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An ESD pathway to quality education in the Cyprus primary education context

Chrysanthi Kadji-Beltran, Nicoletta Christodoulou, Aravella Zachariou, Petra Lindemann-Matthies, Susan Barkere, and Costas Kadis

ABSTRACT
This research is based on the rationale that the well-defined framework of education for sustainable development (ESD), its connection with real life and its specific integration in the educational policies and curricula can help to enhance quality education (QE) in a meaningful and identifiable way. In a first step, the common ground of ESD and QE was explored in different areas: common dimensions, future-oriented objectives, commonly targeted skills, value orientation, teaching and learning approaches. In a second step, this information was taken as a base to investigate how well twelve lesson units for primary school reflect the common ground of ESD and QE. The units were specifically developed for this research, in which ESD experienced teachers (mentors) supported inexperienced ones (mentees). Results indicate that ESD can reinforce QE, but that teachers need support with regard to the political and cultural dimensions of SD issues, collaborations with local communities and assessments.

Introduction
Education for sustainable development (ESD) and quality education (QE) share common visions for the future as well as educational objectives that will help to realise a more just, sustainable society, with high standards of life quality for all in the realm of environmental, social and economic prosperity. However, the pathway to the achievement of QE is less clear compared to ESD, which over time has developed a solid knowledge base and means for attaining its goals (e.g. Wals 2009, 2012; UNESCO 2013). The current research is based on the rationale that the well-defined framework of ESD and its integration in educational policies and curricula can help to enhance QE (UNESCO 2009; Buckler and Creech 2014; Didham and Ofei-Manu 2014). Enhancing QE can be achieved through integration of a holistic perspective on ESD and the use of measurable learning outcomes (e.g. Didham and Ofei-Manu 2014).

Aims and objectives
This paper seeks to explore the common ground of ESD and QE in different areas and to identify strengths and weaknesses in ESD delivery that might enhance or limit the achievement of QE. Specifically within ESD practice we explore:
(1) the promotion of ESD and QE common dimensions (environmental, social, economic, political and cultural),
(2) future-oriented objectives that ESD and QE share,
(3) the promotion of skills common to ESD and QE,
(4) objectives that reflect common ESD and QE attitudes and values,
(5) the use of teaching and learning approaches that are common for ESD and QE.

Education for sustainable development

Sustainable development (SD) represents the vision of a future where humanity embraces the common values of solidarity, equality and mutual respect between people, countries and generations, including economic vitality, justice, social cohesion, environmental protection and the sustainable management of natural resources so as to meet the needs of the present generations without compromising the ability of future generations to meet their needs (UNECE 2005, 1). ESD can help to translate this vision into reality. ESD seeks to balance human and economic well-being with respect for cultural diversity and the Earth's natural resources. It emphasises aspects of learning that enhance the transition towards SD, including future education, citizenship education, education for a culture of peace, gender equality and respect for human rights, health education and education for sustainable production and consumption (UNESCO 2007).

The multiple and complex objectives, along with the breadth and depth of the issues and concepts ESD engages in, point out that ESD holds special attributes and characteristics, and requires special approaches and methodologies: (a) ESD is based on SD principles and values; (b) it deals with environmental, social and economic prosperity; (c) it is locally relevant and culturally appropriate as it is based on local needs and conditions, and acknowledges that acting locally has global effects; (d) it empowers individuals for community based decision-making, social tolerance, environmental stewardship, adaptable work force and quality of life; (e) it highlights the interdependence of environment, economy, society and cultural diversity from local to global levels and takes account of past, present and future; (f) it is inter- and trans-disciplinary as well as inter-sector-oriented; (g) ESD implementation requires the use of a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills; (h) it promotes lifelong learning through critical and creative approaches and (i) it engages formal education (organised education provided within the formal educational system: pre-primary, primary and secondary education), non-formal education (organized educational activities outside the established formal system) and informal education (e.g. the knowledge obtained through daily experience and the educative influences of peers, family and the media) (UNESCO 2005a, 2005b; 2009; Gadotti 2010; Mochizuki and Fadeeva 2010).

ESD is closely connected to the millennium targets set by a series of UN conferences on education. The movement Education for All (UNESCO 1998, 2005c), through the Jomtien, Dakar and Johannesburg documents, underpinned a shared vision of an education that empowers people for change. The millennium objectives focused on establishing a commitment to quality education (QE), and acknowledged that QE is critical to the success of SD (UNESCO 2009). QE that integrates an ESD perspective and includes measurable learning targets and outcomes could become a cornerstone of the post-2014 Global Action Programme on ESD and the post-2015 Sustainable Development Goals as a pathway for global education reform and improvement (Didham and Ofei-Manu 2014).

