Who is telling whose story? The effectiveness of peer-to-peer approaches as inclusive participatory interventions towards sustainability

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Highlights

- Peer-to peer approaches gain popularity as inclusive participatory interventions.
- Evidence of the effectiveness of peer-to-peer approaches is lacking.
- The paper analyses the implementation of 15 peer trainings on sustainable ICT.
- Peer-to-peer approaches must recognize needs and capabilities of the participants.
- Too much focus on quantitative output can compromise the purpose of peer education.

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Abstract

Peer-to-peer approaches refer to a participatory style of teaching and learning, which increasingly gain popularity as inclusive and participatory interventions to encourage changes towards more sustainable energy practices. However, this prominence has not been matched by evidence on the effectiveness of such approaches. By investigating the design and implementation of the peer-to-peer project *useITsmartly*, which centred on the topic of energy efficient and sustainable ICT use, this paper focuses on the effectiveness of this peer-to-peer approach as inclusive participatory intervention. Drawing on the environmental justice literature, it addresses particularly the second-level effectiveness, that is the impact peer-to-peer exercises have on the peer educators themselves in terms of capacity building and empowerment. The paper evaluates the preparation, recruitment, training and multiplication phases of the approach and concludes that it is essential to invest enough time and resources to truly recognize the peer educators and their lifestyles and practices, and enable them to participate in the peer education on their own terms. If not, lack of motivation and skills of the peer educators as well as too much focus on quantitative targets may compromise the actual purpose of the peer-to-peer approach and turn it into a top-down exercise.

Key words

Peer-to-peer approaches, participatory methods, sustainable ICT use, energy use, environmental justice

1. Introduction

Peer-to-peer approaches - also referred to as peer education - have gained in popularity as method of participatory intervention, in which "a minority of peer representatives from a group or population [the peer educators] actively attempts to inform and influence the majority" (Svenson et al., 1998: 10). They appear promising as inclusive approaches in terms of addressing diversity and tailoring an intervention to a particular social and institutional context, and hence as attractive participatory mechanism. The literature shows that in the domain of energy sustainability, approaches to engage people and to encourage them towards behavioural change, in practice, often fail to be effective when the focus is on individuals and their behaviour (Mourik and Rotmann, 2013; Shove, 2010; Wilhite et al., 2003). A peer-to-peer approach by definition is a social learning approach (Bandura, 1986), which carries the potential to overcome this problem and contribute to more inclusive participation.

This paper examines a peer-to-peer approach developed in the project *useITsmartly*[2]*,* which aimed at capacity building towards behavioural changes in the way youths use ICT, particularly through communicating with and through youths about creative new concepts of "smart", energy efficient ICT practices. ICT related sustainability challenges include energy use and material efficiency as well as social and ecological impacts. In European households, the average direct electricity consumption of ICTs amounts to around 20-30% of the total electricity consumption (Christensen et al., 2014). In addition, internet-related energy consumption linked to the transmission, processing and storing of data is significant (Coroama et al., 2013). Further, production and waste handling of ICT devices consume energy and have severe environmental and social impacts, e.g. related to the extraction of minerals and the handling of electronic waste in the Global South (Chen, 2016; Christensen and Rommes, 2019). Hence, the impacts of ICT use are considerable and likely to increase due to the ongoing digitalization processes.

ICT plays an important role in young peoples' daily lives, in increasingly ubiquitous ways. Young people are often described as "digital natives" implicating their "natural" way of dealing with ICT since they have grown up with digital technologies. Although the distinction between young digital natives and older digital immigrants may be an oversimplification of the different relations people have with ICTs (Bayne and Ross, 2011), research indeed shows that young people use a considerable amount of their time on devices, such as smart phones, tablets, and computers (Christensen et al. 2014; Wallis et al., 2016; Lopez-Fernandez et al., 2017). Particularly important in this context is the observation that ICTs are inextricably entwined with many everyday practices of young people, from schoolwork, entertainment and training to socializing with friends and updating oneself about what happens in the world (Livingstone et al., 2018; Christensen and Rommes, 2019). This strong integration of ICT into everyday life makes a change of practices towards more sustainable ICT use appear particularly difficult for many young people. A change of ICT practices would thus not only mean that young people change how they use their devices, but how they do their schoolwork, how they communicate, how they entertain and keep themselves updated and how they "fill empty time". Another important aspect to consider is that young people's ICT practices are collective practices – practices they do as part of their school class, sports team, peer group or family – rather than individual practices. This social-institutional embeddedness of young people's ICT use makes changes of individual behaviour nearly impossible (Christensen and Rommes, 2019). Therefore, approaches to encourage young people to change their ICT practices should take into consideration both the heavy integration of ICT in young people's everyday activities and the social-institutional context of these practices.

Based on the discussion so far, we hypothesise that peer-to-peer approaches with their focus on participation, social context and collective change offer a useful contribution to the repertoire of participatory approaches to engage end-users in more sustainable practices, in general, and when designing interventions aiming at more sustainable ICT practices among young people, in particular. While practitioners of different areas increasingly recognize and implement peer-to-peer approaches, this growing popularity, however, has not been matched by growing evidence on the effectiveness of that method. The ways in which especially young people are trained, inspired and empowered to become peer educators, is underresearched (Tolli, 2012). This paper contributes to filling this knowledge gap by looking at the impact that peer-to-peer exercises have on the peer educators themselves in terms of capacity

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[2] The project «Environmental peer-to-peer education for youths with focus on smart use of Information and Communication Technologies (short: useITsmartly) was funded by the Intelligent Energy – Europe (IEE) program of the European Commission and ran from 2013 to 2016.

building (increased knowledge and skills), empowerment and participation. By investigating the design and implementation of a peer-to-peer project conducted in five European countries with the environmental justice framework as a heuristic, we examine how peer-to-peer approaches can contribute to the repertoire of inclusive participatory approaches in the area of sustainable energy practices.

2. Conceptualisation and Methodology

2.1 Peer-to-peer approaches to engage young people

There is a range of peer-to-peer approaches and the term peer education is often used as umbrella term (Shiner, 1999). Of a diversity of definitions, we can filter the key principle that peer education refers to "a participatory style of teaching and learning" (Southgate and Aggleton, 2016: 2), where people of shared social status or group membership (age, ethnicity, gender, (sub-)cultural group) educate each other about particular issues of concern (Parkin and McKeganey, 2000). Peer education usually involves the training (*peer training*) of a number of members of a target group (*peer educators*), who then engage with their peers in a variety of ways (*multiplication* or *peer work*) to induce changes of behaviour and practices related to a particular issue of concern, such as sexual health or energy efficiency. It has primarily been implemented with young people. However, peer education is increasingly being used with other target groups as well, for example in neighbourhoods where some neighbours adopt the role of ambassadors for energy efficiency or residential renewable energy systems and hence as peer educators for their fellow neighbours (Heiskanen et al., 2017; Berry et al., 2014; Meijer, 2017).

