This issue of the JTEFS comprises seven scientific papers from different parts of the world. I would like to thank all the contributors of this issue of the JTEFS. Warm thanks also to the members of the Editorial board and the reviewers for their professionalism reviewing and commenting on the papers submitted to this issue of the JTEFS.

The paper by Redman acknowledges that teacher education for sustainability is a central part of integrating sustainability into classrooms and schools. However, educating for sustainability is not limited to increased content knowledge; rather it encompasses different forms of knowledge that embrace the normative, dynamic and action-oriented nature of sustainability. Curriculum for a summer sustainability programme had previously been developed based on an interdisciplinary approach which incorporates research and practice from the fields of education pedagogy, sustainability and behaviour change. This article synthesises the insights provided by K-12 teachers who participated in this programme and another teacher who utilised the curriculum during a sustainability unit in her 8th form science class in Phoenix. Data was collected through surveys and interviews over the course of a year. The key findings indicate that one of the major barriers to moving away from traditional, didactic approaches to education is the importance placed on standardised tests.

The paper by Bentham attempts to reveal an understanding of education for sustainable development that is informed by an exploration of policy language and agenda and recent literature in the field. The exploration of policy reveals the possible cause for previous inadequate implementation of education for sustainable development. An exploration of policy and literature reveals some key competencies that are advocated for through education for sustainable development. Insight into how policy has shifted from an ecological to a development focus and substantiation for why this shift is important in addressing current sustainable development issues serves to inform the interpretation of education for sustainable development. Finally, the analysis of policy and literature is triangulated to develop a framework that may assist stakeholders of education for sustainable development in identifying education for sustainable development competencies in policy and practice.

The paper by Cincera presents a qualitative evaluation of seven in-service environmental education teacher training courses conducted in the Czech Republic in 2009–2011. The evaluation applied a grounded theory approach. 14 focus groups, 13 interviews and two post-programme questionnaires were used. The evaluation describes a process of managing cognitive dissonance between the participants’ concepts of effective teaching and environmental education and concepts presented by the courses. The paper discusses the strategies applied by the course managers for facilitating a conflict and defensive mechanisms used by the participants. The paper also discusses the implication of this experience for future courses.

The paper by Bikse and her colleagues seeks to find the competitiveness of Latvian university graduates in Latvia and the European Union labour market concerning aspects of entrepreneurship education. To achieve the purpose of this study to determine the competitive and qualitative levels of Latvian universities and necessary improvements that need to be made, a survey of 4,909 graduates (from the years 2006–2011) representing six Latvia universities was performed between November – December, 2011.
The results indicate that, in general, the graduates consider themselves competitive in the Latvian labour market. The graduates have positive opinions concerning the quality of theoretical knowledge as well as the abilities to present information and to evaluate, analyse and systematise it. At the same time, there are serious improvements that are necessary in regard to entrepreneurship education and to increase the competitiveness of Latvian universities, which can be done by improving the quality of the study process, the content of courses, teaching (learning) methods and the attitudes of academic staff to better motive students to develop their skills emphasising the practical side of the study process.

The paper by van Gejeka provides an insight into the results of a lesson designed and carried out at Riga Construction College in the study subject “Building Constructions”. In particular, the research conducted at this vocational secondary school focused upon introducing a particular form of integrative collaboration amongst the learners. Criteria were developed to respond to the question: How is the organisation of the learning process based on the Learners’ Integrative Collaboration Model changing? A formative teaching experiment, which analyses learners’ integrative collaboration through structured observation at the beginning and end of the acquisition of the study subject “Building Constructions” points at positive changes associated with the model’s criteria: working in a team, mutual learning, business communication and creativity action.

The paper by Badjanova focuses on recent tendencies in education, which highlight the need to align the system of general education in Latvia with the tenets of sustainability. In keeping with this broad target orientation, this paper re-examines international and Latvian experiences and perspectives on the application of a holistic approach to the content of primary education. This review of good practice is set against the backdrop of different theories and approaches concerned with the essence and principles of holism. More specifically, the paper addresses the issue of ensuring successful acquisition of musical cultural values in primary school via a holistic approach. In this regard, the latter is construed as movement towards the new that facilitates positive attitudes towards musical cultural values among learners and is both physically and spiritually nurturing. The paper proposes a theoretically and empirically grounded model for the usage of a holistic approach with a view to enabling acquisition of musical cultural values in primary school.