Quality education

QE is defined as the education that enables people to reach their maximum potential as individuals. It satisfies basic learning needs especially in literacy and numeracy and transfers essential life skills, which can enrich the lives of learners and their overall experience of living (UNICEF 2000). Through personal empowerment learners develop their talents to the full and realise their creative potential, including
responsibility of their lives and achievement of personal aims (Gadotti 2010). Individuals’ development leads to social and economic development for their communities, highlighting that QE is not only a human right, but also an indispensable element for a healthy society that is based on the principles of social justice, equity and democracy, ensuring the future well-being of all (UNESCO 2006).

The heart of QE focuses on learning and the learner: it takes into account what the learner brings along, the content, the context and the processes of learning (UNESCO 2005a). At the level of the system, quality is accounted for within the managerial and administrative structures and processes, the implementation of good policies, the use of appropriate legislative framework, resources and the measurement of the learning outcomes (Pigozzi 2009). Being at the heart of QE, teaching and learning processes are expected to foster: (a) healthy, well-nourished and motivated pupils; (b) well-trained teachers and active learning techniques; (c) adequate facilities and learning materials; (d) a relevant curriculum that can be taught and learned in a local language built upon the knowledge and experience of the teachers and learners; (e) an environment that not only encourages learning but is welcoming, gender-sensitive, healthy and safe; (f) a clear definition and accurate assessment of learning outcomes, including knowledge, skills, attitudes and values; (g) participatory governance and management and (i) respect for and engagement with local communities and cultures in a way that makes education relevant to the socio-cultural realities of the learners (UNESCO 2000).

The Cyprus context in ESD

One impediment to ESD, and thus to QE also, is the rigidity of the prescribed curricula and official examinations which inhibit teachers’ creativity and innovation in teaching and learning (Gadotti 2010). In Cyprus, however, the impact has been reduced with the latest educational reform. Nowadays, educational policy and the curriculum (enacted in 2011) place special emphasis on ESD and the development of sustainable schools (MoEC 2009). The ESD curriculum in particular seeks to transform individuals into critical, active and open-minded citizens, who are capable of living and working together, recognising and respecting cultural diversity, and drawing from their own culture the self-esteem and identity needed for living in a contemporary multicultural society (MoEC 2008; CPI 2010; Zachariou and Kadji-Beltran 2015). However, the implementation of ESD in Cypriot schools was found challenging by school principals and teachers. As a reaction, a mentoring programme was introduced, in which ESD-experienced teachers support novice ones in planning and implementing ESD units for primary schools (Kadji-Beltran, Zachariou, and Stevenson 2013; Kadji-Beltran et al. 2013).

Overview of research

The current research is part of a large project on the induction of teachers to ESD with the help of mentoring (Acronym: INDUCTION). The project was funded by the Cyprus Research Promotion Foundation and co-funded by European Funds. Teachers’ participation in the project was voluntary and every stage was approved by the Educational Research and Evaluation Office of the Ministry of Education and Culture. The project was carried out in three phases, with the current research being part of the third phase. The first phase consisted of a needs assessment and was conducted via a nationwide administered questionnaire and semi-structured interviews addressing teachers new to ESD. The second phase included training on ESD (20 h). The training was carried out during an intensive two-day programme with the support of the Ministry of Education’s Environmental Education Centres’ Network, during which participants (12 pairs of primary education mentors–mentees) received information on the concept of SD and SD issues, the concept of ESD, ESD within the Cyprus curriculum, the development of sustainable schools and on ESD teaching strategies and techniques. Despite the mentors’ experiences on ESD, training was deemed necessary mainly for making them familiar with the new official policy and curriculum guidelines for ESD. Additionally, part of their training was on mentoring. Mentors had more than 12 years of service and had consistently worked with ESD. Some of them had postgraduate studies in ESD or worked as part-time ESD advisors in schools, in addition to classroom service. First
results of the project highlight the value of mentoring. It promotes teacher interaction and the formation of professional learning communities for ESD and increases novice teachers’ pedagogical content knowledge of the subject (Kadji-Beltran et al. 2013).

In the third phase of the project (current research), each novice teacher had to develop an ESD unit constituting of a minimum of three lessons (3 × 80’). The topics were selected by the teachers themselves. They were aligned to the schools’ specific SD profiles, which all schools in Cyprus, according to the new educational policy mandate, are now requested to have. The lesson plans were structured according to the Cyprus Ministry of Education official guidelines (MoEc 2011). They included information about the age group, lesson duration, ESD content, the general purpose of the unit and the aims for each lesson, the teaching techniques employed and the means used. A detailed description of the activities performed was also provided. The lessons were then delivered in primary schools (6–12 year old children; referred to henceforth as age groups 1–6), including overall twelve classes. Teaching was attended by the mentors and their observations were registered in the reflective diaries. During the whole time, regular meetings between mentors and mentees took place, and mentors provided guidelines and feedback on the mentees’ work. Random visits by the researchers guaranteed that what was planned was also delivered.