The main aim of peer education is to achieve a change of behaviours and practices in the respective target group (Ford and Collier, 2006). However, it is important to note that the effect of peer education does not need to stay on the individual level, it can also have effects on the societal level, "stimulating collective action that contributes to individual change as well as changes in programs and policies" (Kerrigan and Weiss, 2000: 2).

The aim of this paper is to study the effectiveness of peer education. A distinction can be made between *first-level effectiveness* and *second-level effectiveness.* First-level effectiveness is about the impact on the overall target group in terms of increased knowledge, awareness, skills, behavioural change and/or collective political action. Promoters of peer-to-peer approaches claim that its advantage over other participatory approaches is that a shared background and shared interests among peers enhance the credibility of the peer educators for the target group. Having a "dialogue among equals" instead of external experts telling the target group how to behave adds to their receptiveness (Kleiber and Appel, 2002). *Second-level effectiveness* refers to the impact of the exercise on the peer educators themselves. In their training to become peer educators and in the following multiplication work, they are coached intensively and get the opportunity to practice a diversity of skills, such as leadership, collaboration, and communication. The impact of peer-to-peer approaches is probably stronger on the peer educators themselves than on the peers they address in their multiplication activities. Peer-to-peer methods allow for peer educators' genuine participation in activities that are of relevance for themselves. In any case, second-level effectiveness is required in order to achieve first-level effectiveness.

Rowe and Frewer (2005) claim that the many different definitions of the concept of effectiveness, basically, refer to two main dimensions: the competence/efficiency of the exercise in achieving its aims

and the fairness of the exercise. The competence/efficiency dimension addresses the information (knowledge and/or opinion) flow and thus relates to the first-level effectiveness. The fairness dimension, then, is more process-oriented and takes the needs, interests and capabilities of the peer educators (and their peers) as point of departure instead of being outcome-oriented in terms of the envisaged behavioural changes in the target group. Hence, it relates to the second-level effectiveness and the environmental justice framework presented below. In the same vein, Shiner (1999) differentiates between peer-to-peer approaches according to whether they focus more on peer delivery, that is, the multiplication work the peer educators do (first-level effectiveness), or whether they focus more on peer development, that is, the development and empowerment of the peer educators (second-level effectiveness).

Evidence of the effectiveness of peer education (both first-level and second-level) is limited (Southgate and Aggleton, 2016; Tolli, 2012; Parkin and McKeganey, 2000; Abrahamse and Steg, 2013). Moreover, Southgate and Aggleton (2016: 3) criticize the existing literature on peer education for being too concerned with first-level effectiveness and measuring outcomes, and not paying enough attention to the "educative processes and practices associated with peer education". This is particularly relevant in consideration of, e.g., the study by Parkin and McKeganey's (2000), who claim that that second-level effectiveness is the impact of peer education that could be documented in a higher degree than impacts related to first-level effectiveness. Along the same line, Jaworsky et al. (2013: 230) describe the following benefits for peer educators: "skills in communication, counselling, presentation development and delivery, conflict negotiation, facilitation, listening, leadership, and problem solving". Further, the authors report that peer educators felt empowered through having gained increased confidence, open-mindedness, and maturity.

However, Parkin and McKeganey (2000), argue that the issue of empowerment as element of second-level effectiveness should be taken with a grain of salt, particularly related to the potential of peer education to empower marginal groups. Can we talk about empowerment when it is the adult professionals and not the peer educators themselves who decide on the information to be disseminated? "*The promotion of adult-ist views may be seen as a form of manipulation within which adults allow others to promote the views which they would wish to have promoted but are unable to promote themselves as a result of their 'non-membership' of the target social group*" (Parkin and McKeganey, 2000: 307). Hence, it is important to note, as Vreede et al. (2014: 39) do, that "the aim [of peer education] is to support young people to gain the skills and competence to initiate and define their own actions, rather than to prescribe a narrow range of lifestyle actions". Also, Gordon and Ball (2015) emphasize the importance of youth ownership in peer education.

Peer-to-peer approaches have mainly been used in the area of health promotion. However, their potential for environmental education and sustainability has been pointed out repeatedly (Chawla and Cushing, 2007; Ford and Collier, 2006; Vreede et al., 2014; Heiskanen et al., 2017). Chawla and Cushing (2007), e.g., emphasize the importance of peers as "role models of success" in environmental education. Particularly in the area of sustainability, the potential of peer-to-peer approaches still appears understudied (Ford and Collier, 2006; Vreede et al., 2014). An exception is the study by Vreede et al. (2014) focusing on the potential of peer education to facilitate sustainability action among youths. About the second level effectiveness, the authors find that the peer-to-peer approach led to an empowerment of peer educators in terms of increased skills, confidence and readiness for sustainability action in addition to increased knowledge and awareness of environmental issues. They identified several factors affecting the second-

level effectiveness, of which "peer support, meaningful contribution, teaching/leadership role, and student ownership" (Vreede et al., 2015: 37), were the most influential. Factors such as recruitment, time and resources available, training and supervision have also been found to influence peer education effectiveness (Kerrigan and Weiss, 2000; Chawla and Cushing, 2007; Tolli, 2012). Still, Tolli (2012: 913) emphasizes that future research is needed to investigate "the possible factors influencing effectiveness during the setting up, running and evaluation of projects".

In this paper, we draw upon the environmental justice framework to address the second-level effectiveness of peer education in order to investigate the question whether and how peer-to-peer approaches have the potential to be effective and inclusive participative approaches.

2.2 Qualifying engagement processes using the environmental justice approach

The concept of environmental justice has been centred on the notion of distributive justice, addressing equity in the distribution of environmental risk and in the distribution of environmental 'goods' and 'bads'. In recent years, the environmental justice concept has developed into an increasingly pluralistic framework, in which a specific focus on energy is addressed in the concept of energy justice (Bickerstaf et al., 2013; McCauley et al., 2013; Jenkins et al., 2016; LaBelle, 2017; Silveira, 2016; Sovacool, 2016).

For the purpose of our evaluation of the *useITsmartly* peer-to-peer project, we adopt an approach that distinguishes five dimensions constituting environmental justice: (1) recognition, (2) distribution, (3) participation, (4) capability and (5) responsibility (Schlossberg, 2004, 2013; Davoudi and Brooks, 2014, 2016). While there is no universally applicable prescription for a fair distribution of environmental quality and a fair process (Walker et al., 2005), we can use the five dimensions as a heuristic aid for evaluating the second-level effectiveness in our peer-to-peer project.

Recognition refers to the diversity of participants and attention to their different needs, preferences, ambitions and experiences. It considers ignored and misrepresented groups in society and calls for greater recognition of these groups to reduce social inequalities. Increased knowledge and awareness, the development of skills and an empowerment of peer educators is achieved more effectively if the peer trainings recognize and attend to the diversities among the participating youths (Kerrigan and Weiss, 2000). This also requires flexibility in the setup of the training and the ability to adjust it to the given context. Enough time should be given so that everyone has the opportunity to be heard (Chawla and Cushing, 2007).