The paper by Reunamo and Suomela seeks to look at the preferences of Finnish early childhood educators through the model of extended environmental education. Behind this model is Palmer’s tree model and an emphasis on empirical, social and ethical components of early childhood education and care. The research method employed a survey. Altogether 924 teams in Southern Finland evaluated their learning environments. By using a factor and reliability analysis, we extracted three factors relevant to the extended Palmer’s model. The teachers primarily emphasised the understanding (learning) aspects of early childhood education and care. The second most important aspect comprised the social aspects of education. The third most important aspect included the ethical and participant aspects of early childhood education and care. Potential implications and indications to the practice of education for sustainable development are discussed.

Astrida Skrinda
Editor-in-chief
OPPORTUNITIES AND CHALLENGES FOR INTEGRATING SUSTAINABILITY EDUCATION INTO K-12 SCHOOLS: CASE STUDY PHOENIX, AZ

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Abstract

Teacher education for sustainability is a central part of integrating sustainability into classrooms and schools. However, educating for sustainability is not limited to increased content knowledge; rather it encompasses different forms of knowledge that embrace the normative, dynamic and action-oriented nature of sustainability. Curriculum for a summer sustainability programme had previously been developed based on an interdisciplinary approach which incorporates research and practice from the fields of education pedagogy, sustainability and behaviour change. This article synthesises the insights provided by K-12 teachers who participated in this programme and another teacher who utilised the curriculum during a sustainability unit in her 8th form science class in Phoenix, AZ. Data was collected through surveys and interviews over the course of a year. The key findings indicate that one of the major barriers to moving away from traditional, didactic approaches to education is the importance placed on standardised tests. As long as external forces and incentive structures reinforce methods of lecture and assess, teachers will struggle transitioning to more experiential, real-world methods that enhance a multiplicity of knowledge. One important suggestion made by the teachers was for increased support by universities through pre-service and in-service programmes focused on educating for sustainability.

Key words: educating for sustainability, teacher education, sustainable behaviours, education pedagogy, behaviour change, sustainability competencies

Introduction

The transition towards sustainability requires preparing educators with the knowledge and skills to implement sustainability curriculum and practices in K-12 classrooms (United Nations Educational, Scientific and Cultural Organisation, 2005). Teachers are ideally positioned to give students an active voice and promote responsible citizenry, therefore situating teacher education for sustainability as an ideal intervention point for transformative change (Makrakis & Kostoulas-Makrakis, 2012). Unfortunately, many education programmes and teacher training programmes focus on declarative knowledge (information, scientific facts) (Cutts, Saltz, & Elser, 2008), while neglecting the social components
of change and action (Lukk, Veisson, & Ots, 2008). Teachers attempting to move away from didactic, information-intensive approaches face barriers associated with the long and entrenched history of presenting knowledge as “immutable information held by experts” (DuPuis & Ball, 2013, p. 74) as well as the top-down requirements of standards and standardised tests that reinforce lecture and assess modes of education (Lukk et al., 2008).

The research presented in this article explicitly focused on behaviour change as an intended outcome of sustainability education. Other researchers have established the need to target behaviour change as a part of sustainability initiatives, noting that the transition towards sustainability “will ultimately depend on the decisions individuals and groups make regarding their own behaviour” (Lukk et al., 2008, p. 36). Although sustainability is a relatively new field, education has long been a means for targeting behaviour change (for instance, health, drug, anti-violence programmes). In particular, environmental education programmes have attempted to foster environmentally responsible behaviours for decades (Arbuthnot, 1977; Hungerford & Volk, 1990; Ramsey, 1993; Pooley & O’Connor, 2000). The field of environmental education provides ample precedence for targeting behaviour change through education as well as insights into (un)successful pedagogical approaches. Although sustainability is a distinct departure from the nature-centric focus of environmental education (Pepper & Wildy, 2008), this research draws upon the literature relating both to environmental education pedagogy and methods for promoting environmentally responsible behaviours.

This article focuses on the efforts of four K-12 teachers in Phoenix, Arizona to implement sustainability education and practices in their classrooms. During a summer sustainability education programme with primary and secondary school students held at Arizona State University in 2011, three K-12 teachers observed, participated and provided feedback to the author in developing innovative sustainability pedagogy. The summer programme was part of the teachers’ master’s degrees in STEM (Science, Technology, Engineering and Mathematics) education and the student participants were targeted through a mentoring programme for low-income minorities. A year-long case study was also conducted with the student participants (Redman, 2013). During the programme and the following year, interviews and surveys were conducted with the participating teachers. In addition to the three teachers that participated in the summer STEM programme, I interviewed a teacher that utilised the sustainability curriculum created for the summer programme during a two-month long sustainability unit in her 8th form science class. While this article focuses on the qualitative data collected from a small sample of K-12 teachers, it was part of a broader effort to understand the knowledge and behaviours held by K-12 teachers regarding sustainability (Redman & Redman, 2013).

