a specific form of sustainability while at home more comfortable forms should not be challenged. They became keen to experiment with it while learning about sustainability in a self-directed manner. At the same time, the teaching staff was interested in a site outdoors to display ongoing work, where the students’ projects could be experienced as part of a “low-tech playground”. This playground should, possibly, be visible to the rest of the campus in ways a research paper simply cannot. Eventually, a small grant became available for a course on the circular economy. This together seemed to be a good match to kick off the project. At the time of writing, the Test Site displayed and served as an outdoor workshop for working on the following projects: The Garden; The Beehive; The Pee-osk – a mobile kiosk for growing tomatoes based on human urine; The Shelter and The Footbath, projects that we will explain further below. Some projects were initiated and later abandoned: The Solar Disk – a self-made solar panel; The Soap – making soap from leftover cooking oil; and The Gas Cow – turning biomass into energy.

After initial excitement, students found themselves dealing with reimbursement forms, with the need to demonstrate outcomes and be accountable. Moreover, Master’s students need to graduate in two years, a rather short time for extracurricular experimenting especially taking the short Finnish summer into account, and staff members needed to find ways to support the experiment and justify its sustainment. From this background, we wished to probe further the value of such grassroots experimentation, as community action taken on by students on campus.

Gathering and analysing the data

The study was conducted as participant observation: the first author knew several of the student initiators and the university staff from teaching duties as well as from study projects and frequently joined the group meetings, or helped out during building days, but remained in the background and was not actively suggesting project ideas or directions to take. The research materials consist of field notes from two years of participant observation by the first author; internal documents (meeting minutes, Slack channels, internal presentation slides); communications material (photographs, renderings, open call invitational posters); and 11 semi-structured interviews of 30–60 mins length (the interviewees are 9 key student organisers, 1 faculty member, 1 sustainability campus representative). The field notes distinctly noted the role, possible influence and reflections of the first author. The draft versions of the manuscript were also subjected to respondent validation (Lincoln and Guba 1985), i.e. sharing two versions of the article in progress with the student participants.

To analyse the data, we drew predominantly on Adele E. Clarke’s approach in Situational Analysis (2005). In this volume Clarke further develops Strauss and Corbin’s grounded theory (1998) to better account for the complexities of social processes and the role of the investigator. Situational analysis is aligned with the Science & Technology Studies framework Symbolic Interactionism, where social processes can be understood through the concept of social worlds such as professional or recreational groups and their shared beliefs which lead to collective actions (Shibutani 1955 in Clarke 2005). Paying attention to social groups and their interactions in this way highlights both the existence of a larger ordering institution in the background and how people usually engage in several of those social worlds. A key analytical task is to identify where social worlds (or sub-
worlds) intersect, as on a university campus, and examine the processes, strategies and consequences of these intersections: who authenticates actions, how anticipated instabilities are negotiated, what patterns of collective commitment emerge and how actors seek to legitimise their actions (Strauss 1978; Clarke 2005). Attention is paid to the values, discourses, material practices and symbolic discourses, or “logics” (cf. Hess 2016), of the various social worlds.

Analysis proceeded using situational analysis maps and open coding as methods: “situational maps” were used to see the elements involved and how they related in specific situations, how the different discourses, human and non-human actors related to each other, and social world or social arena maps helped to articulate the sites of action and collective commitments: the larger picture in which the project was embedded (Clarke 2005). The research materials (such as documents) were summarised in text descriptions. The field notes and interview transcriptions were analysed inductively using open coding to allow themes to emerge from the data, giving voice to the multiple actors (Clarke 2005). The coding analysis focused on how participants framed their experiences, when, for example, questioning the naming of things (e.g. a “university project”) that contradict some of the actors’ interpretations.

The first author prepared the summaries of the research materials and created map diagrams based on initial open coding: what the participants spoke of as valuable, i.e. having symbolic meaning for them, and as bottlenecks for the Test Site initiative, affecting commitment and stability. The map diagrams and summaries were discussed with the second author in five analysis sessions. The sensitising concepts (Clarke 2005) for the analysis probed the following: (i) how did the site unfold? (ii) what is experimental about the site? (iii) what is the meaning of the site for those who partake? (iv) what was learned? – in order to arrive at a first listing of codes. In a second round of coding, we highlighted two sets of codes or tensions as most compelling: (i) Teaching/ Control/ Inside versus Defining/ Autonomy/ Outside; (ii) Visible/ Useful/ Concrete versus Invisible/ Ephemeral/ Open-ended. In the following, we discuss these codes in the results section as the themes (i) “The charm and challenge of experiments: Nobody will visit a research paper” and (ii) “Different returns on investment: Visible and invisible harvest”.