Recognition is a prerequisite for a fair *distribution* of goods and bads. Hence, we need to understand the diversity of those affected by a particular distribution, through investigating real-life situations (Bell and Davoudi, 2016; Schlossberg, 2004). Attention to the distribution of advantages and disadvantages is relevant both for first-level effectiveness (the distribution of positive and negative consequences of the intended behavioural changes in the target group) and for second-level effectiveness (advantages and disadvantages of the peer training and following multiplication work for the peer educators). Peer trainings should focus on benefits, such as increased skills and competencies, which the peer educators themselves find valuable, in order to maintain their interest and motivation. This also may include material incentives, payments or other forms of compensation for the time and effort spent (Shiner, 1999; Parkin and McKeganey, 2000).

Also strongly related with the dimension of *recognition*, is the dimension of *participation* or *procedural justice*. If someone is not recognized, s_he will not be invited to participate. Procedural justice highlights the importance of 'justice as public participation' (Barry, 1995; Adger et al., 2006; Sovacool, 2016) and explores how to achieve just outcomes through local knowledge mobilisation, greater information disclosure, and better institutional representation (Jenkins et al., 2016). For peer-to-peer approaches, it is therefore important to pay attention to and reflect on who participates and in what ways. Active participation from all should be invited and facilitated as participation leads to empowerment (Kerrigan and Weiss, 2000). The peer-to-peer approach should build on the peer educators' knowledges and competencies (Ford & Collier, 2006; Tolli, 2012). This requires that the structure and content of the trainings are flexible in order to allow for peer educators participation in the design of the training and multiplication materials (Kerrigan & Weiss, 2000).

The fourth dimension, *capability*, refers to the ability and capacities of individuals and social groups to function and prosper. Hence, peer trainings should draw upon and support peer educators to develop capabilities so that they confidently are able to fill the role as peer educators. This includes developing knowledge about the issue addressed (sustainable ICT) and skills to carry out the multiplication work. The literature mentions communication and presentation skills, techniques and methods to engage the target group, reflection and evaluation, and interpersonal skills – such as empathy, the ability to recognize and engage with diverse perspectives and community building - as examples for relevant skills to build during the peer trainings (Kerrigan and Weiss, 2000; Gordon and Ball, 2015). A focus on professional growth and personal development is an important motivation for the peer educators.

Lastly, taking *responsibility* for others and for the environment at both individual and collective levels is influenced by structural and institutional contexts, physical and mental conditions, social norms and cultural values (Davoudi and Brooks, 2014). Peer education is about taking responsibility and contributing to a common good, such as sustainability. Peer educators do not only take responsibility for their own actions but aim to contribute to sustainability on the collective level. Being able to take this responsibility requires specific capabilities of the peer educators and the aim of the peer education should be in line with the norms and values of the peer educators themselves. Ownership of the multiplication activities and the ability to set their own goals is important (Chawla and Cushing, 2007; Parkin and McKeganey, 2000; Shiner 1999). This relates to the importance of peer educators feeling that they contribute to a bigger cause and are able to take leadership in order to achieve something that is meaningful to them. (de Vreede et al., 2015).

2.3 Methods

The *useITsmartly* project adopted a peer-to-peer approach in order to obtain the aim of more sustainable ICT use in the target group of young people between 16-20 years. In the introduction, we argued that at least in theory it makes sense to utilize a peer-to-peer approach with its inherent focus on participation, diversity and tailoring an intervention to a particular social and institutional context, because of the social-institutional embeddedness and the strong integration of ICT practices in young peoples' daily lives (Christensen and Rommes, 2019). The youths themselves should be best suited to address the issue of ICT practices in meaningful ways with their peers. To learn how peer-to-peer approaches have an added value in their contribution to inclusive and participatory approaches, we will investigate the effectiveness of the

approach on the peer educators themselves (the second level effectiveness) by assessing the ways in which these young people have been recruited, trained, inspired and empowered to take an "ambassador's role" towards their peers.

The empirical work consists of an evaluation of 15 peer trainings that have been prepared and implemented in five European countries (Norway, Denmark, the Netherlands, Germany and Austria), involving a total of 323 peer educators between 14 and 21 years old. Of the 15 trainings, seven were integrated in the regular schedules and conducted with existing school classes or with students from different classes. Three trainings were conducted with volunteers from different classes or schools. One training was carried out with volunteers from a university. Finally, three trainings were conducted with volunteers from already existing environmental/climate groups (see Table 1 for details). These differences were due to recruitment challenges (see section 3.2). Still, contextual conditions, such as school systems and how they allowed for the organization of the peer trainings, were similar within countries.

All trainings were carried out based on a didactical concept (Pilz and Auer, 2014), which has been tailored to the respective contexts in the five countries (type of school, group size, age of youth, education level, teacher support, time and resources available, language). During the trainings, the trainers further adapted the concept to the particular group of youths and their interests and skills. This contextual adaptation is a central element of peer-to-peer approaches.

The evaluation of the peer trainings has been conducted by the *useITsmartly* project teams in the five countries. The evaluation material for each of the peer trainings is listed in Table 1. Following a grounded approach to qualitative content analysis (Charmaz, 2006; Maxwell and Miller, 2008), the *useITsmartly* project teams analysed the evaluation questionnaires, multiplication reports, notes from evaluative discussions/interviews with students, teachers and experts, and the participant observation by the trainers, that is, the *useITsmartly* project teams, themselves, and wrote confidential country reports for each of the five countries.[3] These reports describe the recruitment approaches, the training and support provided, as well as various institutional and organisational conditions (i.e. the school environment, teacher support, financial and time-resources, size and characteristics of the groups; characteristics of the trainers; existing networks, etc.) and present analyses of the evaluation material.

This paper, then, presents a qualitative cross-cutting analysis of the five country reports conducted by the authors of this paper, who were also part of two of the *useITsmartly* project teams. Participatory observation not only of the peer trainings, but also of various evaluative meetings with all the partners of the *useITsmartly* project has allowed the authors and insider's view and experience.

As mentioned above, the analysis of the peer-to-peer approach draws on the environmental justice framework. For each of the 5 environmental justice dimensions we have formulated questions to guide the analysis of the empirical materials presented above :

1) **Recognition of diversity**: How much room has there been for the inclusion of a diversity of perspectives and norms? How have the peer trainings succeeded in recognizing diversity (e.g. aligned to the contexts and needs of the peer educators)?

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[3] UseITsmartly Deliverable 4.4 "Report on the trainings of the first and second group of IT-peers". This confidential report has partly been summarized in Berger et al. (2016).