Data analysis

In preparation of the lesson-plan analyses, we explored ESD and QE literature in order to identify the common ground between the two. Official ESD and QE documents and literature were treated as qualitative data sources and analysed accordingly (e.g. UNICEF 2000; UNESCO 2005a; Pigozzi 2009; Bolstad 2012). We identified five key areas of common ground: (a) common dimensions, (b) future orientation, (c) commonly targeted skills, (d) values orientation, (e) teaching and learning approaches (see Tables 2–6). Each of the common areas was further analysed to common sub-categories and were organised in a five sections matrix (one for each key area). Each item (sub-category) was used as a criterion for the lesson plans’ analysis. The cell was marked with an X if the criterion was met by the lesson plan described and documented in an adjacent column by the respective quotation from the lesson plan. Additional supportive qualitative data were obtained through the reflective diaries and semi-structured interviews with the participants upon the completion of the programme. From these tools we used the information concerning the teachers’ observations and comments about their classes and their pupils’ responses that met the overall analysis criteria. Mentors’ interviews and diaries also gave information on the lessons’ connections with the curriculum and pedagogy used.

Results

ESD and QE common dimensions (objective 1)

ESD and QE have common dimensions (environmental, social, economic, political and cultural) and are underpinned by principles that support sustainable living, democracy and human well-being, i.e. environmental protection and restoration, protection and sustainable use of the natural resources, sustainable production and consumption patterns, development of citizenship for leading responsible lives in a free society, and a spirit of understanding, peace, tolerance, equity and friendship (UNECE 2012). These principles are reflected in the 17 goals for sustainable development (UN 2014, 2015).

In the analysed lesson plans, only few of the 17 SD goals were addressed (Table 1). The units mainly referred to consumption and production patterns (corresponding to SD goal 12), energy and climate change res(goal 7 and 13) and biodiversity loss (goal 15). The goals neglected were related to poverty, hunger, health, peace and equity (goals 1–6, 10 and 16), economic growth, employment and industrialisation (goals 8 and 9).

Almost all units had strong links to the environmental and social dimension of ESD/QE (Table 2). The economic dimension was explored in lessons on production, consumption, waste and biodiversity,
Table 1. Overview of units and their connection to 17 SD goals.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Content</th>
<th>Aims of units</th>
<th>Connection to SD goals</th>
<th>Age group</th>
<th>Duration</th>
<th>Year of service (teacher)</th>
</tr>
</thead>
</table>
| 1     | Solid waste management                       | • become familiar with the concept of solid waste, be able to classify / group waste using given or own criteria (e.g. material, origin, recyclable or not)  
• become aware of their choices as consumers and the impact these have on creating waste  
• understand the impact that the waste produced due to their consumption choices has on their immediate environment and the country  
• identify and become familiar with ways and actions they could carry out to diminish waste (reduce, reuse, recycle, change of habits, composting) | 12                     | 3         | 3 × 80'  | 1                     |
| 2     | Air pollution and transportation systems, forests | • realise that the traffic problem observed in the area around school has a negative impact on the life quality of pupils and people living in the area  
• learn about the benefits of using bicycles as a pleasant, easy, safe, healthy and environmentally-friendly mean of transport  
• develop positive attitudes towards the use of bicycles and promote the use of bicycles in the children's daily lives | 7                      | 3         | 4 × 80'  | 3                     |
| 3     | Climate change and desertification           | • understand the concept of desertification and its causes  
• explore the desertification problem in Cyprus, its impact on the environment, society and economy, and propose ways of controlling the problem | 13, 15                 | 5         | 4 × 80'  | 1                     |
| 4     | Production, consumption and solid waste management | • become aware of the connection between their personal consumption habits and the production of waste  
• become aware of their responsibility as active citizens to manage their waste in environmentally-friendly ways  
• realise that their consumption and nutritional habits can help to control waste generation  
• explore different models of sustainable consumption in their daily lives | 12                     | 3         | 4 × 80'  | 1                     |
| 5     | Solid waste management                       | • explore the causes of solid waste and the consequences on life quality  
• identify and suggest actions that can diminish and limit the waste problem  
• explore the benefits that trees offer to people through story telling  
• understand that domestic waste has a negative impact on the environment and on living organisms | 12                     | 2         | 4 × 80'  | 2                     |

(Continued)
Table 1. (Continued)

