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Chapter

Green Pedagogy: Using Confrontation and Provocation to Promote Sustainability Skills

Anne Fox and Christine Wogowitsch

Abstract

The chapter describes the features of Green Pedagogy, originally developed in Austria in German where it is still being actively researched. Green Pedagogy offers a structured approach to lesson planning to achieve embedded sustainability competencies within a specific vocational or academic field. The Green Pedagogy approach achieves sustainability competency through a controlled appeal to the emotions and the explicit uncovering of learner values to take on new ideas and new perspectives in a more sustainable direction. The approach is compatible with many recommended Education for Sustainable Development (ESD) pedagogies such as project-based teaching and the case study approach. The approach also implements several more general evidence-based pedagogical strategies such as concept change. The key feature of Green Pedagogy is that the process ends with locally based action whose wider implications are explored. We relate some of the challenges involved in translating a pedagogical approach from one language to another as the ProfESus Erasmus project aimed to disseminate Green Pedagogy to a global cohort of teachers of home economics in English. Reactions of participating teachers in the piloting of the training are explored and some practical solutions offered.

Keywords: Green Pedagogy, home economics, pedagogy, sustainable consulting, sustainability education

1. Introduction

Green Pedagogy is a six-step framework for planning learning experiences from a sustainability perspective that can be applied at many different educational levels and in many different academic and vocational directions. A notable feature of Green Pedagogy is that students not only learn about topics from a sustainability perspective but that they also apply what they have learned directly, to affect their immediate environment, as well as being led to reflect on the potential of their local action for the future. These last two steps of Green Pedagogy ensure that a sustainability perspective is one of empowerment and personal growth rather than simply a source of despair and paralysis in the face of large and intractable problems. Green Pedagogy, as other sustainability approaches, is based on an onion model of wellbeing that assumes that economic wellbeing is dependent on social justice, which in turn is dependent on environmental wellbeing, the so-called strong sustainability model shown in **Figure 1**. This contrasts to the primacy that is usually accorded to
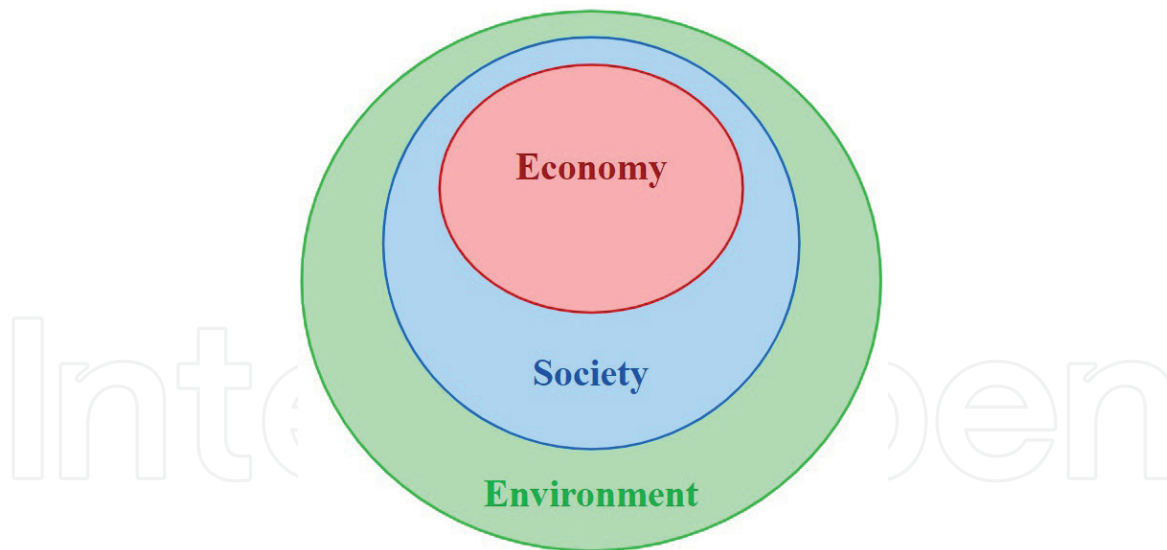
Figure 1.
Nested strong sustainability model.

economic wellbeing in many day-to-day decisions. The final two stages of Green Pedagogy are the way in which the approach builds sustainability competence by automating a sustainability response in the learners; in other words, building a sustainable mindset by making visible the sustainability values upon which daily problem solving can be based.

This chapter is narrated from the perspective of a project that involved the practical transfer of the Green Pedagogy concept from its Austrian-German origins to English in a specially developed blended learning teacher-training course. The linguistic challenges reflect to an extent those faced more commonly in the other direction, from English to a local language and context. The European ProfESus project developed a training course for home economics teachers to help them promote a sustainable mindset in their learners by applying the Green Pedagogy approach and this experience will be used as a case study to illustrate the application of the approach and how it is received both by in-service teachers and student teachers. The coordinating institution of the project, University College for Agrarian and Environmental Pedagogy (UCAEP) in Vienna, Austria, is home to the well-developed Green Pedagogy, which formed the pedagogical basis of the course developed by the project for deployment at European level and beyond. This chapter describes the challenges and successes of translating and transferring a specific pedagogy across languages, cultures and contexts.