2) **Participation:** How were participants selected, who was selected, based on which criteria, who was excluded, how were the selected participants engaged, did that correlate with their needs? How successful were the efforts at engaging the seemingly "not interested" youths? Was there room for confrontation and negotiation between perspectives and/or expectations?

3) How did the approach pay attention to **distributive issues** – e.g. in terms of positive and negative outcomes (benefits and disadvantages) of the approach and how these have been distributed?

4) How were the young people enabled and trained, how was their capacity built so that they could feel sufficiently **capable** to participate and to act as peer educator? What conditions have turned out to be conducive to making participants of peer trainings feel enabled and empowered?

5) What types of **responsibilities** were allocated or distributed amongst participants? And how much scope for flexibility was there for the peer educators to themselves define how they wanted to take up their role as peer-educators?

3 Empirical analysis of the peer-to-peer approaches in 5 countries

Overall, the youths who participated in the peer trainings organized through the *useITsmartly* project evaluated the trainings positively (and even very positively in some cases). They stated that the trainings were beneficial in terms of learning, new experiences, fun and content. However, our cross-cutting analysis of the country reports including the thorough evaluation by the trainers, using the lenses that the environmental justice framework offers, gives a more mixed picture at best.

In order to obtain a better understanding of the challenges related to the second-level effectiveness, and to learn whether the peer-to-peer approach employed in the *useITsmartly* project has been suitable to address the issue of sustainable ICT use with young people, our analysis of the peer-to-peer approach will systematically address the five dimensions of the environmental justice framework. It incorporates the preparation, recruitment, actual peer training and multiplication work. We also address the influence of institutional and/or organisational conditions like the school environment, teacher support, resources, practitioner capabilities and existing networks in order to shed light on the wider settings within which the peer education was planned and implemented and how that affected the recruitment and training of peer educators.

3.1 Preparation

In the *useITsmartly* project, an extensive preparatory phase in six steps preceded the actual peer trainings in order to enable targeted and contextualized peer training trajectories: 1) literature review and survey; 2) focus group interviews; 3) creativity workshops; 4) expert workshop; 5) development of 'vehicle approach'; and 6) development of the didactical concept and training of the trainers for the peer trainings.
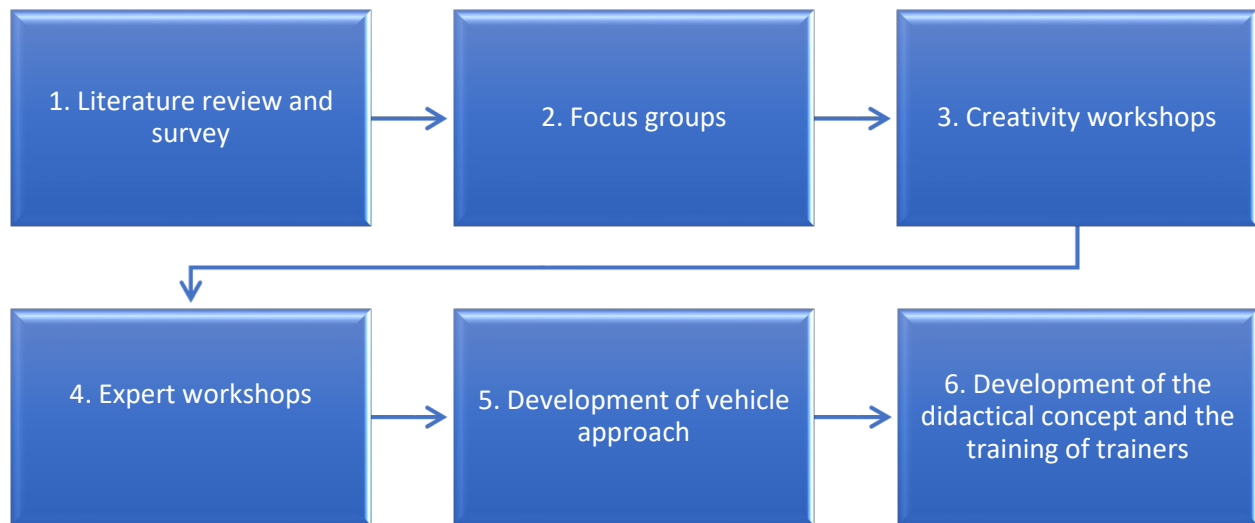
Figure 1: Preparation of peer trainings in six steps

First, data about the actual situation of ICT use among young Europeans was collected using mixed methods, such as a standard quantitative data collection on the amount of energy used on ICT in European households and a questionnaire on young people's ICT user habits (Christensen et al., 2014). Second, in order to obtain qualitative information about young people's ICT use, underlying motivations of these use patterns, and to how young people relate their ICT use to energy and environmental issues, focus groups were carried out in each of the five countries (Christensen et al. 2014; Christensen and Rommes, 2019). These two steps enabled the identification of several energy-intensive ICT practices (e.g. standby; buying new devices instead of reusing/recycling; simultaneous use of several screens; use of large screens; broadband (4G) instead of wifi; video streaming), which were common among youths, and which were used as point of departure for further project activities. In addition, the focus groups illustrated the above-mentioned high integration of ICTs in young people's everyday life and the social-institutional embeddedness of ICT practices (Christensen and Rommes, 2019).

Third, 15 'creativity workshops' were carried out engaging 415 young people with the topic of smart and energy efficient ICT use. Participating youths were invited to develop ideas for changing the identified energy-intensive ICT practices. Fourth, various experts (educational practitioners, social marketing experts, behavioural experts, social enterprises working with young people) assessed the ideas developed in the creativity workshops according to their technical and social feasibility and expected impact. Based on that, the project team created an inspirational toolbox with initial ideas for energy efficient ICT use for different target groups (Rommes et al., 2014).

Fifth, so-called vehicles were developed, that is, topics of interest to young people, which can be used as points of departure to make sustainable ICT use interesting and relevant (Thaler and Zorn, 2010). Vehicles developed included solar fashion, e-waste art, video and photo art, computer games and theatre (Berger and Thaler, 2014). The final step was to prepare the didactical concept (Pilz and Auer, 2014) and train the *useITsmartly* project teams who would act as trainers during the peer trainings. Two project partners (AU, DK) had professional youth educators in their teams. The other partners (DE, NL, NO) had experience in

working with students, giving workshops, implementing participatory trajectories and/or environmental (energy-related) education.

This comprehensive preparation in which efforts were directed at learning about and getting to know the specific target groups as well as understanding their current ICT-related practices have been described and analysed more detailed in other publications (Christensen et al. 2014; Christensen and Rommes, 2019; Rommes et al., 2014; Berger and Thaler, 2014; Thaler and Zorn, 2010; Pilz and Auer, 2014).

Once the six steps were finalised, the actual peer trainings could start – the focus of this paper. However, before addressing the peer trainings, we briefly reflect on how the dimensions of the environmental justice framework were met in the preparatory phase.