Results

Several tensions arise from the story of the Test Site. One relates to the start of the project when students wondered about the mode of teaching and learning sustainability: experimenting with sustainability education brought it outdoors, but also outside of official teaching and curricular objectives. The outdoor green space allowed the students some autonomy and control over the topics they wanted to explore and how, but the location was organised and sanctioned by staff members. In addition, students were subject to the weather and constrained by course schedules. The students’ experimentation was unstructured and open-ended, which jeopardised recruitment and ongoing participation. Staff members needed to justify the use of space, materials, money and time by showcasing concrete, visible outcomes. However, over time, the fact that outcomes needed to be produced, formalities to be followed and students had to leave, helped the development in several ways. When both existing students internally but also new students started to discuss the purpose and strategy of “Test Site” one year in, there were visible outcomes to argue with or against. What students valued the most through the experimentation, self-organising and collaboration skills, were ephemeral and invisible, and more challenging to be brought back into the institutional fold of formal university teaching and learning – if they were to be brought in at all. The following two sections will further illustrate these tensions with excerpts from the data.

The charm and challenge of experiments: “Nobody will visit a research paper”

As mentioned previously, one of the starting points for the Test Site was a couple of students “who did this Tanzania course and […] felt like, why are we promoting this technology in Africa but we are not
willing to use it ourselves?” Several other students from the same interdisciplinary Master’s programme on sustainability stated their discontent with learning about sustainability “in theory” in similar ways: “We always study the environment but we are never in it; we are studying it from our air-conditioned rooms”. Alongside the perceived theory-laden approach, sustainability was seen to carry a heavy psychological burden: “We felt the course was too theoretical, and also because people got a little bit hopeless”. However, while hands-on learning was imagined to create a better, more natural experience, being at the mercy of nature in the site outdoors also brought very Finnish weather problems with it. The long winter season presents certain challenges compared to e.g. Central and Southern Europe, where “different factors […] are hindering but it wouldn’t be the weather at least” which keeps one from working. Despite differing expectations and unknowns about how the harsh weather would impact the Test Site, the first meeting was well attended and brimming with enthusiasm.

At the same time, being outdoors, i.e. outside of “the university”, also pointed to questions of autonomy. One initiator stated that, “it felt so good to be outside. University is so indoors. It also made a separation, a sense of freedom”. The idea of a place where students could experiment was well aligned with the aspirations of both the Master’s programme leader as well as the campus sustainability officer. For the former, the Test Site was meant more as “a site of display. Nobody will visit a research paper”. For the latter, the project fitted the overall strategy of a sustainable campus which draws from “three ideas: circular economy, living labs, campus as a co-creation area”. Both university staff members agreed that the project “should be self-organising, but still [we] provide some influence”. A basic example of this influence was finding the location on the campus, where similar experiments already existed albeit less visibly. Even if the Test Site’s position on the campus map is comparatively central, it is still relatively hidden (see Figures 1 and 2). The location, near an existing community garden, was selected strategically – visible yet somewhat secluded and therefore not a high-risk, high-profile public showcase. However, the university members were also critical about the collaboration, feeling that the “students did not appreciate outside guidance”, in the sense that their suggestions were not taken up much. Some of the students understood the will to guide from outside, but also forged their own identity rhetorically and visually: “it is okay [that] they took ownership, because the land we are on is given by them. But we have our own identity” (Figure 3).

Another helpful move from the two invested university members was the successful application for a small grant related to a circular economy course from the national innovation fund SITRA. While the money clearly translated into budgets for better organising the project, it also became part of continued struggle. On the one hand, students were very economising and used the money sparsely. On the other hand, neither students nor staff managed to keep full transparency of the money flows. While all agreed this was not based on bad intentions, it still led to confusion and tensions. One reason lay in the extra work in the form of reimbursement forms and documentation folders. The programme head was sceptical about the role of the money, saying: “Just the […] money was the problem. Without it, there would have been no work for me, students would have had to collect used materials”. At the same time the programme head felt that current university structures do not provide good tools for this type of extra-curricular work and the ones managing it. Therefore, he used part of the funding to hire a student as a part-time worker for the Test Site. While this was initially contested by the students, and not an easy task for the part-time worker, it was later appreciated from all sides as a useful intervention.