Globally, home economics has diminished as a school subject but there are indications that governments (such as Australia's sustainability curriculum) may recognize the value of strengthening home economics at the school level, given rising global levels of food waste and lack of knowledge about healthy eating and food preparation. There is therefore a direct link between home economics and the issue of sustainability, but several other school subjects exist for which this pedagogy is suitable.

2. Background to Green Pedagogy

Green Pedagogy or *Grüne Pädagogik* [1] was developed at UCAEP in Vienna as a way of promoting a strong sustainability mindset [2–6] in learners. The main aim of the approach is to uncover and explore the values of the learners by provoking emotions and to extend their perspectives, especially regarding the wider range of potential stakeholders, to guide learners to an actionable vision that it is possible to

apply in their local context; a "glocal" approach. The approach has been developed by UCAEP in detail [1] since 2010 when it was first introduced as a way of connecting the agrarian, environmental and pedagogical training strengths of the College. Green Pedagogy was deliberately developed as a practical, implementable pedagogy as a counterpoint to the political policy imperative of Education for Sustainable Development (ESD) which has its roots in international organizations such as UNESCO.

Implementing Green Pedagogy was a central aim of the ProfESus Erasmus+ European project to develop a teacher-training course for home economics teachers that was proposed and led by UCAEP over two and a half years from 2016. The aim of the course was to train home economics teachers to help their students develop professional competencies that were more sustainable. The 8 ECVETS/ECTS blended learning course included several innovative aspects, but one of the main aims was to spread the practice of the Green Pedagogy approach out of Austria to the rest of Europe and beyond.

The first obstacle faced by the pan- European project group with partners from Italy, Latvia, Denmark and Finland as well as Austria, was that there was no description of *Grüne Pädagogik* in English. A literature search for Green Pedagogy in English in 2016, when the project started, led to few results. Those results that did occur were mostly where the concept of Green Pedagogy was used in the same way as the adjective 'green' is used in many English contexts to mean something environmental, sustainable or organic but that did not refer specifically to the Green Pedagogy approach which had been painstakingly developed over several years in Vienna. The first challenge is that the developers of *Grüne Pädagogik* had adopted an adjective that was in general use in English but had no specific reference to their work although, as we shall see later, this was not to be the only linguistic challenge involved.

Most descriptions of sustainable education such as Sterling's Future Fit [7], and The Natural Step [8], describe a holistic, multi-faceted and long-term process approach and Green Pedagogy is no exception. This leads to a barrier of complexity when translating from German to English. However, since the Green Pedagogy approach is based on some well-known pedagogical theories such as constructivism [9, 10], experiential learning [11] and conceptual change [12], these provide familiar footholds into the approach.

3. Aim of Green Pedagogy

The aim of Green Pedagogy is to go beyond surface learning, beyond knowledge and skills and to target long term attitudes or mindset. Attitudes can be further subdivided into values and collaborative skills [13]. By targeting attitudes, the aim is to achieve deep learning about sustainability based on a more conscious understanding of how actions, such as the way in which one plans and prepares a meal in the home economics class, support or negate existing values. In this way, sustainable practices cross over into other areas of the learners' lives at home, at work and in their community in the form of deeply ingrained sustainability competencies such as those developed by UNECE [13].

4. What is Green Pedagogy?

The Green Pedagogy approach to embedding sustainability in the classroom can be summarized in **Figure 2**. Already in translating the diagram from German
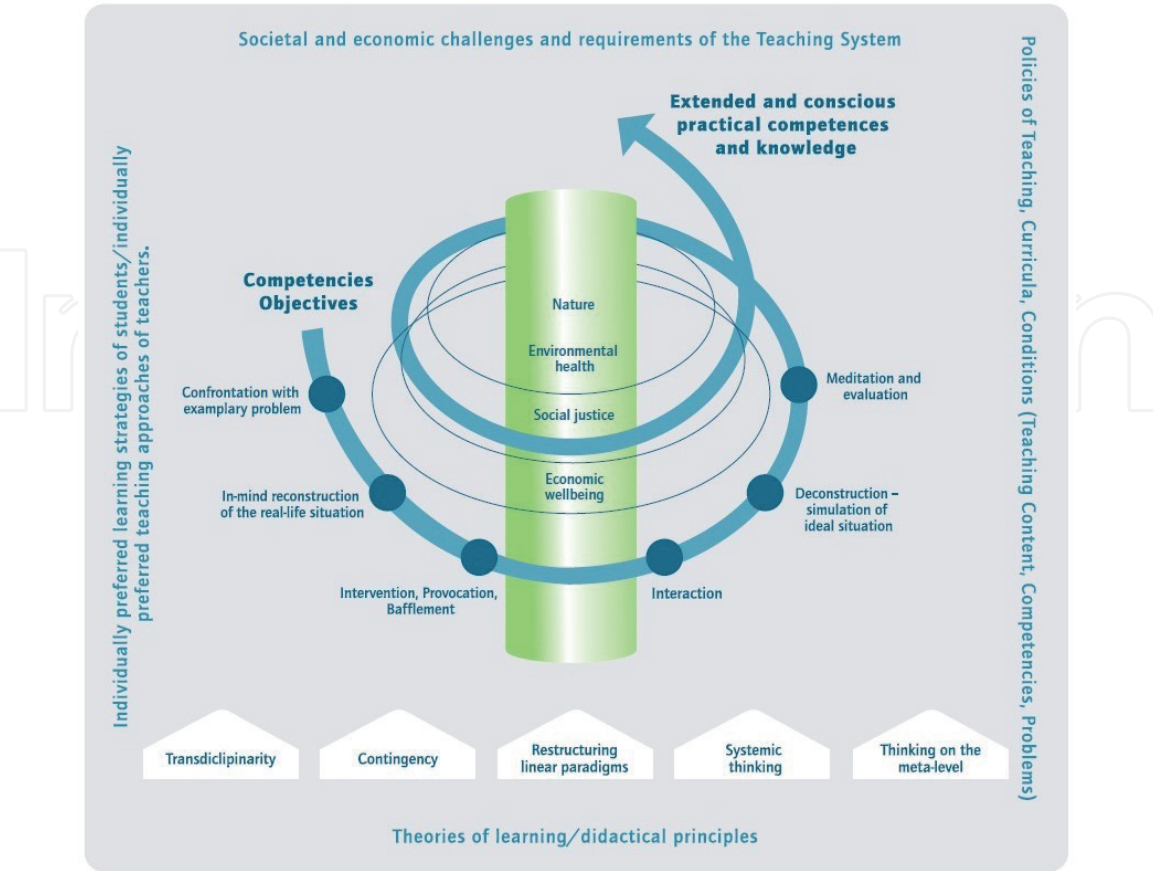
Figure 2.
Green pedagogy: A visual representation.