UseITsmartly was a project that aimed for recognition of an often-neglected group in participatory approaches: youths. It was an explicit aim to recognize this particular group as well as its diverse needs and practices. Hence, the literature study, the focus groups and the creativity workshops aimed at learning how youths' ICT practices can be coupled to sustainability issues. The creativity workshops allowed for direct participation of the youths, who were invited to contribute their ideas and solutions. The experiences made during the workshops informed the set-up of the peer trainings in terms of how to work with youths on the issue of sustainable ICT. Further, the abovementioned toolbox with ideas for energy efficient ICT use was integrated in the peer trainings as idea pool, from which the peer educators could get inspiration for their peer multiplication work. Distributive issues were inquired to by addressing how ICT makes sense to young people, revealing also social issues related to inclusion and exclusion that result from current ICT practices and that may be further affected if they are invited to change their practices (e.g. less online activity can result in social exclusion due to information arrears) (Christensen, 2014). The responsibility dimension was addressed in the creativity workshops where the youths were given the responsibility to develop solutions for energy efficient ICT practices. Capabilities targeted in the training have been carefully defined during the development of the didactical concept and training units and methods were designed accordingly (Pilz and Auer, 2014). The overall aim of the preparatory phase was to enable the project partners to train and empower youths so that they can choose to become engaged and take responsibility.

With this extensive preparation of the peer trainings addressing all five environmental justice dimensions, the basis for the peer-to-peer approach as an inclusive participatory mechanism was laid. The next sections will address how these preparations have been translated and implemented into the recruitment of youths, the actual peer trainings and the following multiplication work.

3.2 Recruitment of peer educators

As for recognition of diversity, efforts at open recruitment outside of the school context with certain selection criteria to ensure diversity were unsuccessful and generated too limited response. Only in a few cases, the group of peer educators participated both voluntarily and in their free time (2e, 4d)[4]. In most cases, the group of youths recruited was an existing school class (2a, 2c, 2d, 4c, 5a, 5b), a group of students from the same school/university that had opted for the training voluntarily (2b, 3a, 3b, 4a), a group of

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[4] The numbers refer to the numbers of the trainings indicated in Table 1.

students that was required by their school administration to participate (4b), or a group of student volunteers from different schools participating during school time (1a, 1b). Recruitment depended on existing and newly established contacts with teachers, lecturers, schools, universities, youth and environmental organisations. In general, it was a challenge to find groups (and schools) willing to participate, apart from the Austrian cases (1a, 1b) where long-term established contacts with schools existed. Tight school curriculums and already planned extra-curricular activities further impeded the recruitment of schools.

However, having to resort to the recruitment of different types of schools with diverse student populations eventually resulted in diversity in terms of gender, backgrounds, skills, knowledges, motivations and interests across and within the participating groups that would not have been possible if the recruitment would have been based on purely voluntary participation (which works as a self-selection mechanism).

In order to ensure the participation of the youths in the peer trainings, discussions and negotiations about the peer-to-peer approach took place with the school administration and teachers, not with the youths themselves. The didactical concept was adapted to fit the aims of the *useITsmartly* project and of the schools, e.g., developing collaboration skills, presentation skills, learning about IT-related energy consumption. Hence, in most cases the distribution of benefits and disadvantages was discussed with the schools, rather than allowing a participation of the youths themselves in these negotiations. As part of the negotiations with schools, attention was paid to capabilities, attempting to fine-tune the training to the knowledge, skills and capabilities, which differed from group to group (e.g. age differences, educational level, type of school, specific interests of the group).

The recruitment process as described meant that the participating youths mostly had not actively and voluntarily taken the individual decision to become peer educators. Hence, they did not get the opportunity to define their responsibilities in the process themselves, but were required to become peer educators within a framework set by the *useITsmartly* project and their schools. While this can be a good idea from an educational perspective as it brings new competences and experiences to participating youths (second-level effectiveness), it is not when the aim is to achieve a genuine dialogue among peers that works like an oil spill (first-level effectiveness).

3.3 Peer training

In many cases, the evaluations showed that the trainers experienced a lack of time to do all the training activities planned (2a, 2c, 3a, 3b, 4a, 4b, 4d, 5a, 5b). Working with schools in many cases meant that there was only one week available to do the trainings and the multiplication activities (only in some cases there was additional time for the multiplication activities, see Table 1). Both within and between groups of youth, there were large differences in educational level, cultural background and interest in ICT and sustainability issues. Identifying these differences offered a starting point for recognising diversity. However, additional time to subsequently tailor the peer training to these diverse needs and ambitions was insufficient in most cases (3a, 3b, 4a, 4b, 4d, 5a, 5b). An exception was a high school in the Netherlands (4c) where the training was spread across a whole trimester as it was integrated into the regular ICT classes, offering sufficient time for adaptation – i.e. reduction of complexity in this case.

In terms of participation and procedural fairness, once the trainings had started, efforts to try to engage those not interested proved sometimes difficult, and success depended on time available and support from the schoolteachers (3a, 3b, 4a, 4b, 4c, 5a, 5b). In some cases, the promise of a certificate was helpful to motivate young people to participate (1a, 1b, 2b). In another case, extra study points motivated participation (4a). Further, giving recognition to the efforts done by the youths turned out to fuel engagement and motivation (e.g. providing rewards like some snacks, free coffee or a free lunch) (2a, 2b, 2c, 2d, 4b, 4c, 5a, 5b). During some trainings, in-between evaluations were carried out to adapt the program to the wishes and interests (in terms of process, organisation or content) of the peer educators (1a, 1b, 2b, 2c, 4a, 4b, 5a, 5b). Examples for adaptations were skipping and simplifying parts of the planned trainings. Further, the evaluations underlined the importance of having enough time to bond and win trust as a precondition to get young people engaged.

Obviously, trainings with pupils that had previous experience with peer-to-peer work were most easy to conduct (2e). Voluntary recruitment had a positive influence on the motivation of the participants. Having a group of students who were a few years older (17-20 years) (4a) was also easing a participatory style of working compared to working with very young youths in a high school setting (4c). The older group found the topic more interesting and relevant, also because they studied communication and multimedia design – they already had knowledge and skills that they could use for their multiplication activities and for this group the vehicle approach of relating the topic of energy efficient ICT use to a topic of particular interest of the youths (e.g. gaming or doing a performance) had positive influence on their motivation.

The perception of fairness indeed turned out important for the motivation of participants and a strong undermining condition was being ill-informed. Although the overall programme was based on a preparatory phase with youths, the peer educators themselves had not participated in the set-up of the programme. Not being involved beforehand and not being offered a choice (e.g. between the peer training and another extracurricular activity) in some cases resulted in outright resistance and sabotage (4b, 5a). As for the distributional issues, the extent to which participants felt that the training was offering something valuable (e.g. developing skills, gaining knowledge, having a good time, getting more attention in the class room compared to regular school classes) affected their motivation as well.