The invested university members tried to lobby for more support for the student-run sustainability experiments, which indicates their commitments and concern with what was worth stabilising. The sustainability officer pointed out that, “we did this kind of hidden organisational push so we could ensure the continuity” and that it was important to make “our students understand how complicated it is sometimes to put practical things into practice”. The students wanted autonomy but at the same time they were dependent on support from within the institution. Moreover, starting projects by which to negotiate the meaning of sustainability when few strings were attached – literally and figuratively “outside” the university – was challenging. It was eased by having a stable, dedicated
Figure 1. Campus map, where the Test Site is indicated by the small black circle, located between the schools of design and business, the seat of the administration and a start-up centre.

Figure 2. The Test Site. Reproduced with permission.
physical site. On the institutional side, unlike other experiments, this project did not involve endless red tape, yet benefitted from proactive members.

The process also became easier once such meanings and definitions of sustainability started to become materialised, which could be fought against or developed further. While most of the students and the university members agreed that on the project level not much experimenting with radically new approaches actually happened, what can be observed are struggles with where to find usable, leftover materials or how to live up to internal understandings of sustainability:

[T]he Japanese foot bath [project …] wanted to make a design that didn’t make use of any glue or any weird bolts or anything, so everything was made with a certain type of wood connection that would click into each other. But in order to do that she needed a certain type of wood.

While this underlines that students experimented materially, another student critically questioned some of the projects, asking what was experimental about setting up a garden and the like. Indeed, the visible projects physically assembled at the Test Site did not resemble the initial mode of ongoing experimentation when the test Site started. Instead, these were either completed projects needing maintenance (e.g. The Solar Disk, The Soap, The Beehive, The Footbath) or somewhat incomplete projects that were not taken further (e.g. The Gas Cow, The Shelter). The urge for autonomy of the experimenters came against institutional limitations such as study time and funding processes which faculty members and students tried to negotiate, resulting at times in unfinished projects.

In this first theme of the results section, we underlined the tensions around the students’ negotiating the meaning of sustainability and the use of the site. While the experiments literally provided ground for the students to explore on their own what sustainability should entail, they were nonetheless dependent on organisational support. While this support in the form of money and legitimacy helped to stabilise the experiment, it also demanded time and created difficulties for organising. For the invested faculty members again, the experiment provided opportunities to break free from routine settings and showcase student output that would otherwise remain difficult to organise.

**Different returns on investment: visible and invisible harvest**

When applying for funding, the programme head made use of early renderings of the project idea in order to show what could be happening there and its aesthetic appearance (see Figure 4). The
student who had provided the renderings also highlighted that the images and the project itself have worth for the university on a rather superficial level, because it somehow proves that strategies materialise: “[…] it’s quite sexy to show this sustainable initiative, this sustainable campus stuff”. In much the same regard, the sustainability officer stated her experience from ten years of promoting sustainability experiments inside the university:

The best thing to have is something useful to communicate the idea to the community when the president or the city mayor are meeting. Have a good picture, have a good title, and then […] you gain the support when you are at a crucial state the next time, […] you have an example, hey, this [is what it] means [to have] a living lab.

These pictures are then easily circulated and are visible outcomes, or projections of possible outcomes, which help to get projects further or start new ones. The programme leader also emphasised that while he did not see the Test Site changing the campus, he and one of the students could use the Test Site renderings as a reference for their two projects on alternative soil enrichment which does not harm the environment. (Soil enrichment and interspecies ethics were salient topics in a university where there was no soil science research unit and where design, engineering and business dominated.)

Alongside the projects and their documentation through images, further relevant outcomes included the inherent technical learnings by the groups, such as the project on self-building a solar panel. However, when something led to the panel’s malfunction, the respective group behind it did not continue with the work as part of a new loop of experimenting. In this regard, most students agreed that the technical learnings each team encountered in their respective projects were not shared, even though that was repeatedly formulated as the aim. In other words, even though there were online folders to document the project development, students did not document the work through photographs or text descriptions and share it with the others by uploading them.