<table>
<thead>
<tr>
<th>Unit</th>
<th>Content</th>
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<th>Duration</th>
<th>Year of service (teacher)</th>
</tr>
</thead>
</table>
| 6    | Transportation systems and climate change   | • understand the role of CO₂ in nature and in our lives, and how it is connected to different natural phenomena  
      |                                               | • understand the mechanism of the greenhouse effect and the factors that have aggravated the natural phenomenon  
      |                                               | • identify problems connected to the aggravation of the phenomenon and develop skills to resolve related environmental problems  
      |                                               | • develop skills and propose actions in order to diminish their personal carbon footprint          | 7, 11, 13 | 6         | 10 × 80’                | 26          |
| 7    | Solid waste management                      | • understand the concept of production – producer, consumption – consumer  
      |                                               | • understand the connection between consumption habits and the accumulation of waste  
      |                                               | • realise the responsibility as citizens to manage waste in an environmentally-friendly way       | 12        | 2         | 5 × 80’                | 10          |
| 8    | Biodiversity and forests                    | • understand the importance of forests and act individually and collectively to improve the environment by changing simple habits of their daily lives  
      |                                               | • become familiar with the forest area nearby their village and develop positive attitudes towards forests | 13, 15     | 6         | 5 × 80’                | 5           |
| 9    | Production, consumption and solid waste management | • understand the concepts of production and consumption  
                                  |                                               | • reflect on their role as consumers and realise that their personal and collective choices determine the production process  
      |                                               | • monitor and observe the solid waste they personally produce and understand how their personal consumption choices influence the volume of waste produced  
      |                                               | • distinguish between real needs and luxury needs                                                | 12        | 1         | 9 × 80’                | 5           |
| 10   | Production, consumption and solid waste management | • connect consumption patterns with waste production  
                                  |                                               | • reflect on real consumption needs and the role of the media and advertisements in creating further needs  
      |                                               | • identify environmentally-friendly products and their attributes, and how opting for these products can diminish waste  
      |                                               | • reflect on overconsumption and develop consumption habits that minimise environmental impact    | 12        | 5         | 3 × 80’                | 6           |
| 11 | Energy and transportation systems | • realise the consequences of excessive use of private transport (cars) in people’s lives and the environment  
• become aware of the need to limit the use of cars and uptake the use of other public or environmentally-friendly means of transportation  
• develop initiatives for promoting sustainable means of travelling | 7, 11, 13 | 5 | 3 × 80’ | 10 |
| 12 | Holistic approach to global environmental issues: greenhouse effect, climate change, desertification and biodiversity | • realise the complexity of global environmental issues as a result of human activity  
• understand that improving and maintaining their school ground improves their quality of life in school  
• develop a sense of ownership and responsibility for their immediate environment and act as individuals and collectively to improve their school environment and simultaneously contribute to the solution of global issues | 7, 13, 15 | 5 | 3 × 80’ | 2 |

Notes: SD goals (UN 2014).
(1) End poverty in all its forms everywhere.
(2) End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
(3) Ensure healthy lives and promote well-being for all at all ages.
(4) Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
(5) Achieve gender equality and empower all women and girls.
(6) Ensure availability and sustainable management of water and sanitation for all.
(7) Ensure access to affordable, reliable, sustainable and modern energy for all.
(8) Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
(9) Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
(10) Reduce inequality within and among countries.
(11) Make cities and human settlements inclusive, safe, resilient and sustainable.
(12) Ensure sustainable consumption and production patterns.
(13) Take urgent action to combat climate change and its impacts.
(14) Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
(15) Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
(16) Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
(17) Strengthen the means of implementation and revitalise the global partnership for sustainable development.
while the political and cultural dimensions were rather neglected. Only unit 8 had a strong connection to cultural aspects as shown below.

- In unit 7 (solid waste management; age group 2), for example, a game of buying and selling goods helped children to realise the costs of meeting human needs and that costs increase with increasing needs. Children had to distinguish between first necessity products and luxury products, and to discuss the environmental impact of increased and unnecessary consumption.
- In unit 8 (biodiversity and forests; age group 6), an old Easter tradition was critically approached. The ‘burning of Judas’ is a cultural practice that holds high risks for safety, especially in communities prone to forest fires. The children discussed whether a local tradition should be preserved as part of the cultural identity or whether it should be dismissed as it endangers the environment.
- In unit 10 (production, consumption and solid waste management; age group 5), children identified imported fruits and vegetables in their local supermarkets and discussed how this affects local producers. The unit included SD issues such as ecological footprint, local vs. global production, social responsibility of companies and fair trade.

**Orientation for the future (objective 2)**

ESD and QE are both future oriented. They uphold and convey the ideals of a sustainable world as the vision to be reached (UNESCO 2006, 2009, 2010; Didham and Ofei-Manu 2014). A future-oriented education helps pupils to become active and productive citizens, instilled with a higher awareness to drive change by empowering and mobilising them (UNESCO 2005c, 2014). Partnerships and relationships with the community are an integral part of future-oriented education as pupils should work with real challenges in a range of real world contexts (UNESCO 2010; Bolstad and Gilbert 2012). Because cultural customs and the skills that go with them vary greatly from place to place, ESD and QE must be culturally appropriate and locally relevant (UNESCO 2005a; Didham and Ofei-Manu 2014). Activities that were culturally appropriate and locally relevant, and fostered the development of skills to find solutions, were identified in almost all units (Table 3). Civil capacity was built by developing and
strengthening decision-making skills, critical thinking and exploration skills. However, only few units were designed as to foster the active participation of pupils in real-life problem solving.