Regarding the capabilities, the evaluations by the youths indicate that regardless of all didactical preparations, most trainings focused too much on providing complex information (sometimes also in response to the demands of the schools hosting the training), rather than on the development of skills and the identification of topics of interest to the participants (potential vehicles). Further, a stronger focus on solutions rather than problems would have been useful, as many youths were overwhelmed by the information provided on climate change, electronic waste and its effect on poor countries, child labour, depletion of natural resources and other environmental effects. Being overwhelmed led in some cases to a feeling of powerlessness, rather than a perceived capability of being able to influence the situation.

Sharing responsibilities between hosting schools and trainers proved crucial for capacity building and collaboration among the young people (2a, 4a, 4c, 5a, 5b). The availability of teachers to support, as well as clarity on roles and tasks was very important (e.g. with the teachers taking disciplinary measures when needed). Where this was not the case, it was detrimental to the group process (2d, 3a, 4b, 5a). Furthermore, a good collaboration (and the time to develop this) between the young people working together on a multiplication idea was very important (and part of the learning goals) for reaching the necessary capabilities (3b, 4a, 4b, 4c, 5a).

While the actual training in many cases took place in an inclusive manner, this was not always the case, depending on e.g. the role of the school in communicating the training and, also importantly, the competence of the trainers to recognize diversity and to flexibly adapt the planned training to the skills, knowledges, and interests of the youths.

3.4 Multiplication

The actual peer-to-peer work is happening during the multiplication phase. However, many peer educators enjoyed developing their multiplication ideas and materials more than the actual outreach activities (2a, 2c, 2d, , 3b, 4a, 4cNL, 5a, 5b). In several cases, peer educators were reluctant to give presentations to other groups of young people. They did not want to look like 'environmental activists' among their peers, and tried to find ways of multiplication that would not involve themselves having to personally address their peers, such as making videos, social media messages, art works for display or games (2a, 2b, 2c, 2d, 4b, 5a, 5b).

Having an idea for multiplication is one thing, but properly executing it is equally important. In several cases, especially the younger youths lacked skills to make a video or game in such a short span of time and reverted to the conventional PowerPoint presentation. In these cases, the multiplication did not reflect a recognition of what these peer educators themselves would have considered an appealing way of communicating to their peers. However, in some cases the peer educators appreciated learning how to make such a presentation.

Participation in the multiplication was voluntary to differing degrees. There were cases where trainers conducted an effective training with resourceful and motivated youths, which resulted in effective multiplication in terms of achieving the quantitative targets for peers reached (first-level effectiveness) as well as second-level effectiveness. Overall, the volunteers (1a, 1b, 2e) and the (somewhat older) media and communication students had the least difficulty with the multiplication work (2c, 4a, 5b) – as it related to the focus of their study. These youths could participate on their own terms and they were given a lot of freedom to develop their own approaches and methods for multiplication where they could use their skills and experiences in the media and communication field.

With other groups, the trainings were carried out with a focus on inclusion and empowerment (skills, knowledge, motivation, self-confidence) of the participating youths (second-level effectiveness). Also among these groups, tailoring the trainings to the interests of the youths and recognizing their preferences particularly in the multiplication phase did succeed in several cases and resulted in successful peer education in terms of second-level effectiveness (skills, knowledge, empowerment of peer educators) and first-level effectiveness. In these cases, the peers felt that they had developed really nice multiplication tools (e.g. video, post-cards, animation, game or a combination of these) and were proud to show these.

For other youths, the multiplication was challenging. In some cases, they felt very uncomfortable or even ashamed to give a presentation about a topic that did not really interest them – hence participation was not voluntary. This demonstrates the earlier pointed out risk with peer-to-peer approaches that they become a means for adults to use young people to convey their message through adult-chosen ways of

multiplication instead of being a youth-led activity carried out on the premises of the young people (Parkin and McKeganey, 2000; de Vreede et al., 2014).

In terms of <u>distributional justice,</u> there was a dis-balance caused by the emphasis that the trainers placed on the importance of the multiplication activities – which is understandable because these form the essence of a peer-to-peer approach, distinguishing it from other educational and awareness raising approaches. However, for many peer educators this multiplication was not necessarily the most important element. Here we arrive at a contradiction in the peer-to-peer approach: the notion that the peer educators will feel engaged and empowered to approach their peers through multiplication activities was based on the assumption that they would become engaged as a result of the training. However, the preceding literature study and workshops had already shown the limited interest of young people in the topic of sustainable ICT use. Further, the embeddedness of ICT in almost all everyday activities of the youths and the collective nature of the ICT use contributed to making youths hesitant and not motivated to change ICT practices.

The emphasis placed on multiplication directly related to the demand of the funding agency to quantify project results, placing a constant pressure on the trainers and peer educators to reach these numbers.[5] This top-down pressure was in fact more decisive for the approach adopted than the actual needs, preference and ambitions of the youths themselves in many cases. A focus on first-level effectiveness undermined the second-level effectiveness. Only in those cases where the training went exceptionally smooth (i.e. with the volunteers and media-and communication students), this pressure was not a problem. In all other cases, it has undermined the possibility of enabling a meaningful dialogue between equals (the peer educators and their peers), which should be the crux of a peer-to-peer approach.

As for <u>capabilities</u> to perform multiplication, this turned out to be a challenge for many. Even though most of the young people recognised the environmental problems related to the use of ICT, many found it difficult to come up with good ideas on how to influence other young people's use of ICT in a less resource- and energy-intensive direction. In peer trainings in Denmark, for example, youths regarded particularly the ideas of reducing the consumption (use) of ICT as futile - their assessment was that such ideas would face to strong opposition due to general trends of convenience and increasing use of ICT. Participants also found it challenging to come up with an easily understandable and clear message for their peers about the rather complex issue of sustainable ICT. In one case, for example, the peer educators felt that young people did not get their message at all and even tore down some of the posters made by the peer educators (2d).

The young people were <u>responsible</u> for their own multiplication activities. They were given the responsibility to choose what issue they wanted to address and how they wanted to address this issue. Multiplication activities tended to focus on topics/measures that would involve least behavioural change from the targeted young people and that would not challenge existing (and appreciated) practices, such as video streaming and staying online all the time. Instead, topics like reducing standby consumption and e-waste received much attention (2b, 2c, 2d, 4a, 4b, 4c, 5a, 5b). E-waste is a very tangible problem (easy to visualise using online materials) that everyone can relate to, and which offers clear avenues for individual and collective action. Being responsible for their multiplication work created challenges when

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[5] Goals included at least 32 peer educators trained per country and 100 peers reached by each peer educator. For a discussion on the quantification of the results of the multiplication efforts by the peer educators see useITsmartly Report D5.2 (Thaler and Berger, 2016).

students wanted to work with something quite far off the topic of sustainable ICT (e.g. hybrid planes, 5a). Here again, the top-down targets set for the *useITsmartly* project were in the way for allowing for an approach that recognises diverse interests among the target group and opens for more flexibility.