to English several important decisions have been taken that will lead the English speaker in certain directions that may not be the intended one. In the remainder of this chapter, we will explain the diagram and end by considering some of the questions that teachers raised when meeting this framework for the first time.

The approach is primarily a pedagogy but can also be used to guide consultancy work. The advantage of Green Pedagogy is that it provides a template for learning activity planning, with the six dots at the base of the spiral representing a recommended lesson planning structure and sequence. The plan need not be restricted to a single timetabled lesson but can be stretched over a series of connected lessons that could represent a case study, a project, a research activity, a lab activity, work placement or a field activity. To account for the fact that a single cycle of Green Pedagogy may stretch over several timetabled lessons, we will use the term learning activity plan (LAP) to refer to a Green Pedagogy cycle. The six steps can be applied across disciplines including most of the subjects that are commonly found in a school timetable. The six steps can also be applied at different education levels from lower primary to higher education. The creators of Green Pedagogy assert that this is a pedagogy that could be used as an everyday pedagogy in most cases [14].

Figure 2 conveys the holistic complexity of Green Pedagogy, which comprises the six steps that should be present in every planned learning activity. These six steps are shown against the background of a rising spiral, which indicates the continuous nature of the process to acquire experience-based competency based around the main pillar of sustainability that comprises economic wellbeing, social justice, and environmental health in the center. The first implication of Green Pedagogy is that this should not be a one-off activity in the way that, for example,

some educational institutions include project-based activities on an occasional basis. A major reason for this is that sustainability in this model is seen as a competence that can only be developed with practice over time, rather than a body of knowledge that can be covered after which educators can move on to the remainder of the curriculum.

Another significant aspect of the diagram is that it refers to 'practical competencies' at the top of the spiral. The implication of this is that the sustainable competencies should always be practiced in conjunction with school subject competencies or vocational competencies. In the case of the ProfESus project, sustainability competencies were promoted in conjunction with home economics competencies. In this way, sustainability is embedded in everyday practice rather than seen as a separate bolt-on activity. In the case of the ProfESus project the target group was home economics and hospitality teachers and trainers. Thus, in the pilot training course, the participants were expected to state explicitly which sustainable competencies and which vocational competencies they were targeting in every learning activity.

We will deconstruct the diagram from the bottom up.

5. Pedagogical foundations

Green Pedagogy is based on several pedagogical foundations, many of which are inter-linked. These are at the base of **Figure 2** from left to right:

5.1 Transdiscplinarity

Systemic thinking is a cornerstone of effective sustainable action [15]. The typical school timetable divided into different subjects is the antithesis of systemic thinking, therefore Green Pedagogy encourages teachers to cross disciplines. Transdiciplinarity refers to literacy in and ability to understand concepts across multiple disciplines. In the ProfESus project an example of this was when one of the home economics teachers planned a project in collaboration with the English teacher in a Swedish school since a great deal of important sustainability material is found in English. This was an authentic and natural way to cross disciplines.

5.2 Contingency

This is a reference to contingency theory [16] which says that every situation is unique and that there is therefore no single optimal solution but only a solution that takes account of the internal and external aspects of whatever specific situation is being analyzed. This reminds teachers that whenever they take up a new topic in class, they need to encourage their learners to evaluate the internal and external situation of the problem being analyzed and come up with their own specific solutions and furthermore that several solutions may be equally appropriate. Going further, contingency also points to the potential for learners to propose viable solutions to real world problems that could be implemented.

5.3 Restructuring linear paradigms

The complex nature of sustainability questions means that it is useful to explore problems and their solutions in a holistic and non-linear way in contrast to the reductionist approach increasingly seen in the scientific disciplines according to Foerster [17]. This aspect of the pedagogy is not only relevant to discussing existing

situations but also relevant to the ability to conceive of different future scenarios as variables change.