Instead, several students pointed to less visible learnings: one of the initiators said that while the above-mentioned objects “were the ‘physical’ outcomes, […] the actual outcomes that are the most interesting are things like, how does something like that evolve and come into being and emerge”. The students therefore emphasised that in the end, it was the social learning on self-organising that had greater impact than the technical knowledge acquired through prototyping: working as individuals while within a collective and learning how to collaborate, recruit and sustain activities were the greatest rewards for their investment in time.
The value of autonomy and self-organising was present from the beginning, when the first group meeting revolved around starting the Test Site based on a set of shared values and interests. However, it was also clear to some of the students that these values were often discussed but failed to be enacted. Some – possibly more self-directed – students felt that constant discussion, promoting a sense of democracy and everyone having a voice, slowed things down. One student pointed out that, “before it was slow and a lot of talk, and so at first I wasn’t motivated that much anymore, but once it started, I got really excited, and it also made me quite proud”. There were also different interactions needed in the starting phase, such as proactive exploring, recruiting or promoting, compared to the upkeep phase of such projects, where students had to commit and deal with more prosaic processes and outcomes.

As part of self-organising, recruitment of participants in ways that underlined the collective notion of the site was important. In later phases, the students staged regular building days and a social day every second week, underlining a collectivity, a shared collective identity, which only appeared over the years. An illustration of this aim for collectivity is seen in the open call for a new generation of projects in 2019, which was explicitly inviting group projects and not individuals working on their own. (Open calls were general invitations sent to the entire university student body to propose sustainability projects for the Test Site.) At the start of Test Site, outsiders showed interest but ultimately did not become involved: “We had problems getting others in because we didn’t know what we were in the first place”. This became easier with time when more protocols and routines had been established and people could argue for or against something. One of the students who was working on the later internal project called “The Glue” summarised her experience with participation in this way: “There was a tension between how much flexibility and how much structure [is needed], but in a way the fixing [of our first trials] helped people to get involved”. It also appeared that some duties like gardening were much easier for others to join, compared to something more open-ended and experimental: “Anyone can move a wheelbarrow or do some weeding, not to say that all gardening is easy, but it’s a low level of entry”.

The opposite of the gardening would then be projects that were less self-explanatory. One example was the central project called the shelter, which was a wooden structure (measuring 6 × 6x6m) that at some stage should provide both a meeting place during bad weather as well as material storage. The experiment here was to build it only as a bare structure so that others would feel more empowered when applying their own ideas regarding e.g. sustainable insulation. However, as the main coordinator of this sub-project stated: “The metaphor of a clothes rack in the shelter project did not work at all, not a single person, besides having big ideas, did anything at all, all levels included”. This underlines a tension between the idealism of making something available for everyone else to shape, versus how likely people actually are to invest their time and act.

In this second theme of the results section, we have underlined the tensions between visible and less visible (or invisible) types of outcomes and learnings that occurred. These included visible proofs of impact, such as the site and its physical projects or photographs and renderings, which were useful in securing institutional support. While the Test Site’s experimentation outcomes also entailed forms of technical learning, the social learning regarding the organisation of the initiative and creating and updating its rules, protocols and roles, was deemed most useful by the student participants. However, as several participants recognised, these learnings remained difficult to share and therefore appeared less visible.

**Summary of insights**

We have outlined two themes with regard to the outcomes and the perceived meaning of participation in grassroots experiments in institutional university environments. The first theme examined the importance of the physical location of the Test Site and how it rendered different experiences by various actors as valuable or constraining. Students concerned with just sustainabilities had the freedom to experiment in the “wild”, but were still confined to campus, and therefore university,
structures of teaching, learning and knowledge production. The second theme highlighted how the visibility of material experimentation outcomes and the invisibility of what students claimed they learned about sustainability, created tensions with regard to recruitment, commitment and legitimacy. Without visible proof, it remained difficult for the students to justify to each other that their exploration was worthwhile and should continue.

Both themes addressed the tensions in the need for institutional support and how to justify it in terms of “returns” or benefits. For example, the students were critical of the use of money, study credits, salaried positions and hierarchical leadership within the Test Site. Despite the criticism, however, the paid student worker clearly helped to stabilise the project and provide needed infrastructure. The advantage of receiving funding was partly counterbalanced by the bureaucratic work it created, but it also meant that there was more incentive to produce neat and clean (formalised) objects and images that were, in turn, used to solicit more funding and/or institutional legitimacy (by showing images in meetings to decision makers).