3.5 Second-level effectiveness of *useITsmartly* peer-to-peer approach

Based on our empirical inquiry, we can summarize the following about the contribution of the preparation, recruitment, actual peer training and the multiplication phases to the second-level effectiveness. Clearly, while some peer educators were enthusiastic and sufficiently capable to learn, practice and develop something to target peers in a manner that the peer educators themselves considered positive, this was not the case for the majority of the participants. It was mainly the volunteers and students from media and communication studies that felt truly inspired and empowered. For other youths, several factors worked against the development of skills, capabilities and self-confidence needed to be able to choose and develop multiplication activities.

In line with previous research (Vreede et al., 2015; Kerrigan and Weiss, 2000; Chawla and Cushing, 2007; Tolli, 2012), both contextual factors, such as group size, age, time and resources, teacher support, quality of teamwork, as well as content factors, such as level of difficulty and complexity of the training, degree of focus on clear and simple information, presentation of solutions and focus on skills for multiplication, affected the capability of the young people to act as peer educators.

For all 15 cases, more time and resources for training and multiplication would have been advantageous in order to adapt the didactical concept to the participating youths and allow for flexibility, to win the trust of the youths, and to provide the youths with sufficient skills and confidence to take ownership of the peer-to-peer project and prevent the approach from becoming a "promotion of adult-ist views" (Parkin and McKeganey, 2000: 307). Especially when comparing the time available for training and multiplication to the extensive amount of time invested in the preparatory phase, the question should be raised if part of that time would not be better invested in more thorough coaching of the youths. In line with this, it would have been an advantage to work with the same youths that participated in the creativity workshops, so that they could have really worked on further developing their own ideas (rather than taking ideas from other youths to develop further). A distribution of the training sessions and multiplication work over a whole semester or school year would also allow for easier adaptation of the approach and more sustainable learning and maturing processes of the youths.

Age also clearly influenced the success in terms of second-level effectiveness, whereby the older participants were much better able to work with the topic, and even more so if it was in line with a topic within their area of study. Also influential was the dependency on the willingness of schools to participate and the subsequent additional demands made by the schools in terms of learning goals, which added time pressure. During the trainings, the support from schoolteachers varied and affected the quality of the process at large. Teacher support was a factor that contributed to successful trainings and was dearly needed as the trainers were not all well-resourced and did not know the youths beforehand.

Conducting the peer-to-peer approach with school classes tended to allow for greater second-level effectiveness than working with voluntary groups, due to greater recognition of diversity and increased capacity and empowerment of all youths in the respective classes, also the less resourceful. Working with

voluntary groups, however, tended to result in greater first-level effectiveness. Generally, we can say that the strong focus on quantitative output and first-level effectiveness in many cases compromised second-level effectiveness.

A difficulty that is more central relates to the topic of sustainable ICT itself and the recognition of the limited interest in this topic (or interest among only a limited group). This limited interest actually became clear already in the preparatory phase. Finding out what the youths really want to learn and do is key and this has not worked out well in all cases, thereby setting the stage for failure later in the process in those cases where the multiplication was experienced as imposed rather than self-chosen. The quantitative goals from the funding agency further added to the feelings of being pressured to perform the multiplication work. In the cases where this feeling became predominant, the peer-to-peer approach could no longer be characterized as inclusive and participatory intervention.

3.6 Reflection on the outcomes

The preceding sections have pointed out how the peer-to-peer exercises have impacted the peer educators themselves in terms of capacity building (increased knowledge and skills), empowerment and participation. This is what we called second-level effectiveness. The empirical analysis indicates that different factors have had an influence on the success of the peer-education trajectories in terms of empowering the peer educators. In line with Kerrigan and Weiss (2000), we found that recruitment possibilities, time and resources, approach in training and supervision have affected peer education effectiveness. Factors pointed out by Vreede et al (2015) such as peer support (e.g. helping peer educators to developing multiplication materials), leadership (e.g. empowering peer educators to feel confident to approach their peers), and ownership (e.g. achieving that peer educators feel ownership of the issue and their multiplication materials) also were influential factors.

In addition to these factors, the effectiveness also related to the combination of the particular topic and the targeted peer educator group. The focus on young people relates to the fact that they are an under-represented as participants in the transition towards a more sustainable energy system. However, this focus brought two challenges. First, the diversity within the broad age group, i.e. differences in both age and backgrounds, affected the second-level effectiveness as it posed great challenges to provide the right approach for such a large diversity of peer educators. Second, the topic of sustainable ICT use did not have great appeal to this group. This was known in advance, hence the outcome that not all peer educators became enthusiastic about the topic is not a problem per se. However, as the approach in the training was not discussed with the students in advance, there was the risk that the adult professionals rather than the peer educators decided on how exactly to address this topic and the multiplication exercises. The project aimed to support young people to gain the skills and competence to initiate and define their own actions rather than to tell them what message they should send to their peers. However, this aim was only achieved with varying success.

In several cases motivation was undermined because the students did not feel that they had a choice to participate or not and because they felt unable or insufficiently empowered to come up with a multiplication activity that they *really* liked themselves. As pointed out in the environmental justice literature, addressing 'capabilities' is crucial as that affects the extent to which people are able to participate – in this case to become peer educators.

4. Conclusion and Policy Implications

Peer education refers to 'a participatory style of teaching and learning' and peer-to-peer approaches increasingly gain popularity as inclusive and participatory interventions to encourage changes towards more sustainable energy system. This paper examined how peer-to-peer approaches can contribute to inclusive participatory approaches by looking at the second-level effectiveness of peer education, that is, the impact the peer-to-peer exercises have on the peer educators themselves in terms of capacity building and empowerment. After all, second-level effectiveness is a pre-condition for being able to effectively engage other peers, and it has not been investigated much yet. The paper evaluated the preparation, recruitment, peer training and multiplication phases of the *useITsmartly* project and investigated how the young people were recruited, trained, enthused and empowered to take on the role as peer educators.

Peer-to-peer approaches appear as promising contributions to the repertoire of participatory approaches because of their focus on participation, diversity and context. The evaluation presented in this paper drew upon the environmental justice framework and its five dimensions recognition, participation, distribution, capability and responsibility, which directly target the quality of participatory processes, and hence the added value that peer-to-peer approaches promise.

Clearly, while the evaluations by the participants and schools were positive, our cross-cutting analysis of 15 peer trainings reveals that peer-to-peer approaches are challenging. If these challenges are not addressed properly, the approach easily waters down to a conventional environmental education exercise that is not well-tailored to its context. A major difficulty lies in the need to acknowledge the intermediary nature of the peer educators and finding time and resources to support them in performing their work on their own terms, rather than using peer-to-peer approaches as an instrument in order to reach pre-defined goals.