- In unit 1 (solid waste management; age group 3), for example, pupils investigated the composition of household waste at home, in schools and in their local community, discussed the impact of waste for their community and the country and came up with ideas on how their own household waste could be diminished.
- In unit 7 (solid waste management; age group 2) pupils identified polluted areas on their school ground and in the local environment, and tried to find solutions.
- In unit 8 (biodiversity and forests; age group 6) children reached the community by preparing and distributing information leaflets about environmental risks and the social impact of forest destruction. Moreover, they simulated the local authority council and went through democratic decision-making processes for addressing the problem.

In some units, class visits by local community members (a policeman in unit 2, a forest ranger in unit 8, a shop keeper in unit 9 and a municipality representative in unit 12) had been arranged. However, they only served as an information tool. Real collaborations between schools and community members were missing in all units (see Table 3). One of the novice teachers commented that ‘working outdoors in the community is not common in Cyprus neither for the teachers, nor for the community’. Her mentor (responsible for unit 11) explained the teachers’ reluctance to collaborate with others as follows: ‘You do not want others to see what you are doing … This project helped me to realise that this is a stereotypical way of thinking that we have to abandon’.

**ESD and QE common skills (objective 3)**

QE provides basic skills and competencies, e.g. in literacy, language and numeracy, without which ESD would be impossible to achieve (UNESCO 2006, 2015; Pigozzi 2009; UN 2015). At the same time, both ESD and QE provide life skills that help pupils to adapt to changes over a lifetime (UNESCO 2005a, 2015) and which are necessary for social, economic and environmental well-being (e.g. cognitive, reflective, social/interpersonal and decision-making skills). ESD and QE also promote leadership skills and encourage critical reflection and decision-making that is reflected in people’s personal lifestyles (UNESCO 2005a; 2005c).

Literacy and language skills were promoted in all units (Table 4). According to the lesson plans, multimedia resources as well as newspaper and internet articles, books and advertisements were used to extract information. Multiple activities for the development of language skills such as brain-storming, concept mapping and debate were also included.

- Unit 1 (solid waste management; age group 3), for example, used a letter in which a garbage collector explained waste problems to the children. After discussing and analysing the letter (comprehension and language analysis), children prepared a video documentary with the help of their teacher in order to inform and raise community’s awareness of problems caused by waste.

| Table 4. Connection of units to ESD and QE commonly targeted skills. |
|-----------------|----|----|----|----|----|----|----|----|----|----|----|----|
| **Skills**      | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
| Literacy and language skills | * * * * * * * * * * * * |
| Numeracy skills  | * * * * * * * * * * * * |
| Life skills      | * * * * * * * * * * * * |
| Reflective skills| * * * * * * * * * * * * |
| Social/interpersonal skills | * * * * * * * * * * * * | |
| Decision-making skills | * * * * * * * * * * * * | |
| Leadership skills | * * * * * * * * * * * * | |

Notes: **strong; *superficial; – no connection. |
Numeracy skills were integrated in most of the units taught. Data were collected, registered and analysed (e.g. the amount of waste produced during break) and tables and graphs used to present the results. The activities were creative and meaningful for the children as the ESD background gave mathematics a specific, real-life context.

• In unit 6 (transportation systems and climate change; age group 6), for example, children were presented with a table indicating the carbon emissions of different types of cars, as well as a map of the area they lived in. They were asked to calculate the distance from home to school and to estimate their carbon contribution, if they travelled by car. Later on, children calculated the impact of different means of transportation and suggested the best way of travelling to school.

Life skills (e.g. map reading, organisational, planning, communication and presentation skills) as well as reflective and social/interpersonal skills were fostered in almost all units (see Table 4). Decision-making skills were promoted in those units that included problem solving in a real life context (e.g. unit 6). The development of leadership skills was not explicitly mentioned in the lessons plans. However, leadership skills might have been promoted when children worked in groups, collected and processed information, decided on a course of action, distributed responsibilities and reached a common goal (see Table 4).

**ESD & QE values orientation (objective 4)**

ESD and QE seek to develop values such as justice, equity, tolerance, solidarity, sufficiency and responsibility, gender equality and social cohesion. They emphasise care, integrity and honesty, sustainable living, democracy and human well-being in the spirit of understanding and friendship amongst all peoples, ethnic, national and religious groups and persons of indigenous origins (UNESCO 2009). Awareness raising and emotional development are thus important components of both ESD and QE. Moreover, ESD and QE have to be inclusive for all people and follow a rights-based approach (Pigozzi 2009; UNESCO 2015).