5.4 Systemic thinking

Systemic thinking is well known as a key factor in developing a sustainable solution to real world problems [15] since students must see all interwoven aspects of the system under consideration in their own community. Thus, systemic thinking is a precondition for any effective sustainable learning process. Systemic thinking encourages problem solving through defining the problem as part of the system from which it derives and then looking at different aspects of the system to see which of these need to be, and which can be adjusted to come closer to a solution of the problem.

5.5 Meta-thinking

Since the Green Pedagogy approach is more than mere knowledge transfer but also about developing a sustainable mindset around relevant collaboration and values, it is appropriate to add a layer of meta-thinking. This is supported by the extensive work of educators in promoting thinking about thinking as a way of raising learning levels in general. As an example, the work of Ritchhart, Church and Morrison on what they term Visible Thinking [18] is enabling educators globally to engage learners in thinking about their thinking to measurable effect in terms of achieved learning. Meta-thinking is important in the application of Green Pedagogy in that it supports the generation of novel solutions to intractable and complex sustainability problems. It has also been pointed out that the increased complexity of the modern world requires increased self-reflection, which is an integral part of meta-thinking [14].

It could be argued that these five cornerstones of Green Pedagogy seem to overlap, and that systemic thinking could be sufficient to cover them all. However, each cornerstone highlights a specific aspect of systemic thinking that is of benefit when being considered by teachers separately as they develop their learning activity plans.

6. The six steps

It is recommended that once a teacher or institution has made the decision to promote a sustainable mindset in their learners, that most learning activities should follow the Green Pedagogy format in the order in which they are described across the six steps. The learning activity plan template developed by the ProfESus project helps teachers planning one or several lessons or trainings. It is often more appropriate to go through the six steps over a series of lessons rather than in one short 45-minute or 90-minute timetabled class. The learning activity plan (LAP) [19] template is thus a tool to act as a prompt for teachers so that they do not forget to highlight the targeted professional and sustainability competencies and how they will be exercised over the six steps. The LAP template can be used as an aide-memoire rather than being explicitly filled out before each lesson or group of lessons.

As we describe the six steps below, it should be noted that where there is a choice of topic, the teacher should choose 'wicked problems' (*i.e.* unGoogleable problems) [20] that are part of complex systems and of direct relevance to the learners by preference. These could also be in the format of a case study. Case studies are particularly well suited to the Green Pedagogy approach because they often deal with

wicked problems and 'bridge the gap between theory and practice and between the academy and the workplace' [21].

7. Sample case lesson

We will now describe the six steps in more detail using the example of menu planning to illustrate how each step follows the previous one. 'The Menu today can change your World Tomorrow' is a sample lesson plan built around the application of Green Pedagogy. The main purpose of the lesson is to raise learners' awareness of the criteria to use in preparing menus for specific target groups such as kindergartners, hospital patients or residents in elderly care homes. The conventional way of tackling this topic is by focusing on nutritional values and individual preferences, tempered by budget constraints. The aim of the case study lesson is to build awareness of the complexity of planning healthy and sustainable nutrition and to use extended criteria in concrete planning situations.

7.1 Step 1: Confrontation with the problem

In this stage, learners must come to the realization that a specific problem exists and needs to be solved, achieved by finding out what learners already know about the designated topic. In the case study lesson, this was done by exploring the concept of 'meal' by showing images of a wide variety of meals, some of which probably pushed the boundaries of some of the learners. They included traditional meals, hospital tray meals, insect dishes, vegan dishes and 3D printed food. A key aspect of Green Pedagogy is to evoke and use emotions in order to prompt action and reflection and this is particularly essential in this first step in order to motivate learners. For example, most people would react to the idea of an insect-based meal, such as the one shown in **Figure 3**, with disgust.

7.2 Step 2: Reconstruction

This is the step during which misconceptions are uncovered and confronted. So, the reconstruction refers to what is put in place of misconceptions. In the case study lesson, the learners were presented with a set of weekly menu plans from different types of institutions such as schools, hospitals, elderly care homes and kindergartens. The learners were then asked to analyze the menu plans according to nutritional, practical and dietary requirements. This step is the first stage of conceptual change [12] where the teacher finds out what the students believe they know about the topic. This stage leads directly to the next step in which the perspective is widened.

7.3 Step 3: Provocation

In this stage learners are prompted to suggest solutions by being provoked with unexpected possibilities. Ideally the provocation should come as a response to the direction in which the learners have been going so far. Therefore, the provocation can neither be the start of the lesson nor be completely planned in advance. An important aspect of this stage is to widen the scope of stakeholders involved in the problem. In Green Pedagogy, this stage is also referred to as "irritation" and this can be confusing for English speakers as we explore later in this chapter.

In our case study lesson, this stage was achieved by showing the learners images of the food production, consumption and waste cycle involved in some of the menu plans that had been described. These included images of intensive farming, use of

Figure 3.
Tarantula spiders as a meal.

Figure 4.
Do eggs and chicken come from battery farms?

pesticide, intensive farming methods of animal husbandry regarding pigs and milk cows as well as images of the food waste and garbage that is a common end result of this type of institutional catering. At this point the learners realized that they had not considered intensive farming methods (as seen in **Figure 4**) or pollution problems that were embedded in their menu plans. Their perspective had stayed almost wholly in the kitchens.

This step is the second stage in the conceptual change process in which beliefs are challenged. This stage was an invitation to re-visit the menu analysis stage to discuss possible improvements. In a learner group that has already been exposed to Green Pedagogy for a while, this step could sometimes be a rapid and simple check whether all stakeholders have been considered.