Generally, we can conclude that if there is too little recognition for the peers and their lifestyles and practices and if the peers are not sufficiently able and/or willing to work on the multiplication, then the peer-to-peer approach, in fact, misses its purpose and turns into a adult-led top-down exercise. In this case, the peer educators do the multiplication work due to pressure from teachers or trainers, not because they feel inspired and empowered to work towards more sustainable ICT use among their peers based on the knowledge, skills and tools they have developed during the training.

Considering the urgency of addressing sustainability challenges related to all areas of everyday life, the environmental justice framework emphasises the importance of inclusive participative sustainability transitions. In order to enable democratic and inclusive transitions, it is important to target all groups and not only those already interested. Although first-level effectiveness increases when peer-to-peer approaches work with volunteers and environmentally-engaged youths, the environmental justice framework shows us how important it is also to tailor the peer training towards more hard-to-reach groups of youths. This obviously requires more resources. However, if successful, this will provide youths with valuable knowledge, skills and self-confidence/maturity (second-level effectiveness). Further, it would have influence on the first-level effectiveness as different groups of people/social networks would be reached.

As for the specific topic of sustainable ICT use, with the ubiquity of ICT in our daily lives at home, at school and at work, it clearly is a very relevant topic. However, ideally, addressing it should be part of a systemic approach, whereby e.g. the schools themselves – including IT management, school management, curricula

– also become tuned to the aims of a more sustainable use of ICT. This could help to overcome the feeling of powerlessness and would also entail an acknowledgement of those areas of ICT that are difficult to change if no interventions from policy and business take place too. Nevertheless, peer-to-peer approaches have the potential to lead to collective and systemic changes if the aim, preparation, recruitment and implementation offer room to consider what matters to the peers. As for all participatory approaches, if used instrumentally the chances of success are lower. Peer-to-peer approaches need to be aligned to the needs, capabilities and ambitions to those participating.

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Table 1: Overview of peer trainings in five countries

	Country	Number of peer educators	Composition of group of peer educators	Trainers	Duration of training and multiplication	Evaluation material
1a	Austria	18	Student volunteers from 9 different vocational schools Gender:	3 trainers from Austrian useITsmartly team	3 days training + multiplication work in the following 8 months	• Evaluation questionnaire filled out by students after each unit of peer training • Reports of multiplication activities • Participant observation of trainers
1b	Austria	12	Student volunteers from 5 different vocational schools	1 trainer from Austrian useITsmartly team, 1 external expert	3 days training + multiplication work in the following 6 months	• Evaluation questionnaire filled out by students after each unit of peer training • Reports of multiplication activities • Participant observation of trainers
2a	Denmark	9	Students from the same social science class of a secondary grammar school	2 trainers from the Danish UseITsmartly team, 1 supporting teacher	In social science lessons for the duration of 4 months	• Notes from plenary discussion with students • Individual reports based on vehicle work • Participant observation of trainers
2b	Denmark	9	Student volunteers from different classes of a technical-vocational school	3 trainers from the Danish UseITsmartly team, 1 supporting supervisor from the school	Seven training sessions during one month	• Evaluation questionnaire filled out by students after almost each day of training • Reports of multiplication activities • Notes from oral evaluation with students • Participant observation of trainers
2c	Denmark	20	Students from the same class of a secondary grammar school focusing on visual arts	2 trainers from the Danish useItsmartly team, 1 supporting teacher	Training and multiplication were an integrated part of the school curriculum for 2 months	• Evaluation questionnaire filled out by students after almost each day of training • Reports of multiplication activities • Notes from oral evaluation with students • Participant observation of trainers
2d	Denmark	31	Students from the same class of a commercial business school	2 trainers from the Danish UseITsmartly team, 2 supporting teachers	Training and multiplication were integrated part of the school curriculum for 2 months	• Evaluation questionnaire filled out by students • Reports of multiplication activities • Notes from oral evaluation with students • Participant observation of trainers
2e	Denmark	9	Volunteers from the youth division of an environmental organization focusing on sustainability.	2 trainers from the Danish UseITsmartly team (1 trainer)	1 day training, multiplication was carried out as part of their existing volunteer work	• Evaluation questionnaire filled out by students • Reports of multiplication activities • Notes from oral evaluation with students • Participant observation of trainers

Table 1: Overview of peer trainings in five countries

3a	Germany	11	Students from the climate working group of a high school	4 trainers from the German useITsmartly team, 1 supporting teacher, 1 initiator of the climate group of Climate Group)	2 days of training, multiplication work afterwards	• Evaluation questionnaire filled out by students • Reports of multiplication activities • Notes from feedback rounds and discussions with students • Participant observation of trainers
3b	Germany	16	Students from 2 different classes of a vocational school	4 trainers from the German useITsmartly team, 1 supporting teacher	1 week including the multiplication activities	• Evaluation questionnaire filled out by students • Reports of multiplication activities • Notes from feedback rounds and discussions with students • Participant observation of trainers
4a	Netherlands	11	University student volunteers (course to earn extra study points)	2 trainers from the Dutch UseITsmartly team, 2 supporting university lecturers	1 week including the multiplication activities	• Evaluation questionnaire filled out by students twice • Reports of multiplication activities • Notes from plenary discussion with students • Participant observation of trainers
4b	Netherlands	24	Students from different classes of a high school (obliged to participate in a week without class while other students were on excursion)	3 trainers from the Dutch UseITsmartly team, limited support from 1 teacher	1 week including the multiplication activities	• Notes from focus group discussions with students • Reports of multiplication activities • Interview with teacher • Participant observation of trainers
4c	Netherlands	23	Students from one class of a lower vocational school	2 trainers from the Dutch useITsmartly team, 2 supporting teachers	1 semester with weekly training sessions including multiplication work	• Evaluation questionnaire filled out by students • Reports of multiplication activities • Notes from plenary discussion with students • Participant observation of trainers
4d	Netherlands	13	Volunteers from a university student group aiming at enhancing sustainability within their university	Dutch UseITsmartly team	1 workshop only (not a full training)	• Oral feedback of participants • Participant observation of trainers

Table 1: Overview of peer trainings in five countries

5a	Norway	58	Students from 4 classes of the programme for electricity and electronics at a vocational high school (trained in 2 groups)	3 trainers from the Norwegian useITsmartly team, 6 supporting teachers	1 week of training for each group + 3 months for self-organized multiplication activities	• Evaluation questionnaire filled out by students • Reports of multiplication activities • Notes from plenary discussion with students • Notes from discussion with teachers • Notes from short discussion with invited experts • Participant observation of trainers
5b	Norway	59	Students from 2 classes of the programme for media and communication (trained in 2 groups)	2 trainers from the Norwegian UseITsmartly team, 6 supporting teachers	1 week of training for each group including multiplication activities	• Evaluation questionnaire filled out by students • Reports of multiplication activities • Notes from plenary discussion with students • Notes from discussion with teachers • Notes from short discussion with invited experts • Participant observation of trainers

Table 1 Overview of peer trainings in five countries