All units aimed at the development of values, albeit mostly in an environmental context, and most units intended awareness raising and emotional development (Table 5; compare Table 1). Some units wanted to make children aware of their personal responsibility for reducing, reusing or recycling waste and their choices as consumers (e.g. units 1, 4, 7, 9 and 10), others focused on environmentally-friendly ways of transportation (e.g. units 2 and 6) or the development of respect for wildlife (e.g. units 1 and 8).

• In unit 1 (solid waste management; age group 1), for example, pupils were shown a movie (Happy Feet) and then asked to express their feelings on wildlife and pollution. Afterwards, they were asked to use their feelings to sensitise peers and the local community through creative presentations (e.g. posters, short movies, newsletters).

Although many units would have allowed a rights-based approach, people’s rights or animals’ rights were not included in the analysed lesson plans (see Table 5). Unit 10 (production, consumption and solid waste management; age group 5), for example, did not use the opportunity to discuss working conditions or child-labour when addressing fair trade. There was also no evidence that animal welfare was considered in the biodiversity unit (unit 8).

**Table 5.** Connection of units to ESD and QE values orientation.

<table>
<thead>
<tr>
<th>Indicators of values orientation</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Inclusive of all students</td>
<td>**</td>
</tr>
<tr>
<td>Development of values</td>
<td>**</td>
</tr>
<tr>
<td>Awareness raising and emotional development</td>
<td>*</td>
</tr>
<tr>
<td>Rights-based approach</td>
<td>_</td>
</tr>
</tbody>
</table>

Notes: **strong; *superficial; – no connection.
Awareness raising was mentioned in the novice teacher’s diaries as a focal outcome of their teaching. The teacher of unit 1, for example, explained that she expected that ‘cognitive development and skills such as data and chart interpretation, deduction, data processing and elaboration would help children become aware of the impact their daily lives have on the environment’. Most importantly, the expected outcome of raised awareness was action and behavioural change. The teacher of unit 8 reported in her reflective diary that she ‘expected [her] class to lead a life style that would help to protect forests’.

**ESD & QE teaching and learning approaches (objective 5)**

ESD and QE are interdisciplinary and characterised by child-centred approaches (UNICEF 2000). Transformative teaching and learning approaches include knowledge construction through participation of pupils in syllabus design and through collaborative and participatory learning activities/projects; the development of critical analysis and problem-solving skills like cooperative inquiry, action research and field visits to envisage alternatives and seek solutions to real-life problems; the use of assessments and the shift from delivering education towards facilitating learning (Pigozzi 2009; Didham and Ofei-Manu 2014).

All units were based on interdisciplinary approaches (Table 6). The mentor of unit 8 explicitly mentioned that she had ‘… pointed out [to the mentee] how important it was to diffuse areas of the topic we studied in different curriculum areas’. Mentees also commented on the complexity and challenge that interdisciplinary approaches constitute for them. The teacher of unit 3 explained: ‘I am aware that interdisciplinary approaches are important for ESD delivery. I was not sure, though, how to organise them without messing with the sequence of the lessons and without confusing the children’. In almost all units, child centred and participatory learning approaches were apparent (Table 6). They included field activities, brain storming, concept maps, scientific investigations, explorations, web-quests, environmental auditing, modelling, debate and document reviewing. Units for younger children included story-telling and role-play activities (e.g. unit 5).

- The teacher of unit 1 (solid waste management; age group 3), for example, illustrated the diversity of approaches as follows:

  We played environmental games. The children worked in stations studying and interpreting statistical data on our issue. We used web pages of environmental NGOs, photos of their neighbourhoods, drew charts … We used YouTube to find information on composting … These approaches encouraged pupils to participate and built up their enthusiasm.

Most units offered activities for the development of higher order thinking skills such as critical, logical, reflective, metacognitive and creative thinking. In almost all of these units, teachers were facilitators. They created the conditions for exploration, reflection, critical analysis, synthesis and evaluation of information, decision-making and problem solving. Pupils were at the centre of the processes and actively engaged.

- Unit 2 (air pollution and means of transport; age group 3), for example, employed numerical skills for the exploration of transport issues and then language and arts for communication, awareness raising and dissemination of children’s ideas. The unit started with a presentation from the local police officer who explained traffic and safety issues. The unit started with a presentation from the local police officer who explained traffic and safety issues. The children discussed the information

<table>
<thead>
<tr>
<th>Approaches and techniques</th>
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Notes: **strong; *superficial; – no connection.
received and the teacher suggested the need to experience the problem. The class decided to go out and observe the traffic, when parents drove to school to pick up their children. In order to observe and report the drivers’ conduct they defined what ‘problematic conduct’ and ‘proper conduct’ would be via brainstorming and organised their ideas in the form of an observation table. They were divided in groups and each group was responsible for observing and registering two specific types of conduct. At the end of the school day, children were safely positioned at the front side of the school for 10 min, filling-in their observation sheet. The following lesson used Excel spreadsheets to register and analyse the collected data and to present the outcomes. Children’s involvement in the lessons’ planning was pointed out by the mentor of unit 2: ‘Pupils responded really well to the activities. … They had the opportunity to participate in deciding what to study and how to organise the teaching and learning process… so there was enthusiasm and this definitely had a positive outcome’.