Both themes also draw out what was valued by the students: at first, the freedom to choose sustainability topics to work on and later the learnings gained through sustained collaborative action that emphasised collectivity over individual initiative. The students actively sought alternative ways to engage in “sustainability”, ways deliberately counter to what they saw as problematic in university knowledge production: for instance, the students’ apparent worry about exporting compost toilets to Africa as part of sustainable innovation yet not disseminating them further at home. What the toilets are in Africa, are the air-conditioned rooms of the campus buildings in Finland (in which the students wonder why it is there they learn about sustainability).

However, this will to explore had practical limits insofar as exploring the workings of, for example, basic solar power or sustainable building practices were not taken up to any new level and were even abandoned after problems occurred. Instead, the students emphasised the importance of practising to be inclusive on-site, and the process of working together was deemed as the main learning. This was challenging to concretise by the interviewees, as it entailed the patience of learning to work together, go through frustrating community meetings, devise an Open Call that explicitly asked for applications from teams rather than individuals, initiate projects that would attract new participants, and so on. At the same time, there was no similar “return” to the university in terms of formal research or teaching contributions: there were no pedagogically aligned learning objectives, for example.

**Discussion: the difficulty of making experimentation and a place last**

In this section we reflect on the study’s key findings in dialogue with insights from the literature on experimentation. The sustainability officer’s praise of living labs, the programme lead’s focus on a “playground” and the many interested students in the first call for the “Test Site” emphasise just how enchanting the promise of testing out a vision is. This excitement reflects what Evans, Karvonen, and Raven (2016) in their book *The Experimental City* refer to as the charm or attraction of experiments. Hence, it was crucial to have actors committed to the vision, whether living lab, playground or testing site, in order to secure the physical location – which in turn helped to ensure other participants’ commitment.

We have also seen how the renderings of the Test Site and the fact one could visit an actual real site led to further research projects. These physical outcomes also proved to be essential in committing people, illustrating Hinchliffe et al.’s (2007) notion of two responsibilities, namely the need to be “seen delivering” and to be aware of the time-consuming work of others. Evidence is not only important for funding bodies or other external actors; it is equally important for the people working through their messy projects – allowing collectives with less political power to act in modalities outside of the imaginary of neoliberal capitalism (Hinchliffe et al. 2007). Therefore, demonstrations have different functions and returns for the “investors” outside and inside.
At the same time, the second responsibility, that of otherness (ibid), being aware of others’ work and contributions, is also present in the Test Site. For the most part, the learnings did not resemble the technical/cognitive type (albeit some personal learning journeys certainly took place) but rather a situated type of social learning as a community (König and Evans 2013; Heiskanen et al. 2017). Be it the patience of learning to work together, and go through frustrating community meetings; or the Open Call that explicitly asked for applications from teams rather than individuals: the experimentation contributed to increasing levels of collective responsibility, of acknowledging each other and being generous towards others.

Nevertheless, the students were not truly “in the wild” and could not always escape the institutional constraints of the campus. Missing commitment over time due to student transience on campus impacted the Test Site and is a key factor in initiatives such as university campus community gardens (Laycock Pedersen and Robinson 2018). As universities become ever more efficient and increase student throughput so as to not waste resources, their formal structures of curricular courses and learning, legitimised in the form of credits and grades, will only amplify (May and Perry 2017). The power of young people to influence their own learning is fragile and prone to these bureaucratisation processes.

Consequently, at a time where not even experts can provide us with blueprints on sustainability (Lave 2012; Skjølsvold 2013), the role of community-based grassroots experiments in environmental knowledge making is fraught with conflict, especially when placed within university confines and neoliberal science regimes. The Test Site, and similar initiatives, underline the ongoing struggle over scale, insofar as universities initiate large infrastructural change projects, the learnings of which should be used as a recipe elsewhere (Evans, Karvonen, and Raven 2016). Such “exportability” often renders the work as techno-solutionist and open to critique (May and Perry 2017).