7.4 Step 4: Interaction

The interaction stage is necessary for learners to process and evaluate possible solutions in the light of the wide range of additional perspectives met in the

previous stage. The interaction stage is an opportunity for collaborative analytical discussion. In the case study lesson, step 3 was a silent gallery walk. Therefore, after the walk, the learners were full of ideas to discuss what needed to be done to improve the menu plans in this interaction stage based on the new information about the food production chain. In the sample lesson, this involved discussion and writing notes on the posters about what additional information they needed before amending their menu analysis. It was an opportunity to voice the emotions that arose from the silent gallery walk of the previous stage. At this point, it is easy for learners to be overwhelmed by feelings of frustration and the teacher needs to use moderation and facilitation skills to make this a useful interaction. This is the final stage of the conceptual change process in which earlier beliefs are amended in the light of new information and thinking.

7.5 Step 5: Deconstruction

This stage is needed to reduce learners feeling powerless in the face of the problem under consideration. In this stage, learners are prompted to relate what they have learned to their personal experience. In the case of the sample lesson, learners were asked to consider their school canteen and what they could do to improve the situation in this local context. They suggested that the meals at school should be labeled according to the different aspects that they had discussed. This included adding icons to the school menu showing whether the meal is organic, vegetarian or produced according to recognized animal welfare benchmarks. In this way, learners can create viable solutions to real life problems.

7.6 Step 6: Reflection

This final stage requires the learners to create a vision of where their ideas or actions from stage 5 could lead. To embed learning, it is equally important to ask learners at this final stage what they learned in this process. In the case study lesson, this was achieved by asking what the effect would be if canteens and restaurants across the region adopted their new icon system.

The six steps do not necessarily take the same amount of time each. In some cases, it will be appropriate to spend very little time on one or two of the steps. For example, in some contexts it is possible for the provocation stage to take only two minutes.

7.7 Synopsis

We can also look at how the case study lesson plan sits on the pedagogical foundations at the base of the diagram. The proposed LAP becomes transdisciplinary at step 3 where the learners are invited to consider the wider context of their menu plan analysis. Contingency is included once the learners are prompted to consider how the wider menu analysis can be applied to their local context. The restructuring of linear paradigms occurs when the learners are prompted to revisit their menu plan analysis in the light of the new information on food production methods. The third step prompts learners to think about the whole system of food production and therefore represents systemic thinking. Finally, there are several points in the lesson where learners are prompted to think at a meta-level, when they are for example invited to consider what constitutes a meal for them, how much the production methods of food affect their emotions and when linking the general principles of menu planning to their local context and to their personal preferences.

8. Theoretical underpinnings

The Green Pedagogy approach is based on several theoretical foundations that have been extensively described in the literature in German and summarized in English [1]. These include:

Kolb's experiential learning in which learning is 'a continuous process in which experiences are collected in concrete or abstract form and are then used in experimental or reflective ways' [11]. In Green Pedagogy this is manifest through the way in which students learn through the deconstruction, reconstruction, and reflection of a specific problem (Steps 1-6).

Green Pedagogy also reflects Situated Learning [22] by proposing that learning is bounded by the circumstances and settings in which it happens, including the existing mental frameworks that learners bring to the room. This is manifest in Green Pedagogy by the insistence on starting with a meaningful problem and probing what learners already believe about the problem before going on to discover new solutions (Steps 1-6).

The theory of concept change [12] aims to counteract incorrect beliefs by first examining what learners already know about the considered problem or topic before challenging these beliefs with new perspectives (Steps 1-4).

Constructivism [9]: Green Pedagogy reflects constructivism in its step-by-step process that takes a learner from a known topic to a new understanding of the topic through collaboration, discussion, analysis and reflection (Steps 1-6).

Reflective thinking [23]: The whole process of Green Pedagogy embodies Dewey's reflective thinking which he describes as follows: 'Reflective thinking, in distinction of other operations to which we apply the name of thought, involves first a state of doubt/hesitation/perplexity/mental difficulty in which thinking originates. Secondly an act of searching/hunting/inquiry to find material that will resolve the doubt, settle and dispose of perplexity'.

Expansive learning [24] describes an approach to learning that aims to improve the lives of the learner and society at the same time. The approach uses a prescribed cycle of inquiry by highlighting the contradictions of the current situation (a specific type of problem-solving activity) and empowering the learner to find realistic solutions.

Figure 2 is bounded by reference to preferred learning approaches on the one side and constraints and requirements of applicable policies and curricula on the other. This means that Green Pedagogy can be applied in widely different educational settings. Green Pedagogy does not rule out using other proven effective sustainability approaches. It is compatible with UNESCO recommended approaches to sustainability [25] such as storytelling, project-based learning, and values education. The novel feature of Green Pedagogy is that it provides a format for planning learning activities that puts the dual competencies of sustainability and subject specific skills at its center, the whole based on learner values that are made explicit during the process.

We have described how Green Pedagogy can be applied in one specific home economics lesson, but it can be applied equally successfully to a wide range of other school and vocational training areas. The following list contains exemplars from different vocational and academic fields where it would be advantageous to employ the Green Pedagogy approach.