- In unit 4 (production, consumption and solid waste management; age group 3) pupils surveyed the composition of waste produced at school. This was followed by the development of a concept map in order to identify its main sources (e.g. waste from breaks and waste produced during classroom activities). Children received information on waste management, brainstormed ideas for solutions and invented means to systematically monitor the waste management of their school (e.g. by weighing the daily waste). All activities involved data collection, analysis and interpretation, reflection, creative thinking and evaluation processes.

- The mentor of unit 7 (solid waste management; age group 2) summarized her classroom observations as follows: ‘Pupils were enthusiastic with the lessons, even when these took place at the end of the school day, when they were tired. They were so keen to participate that the lesson was led by them.’

- Children’s active involvement in the lessons’ planning was also pointed out by the teacher of unit 8 (biodiversity and forests; age group 6): ‘They loved it. They loved that we used different approaches and methods. Learning was not pre-packed and given to them. They lead their learning and based on that, the lesson in the classroom evolved’.

With the exception of units 2 and 6, assessments were either absent or rather superficially mentioned in the lesson plans (see Table 6).

- In unit 2 (air pollution and transportation; age group 3), children had to write a letter to the local authorities. In this letter, they explained solutions to a problem they had dealt with (use of bicycles as a mean of transportation). This was an evaluation activity as the letter was based on children’s reflection on what they had learnt and discussed during the lessons.

- In unit 6 (transportation systems and climate change; age group 6), the teacher assessed the outcomes based on pupil’s handouts, concept maps and solution sheets to a proposed problem (identify the transport means and draw on the map the route from home to school with the minimum carbon footprint possible).

Novice teachers had mainly used formative assessments and explained that the whole evaluation process had been difficult for them. One teacher (unit 12) mentioned ‘the lack of straightforward evaluation criteria. Being given the expected outcomes and aims set by the curriculum is not enough.’ The teacher of unit 4 found it particularly difficult to assess attitude changes: ‘It requires systematic observation and logging of children’s behaviour. A quantitative way of observing their attitude change in diminishing waste would be to daily monitor and register the waste quantities created in school.’

**Discussion**

The lesson plans were pedagogically sound and well structured, with clear, achievable objectives. They were developed according to the ESD/QE pedagogy, they were child centred and used a variety of experiential, collaborative and participatory approaches. They also created opportunities for the development of higher-order thinking skills (critical, logical, reflective, metacognitive and creative thinking).
The issues covered established connections with the social and economic aspects of SD through an interdisciplinary approach, indicating teacher's awareness of the issues' systemic nature and their ability to use cross-curricular approaches. Despite all of these merits, for most units, areas for further development and improvement were identified.

Most activities were culturally appropriate and locally relevant, and sought to build civic capacity. While this is a great opportunity for building partnerships and networks with local communities and other agents, this opportunity was not sufficiently exploited. Large class sizes, time limitations or financial constrains might have hindered teacher's efforts to leave the classroom (see also Jenkins 1994; Kent, Gilbertson, and Hunt 1997; Ernst 2007; Nikolaou 2013). However, as several lessons included activities outside the classroom, other reasons were more likely responsible for the limited collaborations between schools and communities. One reason could be that the novice-in-ESD teachers were not sufficiently prepared by the preparatory workshop or their mentors to initiate such collaborations (see also Maso 2014). Another, not mutually exclusive reason could be the introvert school culture in Cyprus (Pashiardis 1998; Kadji-Beltran et al. 2013), pointed out by some the participants (e.g. unit 11 mentor). Nevertheless, sustainable schools are expected to initiate partnerships with the local community or to participate in them (Tilbury 2009; UNECE 2012). Such collaborations establish links with the local culture in a practical and meaningful way (Gruenewald 2008; Knapp 2008) and help pupils to become fully participating members of their communities and citizens of the world (UNESCO 2010).