Elsewhere we have argued that environmental activists use grassroots material experimentation to the same ends as these Test Site students: to learn about and practice what sustainability and unsustainability is in lived experience onsite and with commitment, identifying issues ignored or neglected by mainstream institutions (Berglund and Kohtala 2020). These activists work in modalities we have called “the dirt way” – a non-formulaic way of getting to answers “the wrong way”, referring to Bowker and Star’s use of the term to illustrate how people work against organisational constraints to get things done (Bowker and Star 1999; Berglund and Kohtala 2020). The Test Site participants found worth in having something concrete to show for themselves – in working the dirt way, intimately involved in place and materiality, rather than in isolated, “tamed” classrooms, in which the legitimate forms of sustainability are pre-defined (cf. Farrell 2004; Marres 2012). Such experimental performances allow social actors to explore their abilities to make change and articulate contentious sustainability issues, which gives these issues a new public form (Lezaun, Marres, and Tironi 2017).

Experimenting as “social learning under conditions of deep uncertainty” (Sengers et al. 2016), with pending or unclear outcomes and emergent, non-hierarchical organising, can easily turn into frustration. Claims about how DIY urbanism’s aesthetics and materiality, its unfinished touch and malleability enable and even invite participation do hold true (Wendler 2016), but only partly. Even so, the Test Site showed how collective DIY experiments do offer useful and concrete formats which stabilise experimental settings that are otherwise open-ended. The demonstrations on the Test Site made its purpose clearer and proved useful for new participants to argue for or against something.

Finally, we can also posit that the Test Site went through the front line of the struggle underlying any negotiation of sustainability, namely the interrelationships between economic, ecological and social modes of organisation and working through them (Hodson and Marvin 2017). Whether this has potential for transformation partly hinges on the question of how competing logics can in the end inform stakeholders such as an institution like the university on what was learned (König and Evans 2013), or even change epistemic practices (Temper and Del Bene 2016). On this point, we can agree that learning from the Test Site was only weakly communicated back to the institution.
Therefore, while the university allowed for an experiment in turn could not change the existing structural limitations.

Conclusions

In this paper we have examined how students valued experimentation and the role it played on a "sustainable campus". On both symbolic and material levels, we conclude that indeed, the modality of experimentation is highly charming. Key personnel of the university were excited to break free from the curricular, day to day procedures and instead showcase different processes, following largely the discourse of living labs and campus co-creation. For students, process entailed a feeling of autonomy, mostly symbolised by their “own" piece of land. This included material projects through which they explored social and environmental aspects of sustainability in a self-directed, practical manner. Experimentation was thereby linked to different meanings for the stakeholders, to what environmental issues were seen as relevant in comparison to formal course syllabi, and who had the power to decide.

Secondly, there were also different expectations and outcomes regarding this grassroots experiment. We posit that there were two different, yet co-constituting returns on investments in the "Test Site", namely visible demonstrations and a less visible social learning. On the note of demonstrations, personnel were keen on establishing the “Test Site” to showcase students’ work and thus photographs or renderings showing (possible) results were helpful both in the establishment of the site and further projects following the “Test Site”. For the students, physical outcomes mattered as well. In the university world they were conditioned by, that of learning objectives, structured timetables, formal assessments and proofs-of-concept, open-endedness appeared chaotic and self-selection useless. The Test Site was then a place to produce something concrete to which to commit. The more important result for the students was something less visible, namely, how to organise a collective in an inclusive manner within the open-ended setting of an experiment. This draws attention to the shortcomings of a techno-solutionist perspective of sustainability and the opportunities for experimental learning beyond the traditional classroom.

As informal experimentation within an institutional, educational setting, the Test Site’s own experiments did not directly contribute to or impact the university’s formal teaching and research activities, because the final decision-making power on curricula hinges on various expectations of what universities need to deliver and what are efficient ways to do so. Experiments were nevertheless key to establishing further experiments within the university, indicating growing support of experimentation as a modality. The promise to test, to turn ideas into reality and to negotiate this as part of sustainability transformation is promising, but the “what” is important for the participants as well as the why and the how. Experimenting in an open-ended manner to define what sustainability means in lived practice and who has the power to define, is what mattered, and this was the most challenging aspect of this modality.

Acknowledgements

We would like to thank the students and staff involved in the Test Site for their insights and the members of NODUS (Sustainable Design Research Group) and INUSE (Users and Innovation Research Group) for their valuable comments on earlier versions of the manuscript. The work was supported in part by the Nessling Foundation (Grant 201900394).

Disclosure statement

No potential conflict of interest was reported by the author(s).
Funding
This work was supported in part by the Nessling Foundation under Grant 201900394. Maj ja Tor Nesslingin Säätiö.

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