1. Agricultural practice: learning best practices for the control of weeds and pests

2. Geography: exploring the results and implications of different urban planning policies

3. Physics: exploring the implications of using renewable energy as well as the mechanics of efficiency

4. Hotel management: considerations when making decisions about purchase or lease of bed linen and staff uniforms, reduction of food waste

5. History: analyzing and learning from mistakes in the course of catastrophic events such as the Irish potato famine

6. Consultancy exercise: devising a new marketing strategy for a hospitality business such as a holiday activity center.

9. Implementation of Green Pedagogy

A summary of areas of current research into the application of Green Pedagogy in the classroom reveals some of the issues with which teachers may need to deal, when adopting it as a new practice. The identification of strengths and drawbacks of the concept of Green Pedagogy is a matter of ongoing research, for which lesson plans of experienced teachers are the material of continuing qualitative analysis to advance the concept itself further.

First results show difficulties in transfer to daily practice. Often, open learning processes without obvious clear solutions tend to be rejected by teachers and the processing of the resultant emotions is rather limited, even though bafflement and provocation are applied. Sometimes it proved to be hard to uncover multi-perspective points of view.

These results led to the development of follow-up courses to cover the demand for further training of teaching staff to meet the future challenges of sustainable teaching practice.

Another current research project deals with the strengthening of personal and social competencies in Green Pedagogy learning processes. It focuses on presenting concrete didactic measures to foster the development of personal and social competencies of learners. Therefore, the application of Green Pedagogy represents an active field of inquiry where not all best practices are yet finalized. This may present an additional challenge when attempting to translate the approach from its native German into English for an international audience.

10. Translation: the ProfESus case

The ProfESus Erasmus+ project developed an 8 ECVET/ECTS teacher training course aimed at home economics teachers and hospitality trainers to help them prompt sustainable mindsets in their students. The course attracted 35 participants not just from Europe but also from Pakistan, Egypt, Kenya and Tanzania. The 15-week blended learning course started with a face-to-face week in Vienna for Module 1 followed by two online modules in which participants explored different aspects of the pedagogy such as systemic and strategic thinking, collaboration, and values education in Module 2. There followed planning and execution of a lesson or series of lessons in Module 3 in their home setting and finally they met up again to exchange feedback on their experiences and make plans for their future practice in the classroom in the final fourth module which took place face to face in Finland. Course participants were introduced to Green Pedagogy in Module 1 in Vienna, revisited it as a pedagogical approach in Module 2 and were required to implement

it in their project lesson(s) in Module 3 by using the specially developed learning activity plan template in which the elements of Green Pedagogy were embedded. At the meta-level, the project partners planned the blended learning course itself to follow the Green Pedagogy structure. In the next section, we will review some of the questions and misunderstandings that our participants experienced as they tried to understand the translated version of Green Pedagogy in English. Note that for almost all the participants, English was their second language, which could have created an even greater remove between the original German version and their final understanding of it.

11. Areas of potential misunderstanding

The project had several opportunities to discover participant reactions to the new approach. These included the two face-to-face weeks, the learning diaries that formed a required part of the course, dialog during three online meetings that occurred during the online section of the course, the content of the responses that the participants gave to the required tasks and multiple feedback surveys during and after the course.

From the experience of the ProfESus pilot blended learning course the following issues regarding Green Pedagogy became apparent.

11.1 Irritation

The word as it is used in German can best be compared to the grit that forms the pearl in the oyster, meaning that this is a stage that can be used to generate new understanding and learning. It is unfortunate that the German word has its direct English equivalent, which is rather negative in meaning. Some of the ProfESus course participants therefore understood this stage 3 at first to mean that they should cause annoyance in their students, rather than the intended meaning that an attempt should be made to make learners stop and think when something surprising or out of place is presented to them.

11.2 Provocation

The challenge with this in stage 3 is that it seems too similar to the first confrontation phase, but also with placing it sometime into the lesson rather than at the beginning. Many teachers understand the value of starting a lesson by provocation, so waiting for this stage had to be justified. However, the second name for this stage, intervention, might make things clearer. Thus, a lesson starts with a confrontation that identifies and defines a problem and after exploration of that problem has begun, targeted interventions that widen the perspective of the problem, are brought in by the teacher.

11.3 The value of the last two stages

The issue of sustainable development as a central topic for a lesson is becoming more popular as the urgency of the problem becomes more apparent. Repositories such as the World's Largest Lesson and the British Council, which helps teachers globally teaching English, offer a wealth of free resources. It is common in these lesson plans to stop at the point when the sustainability problem has been described and analyzed. The last two stages of the Green Pedagogy approach are extremely important to combat feelings of hopelessness and lack of agency by focusing on

what students can do in their own context that relates back to the analyzed problem. In the example of the British Council lesson plan entitled 'Climate Change' [26], which does not follow the Green Pedagogy template, it is suggested that generating visions and solutions is added as a time-filler in case the lesson ends early, or the teacher needs to give some homework. Had this lesson plan been created using the Green Pedagogy approach it would have recognized that the last two stages of Green Pedagogy are critical for the mental health of the learners and should not be seen as optional extras.

12. Initial teacher reactions to Green Pedagogy

Green Pedagogy was new for all the non-Austrian participants in the ProfESus course. Even the participants from Germany, although German-speaking, had not been introduced to this approach before. For the Austrian participants, some of whom were recruited through the project coordinating organization, UCAEP, which also developed the pedagogy, Green Pedagogy was nothing new and already embedded in their practice.