The prominence of environmental and social issues and the narrow range of SD goals in the analyzed lesson plans reflect the typical SD perception of teachers in Cyprus (Zachariou and Kadji-Beltran 2009). The goals neglected would have warranted a more complex scrutiny of the social, economic and political impacts of human activities and a discussion on conflicts of interest. The participating teachers, inexperienced in ESD, might not have been prepared enough to deal with conflict issues and principles of human and animals rights in class, although they had the help of their mentors. However, they might also have been reluctant to deal with political issues in general. Teachers were found to maintain their political neutrality to avoid conflicts with parents or the school administration (Leahey 2014), tend to avoid the discussion of political issues as they place an emotional burden on their pupils (Kahne and Westheimer 2014) and are assimilated by the existing apolitical educational culture (Pitsoe and Mahlangu 2014). Moreover, discussing political issues with young children lies on a thin threshold between 'converting' and actual critical thinking development (Thomas 2012). Nevertheless, teachers need conflict issues to trigger debates and moral dilemmas for value development and reflection. Discussing conflicts of interest is an indispensable element of both ESD and QE that helps pupils to make value judgements, engage in public debate, acquire action competence and take action (Lundegård and Wickman 2007). A marginalisation of conflict issues is a weakening factor for both ESD and QE, and contributes to a superficial implementation. The cultural dimension was also marginalized, although all units held a potential for its integration. One reason for its marginalisation could be that its integration requires the opening of schools towards the communities (Knapp 2008), which was rather not the case in the present study.

Literacy, language and numeracy skills were developed in meaningful, child-centred activities, and life skills were sufficiently targeted. We nevertheless identified a need for placing more emphasis on the development of leadership skills. The same need is stressed in the final report on the UN Decade of ESD (Buckler and Creech 2014). One of the greatest weaknesses in the scrutinised lesson plans was the absence or vagueness of assessment. A marginalisation of assessment has been attributed to the complexity of ESD, its systemic, holistic and interdisciplinary nature, the subjectivity of values and the issues it deals with, and the complexity of pedagogy used (Raptis 2000; Kadji-Beltran 2002). However, teaching, learning and assessment should be constructively aligned, ensuring that the assessment task and the pedagogical approaches reflect the learning outcomes which the pupils are expected to achieve (QAA/HEA 2014). For answering the question what pupils have actually retained in the long-term, repetition of assessments is also required (Sizer 1992).

There are certain limitations to the present research. The overall ESD school implementation was monitored via the submission of the lesson plans, reflective diaries kept by mentors and mentees...
and a final interview with both of them. As the lesson plans were developed with support and guidance of experienced mentors, we believe that they provided detailed information about the actual lessons taught. However, without direct observations and in-depth interviews with the pupils during the implementation phase we cannot be sure, how ESD/QE was actually implemented and to which avail. Reflective diaries and interviews mainly focused on the mentees' professional development and collaboration with their mentors and are not mirroring school reality. Moreover, our sample was small and restricted to one part of Europe. Generalizations from our results should thus be taken with care.

**Conclusions**

The present results lead to the conclusion that ESD can enhance the key elements and characteristics of QE in ways that QE will become QE for SD (as outlined in Didham and Ofei-Manu 2014). Nevertheless, we identified weaknesses in the implementation of ESD concerning the marginalized political and cultural dimensions of SD issues, a lack of active participation in and collaborations with the local communities and a lack of assessments. The way ESD was approached in the scrutinized lesson plans reflects ‘ESD 1’ (Scott and Gough 2003; Vare and Scott 2007). In this lighter version of ESD, the problems humanity faces are essentially environmental, can be understood through science and be resolved by appropriate environmental and/or social actions and technologies. In ESD 2, the deeper version of ESD, success cannot be measured in terms of environmental impacts because it is an open-ended process; outcomes will depend on people’s unforeseen decisions in the future and on unforeseeable circumstances. However, the extent to which people have been informed and motivated, and been enabled to think critically and to take responsibility, can be researched (Vare and Scott 2007, 193).

The proximity of the lesson plans to ESD 1 can be explained by the early stage of the policy implementation in Cyprus, the teachers’ lack of experience in the field and the limited time frame of ESD in their teaching. Pigozzi’s (2010, 267) question ‘is a decade long enough?’ is well justified. For DESD, the period of 10 years allocated for addressing ESD issues was too short to achieve the deep changes required for bringing about sustainability. In the case of Cyprus, this interval was even shorter. We can therefore argue that ESD two takes time to develop. Nevertheless, the question, how teachers can be motivated, supported and empowered to establish a school culture that will finally lead to QE for SD, arises. The present research demonstrates the advantages of a mentoring system involving ESD experienced and novice teachers. However, data also lead to the conclusion that pre-service and in-service teacher training have to place greater emphasis on suitable means to address the political and cultural dimension of ESD/QE, on the creation of partnerships with the local community and on assessments. Further research should focus on detailed data collection and analysis of lesson-plans, observations, reflective diaries and the monitoring of actual instruction in order to diagnose the real needs of teachers and for identifying actions needed for effective teacher empowerment and support. We have to consider which competences should be acquired by teachers in order to make up for the current gaps in ESD interpretation and implementation and take these into consideration when developing teacher education programmes. Achieving a strong form of ESD can be an effective driver to the enhancement of QE.

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References