In the blended ProfESus course, questions arose because of the unfamiliarity of the new pedagogical framework. Below are the four main questions together with responses.

1. Does the Green Pedagogy format not become repetitive over time? The response to this is that if each learning activity ends with a truly actionable plan at the personal level, this should maintain learners' engagement.

2. Can you apply this to all your lessons? The Green Pedagogy approach is almost subject agnostic. Although it may seem difficult to fit Green Pedagogy into the study of mathematics at first glance, there are wide possibilities to apply mathematical skills in the field of sustainable development, such as land consumption, food waste percentages or precipitation amount. Most traditional school and vocational subjects easily lend themselves to the Green Pedagogy approach.

   The question also refers to the use of Green Pedagogy throughout a course, which is implied in the methodology aims of Green Pedagogy and therefore it is beneficial to integrate sustainable work practices in most lessons.

3. Do you have to go through all the steps? It is recommended that steps are not omitted, and this is particularly important regarding steps 5 and 6, otherwise students can be left feeling overwhelmed and helpless.

4. Is this forcing the teacher views on to the students? The role of the teacher in Green Pedagogy is to provide additional perspectives for the learners to consider. These new perspectives may lead to new solutions that better chime with learners' existing values. Therefore, this is not about a teacher imposing their values on learners.

13. Identifying a sustainable mindset

We could attempt to see how well the concept of Green Pedagogy was embedded in our teacher participants by examining the learner diaries that we asked them

to compile as part of the four-month course. A text analysis carried out using a content analysis software tool showed that the concept of Green Pedagogy was a minor rather than a major theme for the ProfESus participants [27]. This indicated that there was more work to be done in conveying the practice of Green Pedagogy more efficiently in English and that a four-month course is insufficient on its own to effect sustainable change in didactics and education. A continuous peer-reflection process might help to implement Green Pedagogy enduringly into a wider field of learning.

14. Conclusions

Green Pedagogy is useful amidst the plethora of materials emerging from the UN Sustainability Goals initiative to help teachers include more sustainable approaches insofar as it gives clear guidelines at the lesson planning level. This pedagogical approach can be used at all levels of schooling and beyond in higher education. The 6-step process is also useful as a way of approaching consultancy briefs where the aim is to include a sustainability perspective. The second main advantage of implementing Green Pedagogy is that it can be used to lead educators to target both vocational (or subject-specific) competencies and sustainability competencies simultaneously. This means that academic or vocational skills are acquired through a sustainability perspective and that sustainability does not need to appear as a distinct topic in the school timetable since it can be infused across large parts of the existing curriculum. The Green Pedagogy guidelines can be justified by reference to established theoretical frameworks such as conceptual change. Learners can be overwhelmed by the intractable problems of the world and Green Pedagogy offers a way of countering this. An important aspect of Green Pedagogy is to allow learners to uncover their own values as a result of what they have been exposed to through the Green Pedagogy approach rather than imposing teacher values on learners. The approach encourages learners to widen their consideration of the range of relevant stakeholders affected by the problem as a way of highlighting the sustainability aspect of any problem. Thus, a systematic implementation of Green Pedagogy across an educational institution will lead to its learners understanding much more about, for example, the institution's suppliers, its treatment of waste and its local impact after first examining the chosen problem in a national or global context. The stakeholder understanding will also include the learners' own context at home and include the effect of the actions of family members. An important part of Green Pedagogy is to end learning activities with an actionable vision that learners can act upon rather than leaving the classroom feeling that all is hopeless. It is easily combined with other recommended sustainability education approaches and provides a useful checklist to ensure efficacy. Thus, Green Pedagogy is a useful addition to the sustainability education lexicon if some of the German origins are thoroughly explained, to ensure that Green Pedagogy transitions effectively from the German-speaking sphere to the English context. It is a pedagogy that can support transformative learning through the exploration and clarification of learners' own values.

Figure 2. By permission of the ProfESus project

Figure 3. From Flickr https://www.flickr.com/photos/slapers/6720032299/in/pool-1453665@N24/

Figure 4. Compassion Over Killing, CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons

Conflict of interest

The authors declare no conflict of interest.

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References

[1] Hochschule für Agrar- und Umweltpädagogik. Green Pedagogy: From theoretical basics to practical sustainable learning activities. Hochschule für Agrar- und Umweltpädagogik, Vienna: Vizerektorat für Umweltpädagogik, Weiterbildung und Forschung [Internet]. 2018. Available from: https://www.haup.ac.at/wp-content/uploads/2019/10/Green-Pedagogy.pdf [Accessed 2020-12-13]

[2] Sterling S. Sustainable education: Re-visioning learning and change. Dartington: Schumacher Society, Green Books; 2001. 96 p. ISBN-1-870098-99-4

[3] Sterling S. Higher education, sustainability, and the role of systemic learning. In: Corcoran P B. & Wals A E J, editors. Higher education and the challenge of sustainability: Dordrecht: Springer; 2004. p. 49-70. DOI: 10.1007/0-306-48515-X

[4] Starchan G. System thinking: The ability to recognise and analyse the interconnections within and between systems. In: Stibbe A, editor. The handbook of sustainability literacy. Dartington: Green Books; 2009. p. 84-88. ISBN-1-900322-60-9

[5] Holt DB. Constructing sustainable consumption: From ethical values to the cultural transformation of unsustainable markets. The Annals of the American Academy of Political and Social Science. 2012; 644(1):236-255. DOI: 10.1177/0002716212453260

[6] Ikerd J, Gamble L, Cox T. Deep sustainability: The essentials. [Internet]. 2014. Available from: https://sites.google.com/site/sustainabilitydeep/ [Accessed 2020-12-13]

[7] Sterling S. The Future fit framework: An introductory guide to teaching and learning for sustainability. Plymouth: Higher Education Academy; 2012. 76p.

[8] Holmberg J, Robèrt K-H. Backcasting - A framework for strategic planning December 2000. The International Journal of Sustainable Development and World Ecology. 2000; 7(4):291-308 DOI: 10.1080/13504500009470049

[9] Vygotsky LS, Cole M. Mind in Society: Development of Higher Psychological Processes. Cambridge, Massachusetts: Harvard University Press; 1978. 174 p. ISBN 978-0-674-57629-2.

[10] Piaget J. Psychology and Epistemology: Towards a Theory of Knowledge New York: Viking Press, 1972. 166 p. ISBN-0-670003-62-X

[11] Kolb DA. Experiential Learning Theory: Previous Research and New Directions. [Internet]. 1984. Available from: http://www.d.umn.edu/~kgilbert/educ5165-731/Readings/experiential-learning-theory.pdf [Accessed 2020-12-13]

[12] Posner GJ, Strike KA, Hewson PW, Gertzog WA. Accommodation of a Scientific Conception: Toward a Theory of Conceptual Change. Science Education. 1982; 66, S:211-227. https://doi.org/10.1002/sce.3730660207

[13] UNECE. The competences in education for sustainable development (learning for the future: competences in education for sustainable development). [Internet]. 2011. Available from: https://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publication.pdf [Accessed 2020-12-13]

[14] Wogowitsch C. (Hrsg.), Grüne Pädagogik: vom Theoriefundament bis zu professionsorientierten Lernarrangements [Green Pedagogy - From theoretical foundations to professional learning practices]. [Internet]. 2013. Available

from: https://www.haup.ac.at/
wp-content/uploads/2019/10/
Gru%CC%88ne-Pa%CC%88dagogik_
Vom-Theoriefundament-bis-
zu-professionsorientierten-
Lernarrangements-1.pdf [Accessed
2020-12-13]

[15] Cabrera D, Cabrera L, Powers E.
Unifying Theory of Systems Thinking
with Psychosocial Applications.
Behavioral Science. 2015;32(5):534-545.
DOI: 10.1002/sres.2351

[16] Fiedler FE. The contingency
model: New directions for leadership
utilization. In: Matteson MT,
Ivancevich JM, editors. Management
and Organizational Behavior Classics.
Burr Ridge Illinois: Irwin Professional
Publishing; 1993. p. 333-344.
ISBN-978-0-256-08750-5

[17] Foerster H. KybernEthik
[Cybernetics]. Berlin, Germany:
Merve Verlag; 1993. 173 p.
ISBN-978-3-883-96111-8

[18] Ritchhart R, Church M,
Morrison K. Making Thinking Visible:
How to promote engagement,
Understanding and Independence for all
learners. Hoboken, New Jersey: Wiley;
2011. 320 p. ISBN-0-470915-51-X

[19] ProfESus Erasmus+ project. Link
to Learning Activity Plan template
and sample lesson. [Internet]. 2018.
Available from: https://profesus.eu/
outputs/english/ [Accessed 2020-12-13]

[20] Rittel HWJ, Webber MM. Dilemmas
in a General Theory of Planning. Policy
Sciences. 1973;4:155-169. https://doi.
org/10.1007/BF01405730

[21] Barkley C, Barkley EF, Cross KP,
Major CH. Collaborative learning
techniques: A handbook for college
faculty. San Francisco, CA: Jossey Bass;
2005. 182 p. ISBN-978-1-118-76155-7

[22] Lave J, Wenger E. Situated learning:
Legitimate peripheral participation.

New York: Cambridge University Press;
1991. 138 p. ISBN-978-0-521-42374-8

[23] Dewey J. How we think: A
restatement of the relation of
reflective thinking to the educative
process. Boston, Massachusetts: Heath
and Company; 1933. 301
p. ISBN-978-0-669200249

[24] Engestrom Y. Learning by
Expanding: An Activity Theoretical
Approach to Developmental Research.
Cambridge: University Press; 2014. 299
p. DOI 10.1017/CBO9781139814744.

[25] UNESCO Teaching and Learning for
a Sustainable Future. [internet]. 2019.
Available from: https://web.archive.
org/web/20191203150607/http://
www.unesco.org/education/tlsf/mods/
theme_a.html [Accessed 2020-12-13]

[26] British Council. Teaching English
Lesson Plan "Climate Change"
[internet]. 2019. Available from: https://
www.teachingenglish.org.uk/sites/
teacheng/files/Kiribati_lesson_plan.pdf
[Accessed: 2020-12-13]

[27] Fox A, Īriste S, Bezeljak P. Detecting
a Sustainable Mindset through Using
Content Analysis of Teacher-produced
Learning Journals. Journal of Teacher
Education for Sustainability. 2019;2:56-
69. DOI: 10.2478/jtes-2019-0003