Herein I reflect on the insights provided by the K-12 teachers concerning the opportunities and barriers to integrating sustainability into a traditional classroom setting. This article concludes with recommendations for working within the difficult, cumbersome and discipline-focused structure common in many K-12 schools, while capitalising upon existing opportunities, to advance the implementation of sustainability education.
Opportunities and challenges for integrating sustainability education...

Background

Major challenges in educating for sustainability

Traditional approaches to education often focus on value-free, didactic, one-way methods of communication (Blumstein & Saylan, 2007). Other scholars have noted that these mechanistic and rote education methods have exacerbated sustainability problems by promoting simplistic, isolationist thinking and by positioning the students as passive recipients of information (Orr, 2004; Williams, 2008; DuPuis & Ball, 2013). Additionally, the long history of disciplinary and reductionist research often neglects the holistic approach advocated for by many sustainability scientists (Orr, 1991; Sipos, Battisti, & Grimm, 2008; Nolet, 2009). The systems that train teachers (i.e., universities) as well as the structure of K-12 schools tend to reinforce positivistic, value-free views of science and didactic, expert-driven approaches to education (Owens, 2013). Clearly change within our education institutions needs to occur in order to support holistic sustainability education (Sterling, 2003).

One of the most commonly cited barriers to change within the K-12 system is the already over-crowded agenda. An education professor, Stir (2006), wrote that, “It sometimes seems that the curriculum is too crowded, the day is too busy” (p. 836). Teachers are expected to cover an ever-growing list of standards, prepare students for standardised tests and equip them with the knowledge and skills they need for their future careers. In the face of all that, educators are expected to be doing, sustainability education is often seen as an additional burden that teachers have neither the time nor resources to bear (Wheeler & Byrne, 2003).

A number of education scholars have noted that one of the greatest pressures facing teachers is the emphasis on achieving high standardised test scores (Wheeler & Byrne, 2003). Test scores are not only linked to funding but also often, “seal the fate and set the salaries of principals and teachers” (p. 27). This creates a barrier to implementing novel pedagogical approaches not only because teachers and students spend weeks of class time preparing for standardised tests but also because standardised tests reinforce the emphasis on technical or factual knowledge (Marzano, 1990). An education researcher Marzano (1990) wrote that “a school or district that wishes to improve student scores on standardised achievement batteries should focus its curriculum on test-taking skills, content specific factual knowledge, and content specific procedural knowledge” (p. 97). While my research suggests focusing on multiple ways of knowing, with an emphasis on subjective, dynamic forms of knowledge, through experiential, real-world approaches, the pressure placed on teachers to achieve high standardised test scores reinforces didactic methods that target technical forms of knowledge.

In order for teachers to lead the way towards sustainability, they need both external and internal support. A number of sustainability education researchers have called for universities, non-governmental organisations (NGOs) and businesses to provide external support for K-12 schools (Wheeler & Byrne, 2003). One of the ways that universities and NGOs commonly interact with K-12 teachers is through pre-service (i.e., undergraduate education programmes) and in-service training (i.e., continuing education courses). Yet, education researchers, Wheeler and Bryne (2003), lament that “in pre-service education, sustainability is totally absent as a holistic concept” and “the net result is a near-absence of sustainability education in the K-12 system” (p. 28). In addition to the
lack of sustainability education support provided by universities and NGOs, businesses may dis-incentivise sustainability practices in schools. For instance, waste management companies often charge schools premiums for recycling bins and services. This lack of support for sustainability in pre-service and in-service training as well as in supportive business practices often leads to educators feeling isolated in their efforts to engage students, schools and classrooms in sustainability.

In the face of a growing list of standards, high-stakes standardised tests, crowded classrooms and constant budget crises, the teachers I worked with were, however, enthusiastic and passionate about sustainability. In the following pages, I suggest ways to support teachers in their efforts to integrate sustainability into their classrooms and confront some of the barriers to educating for sustainability.

**Education aims and pedagogy**

The approach to sustainability education implemented during the summer programme was based on insights from three distinct fields of research and practice: education pedagogy, behaviour change and sustainability competencies (Frisk & Larson, 2011; Redman, 2013). In creating a cohesive, interdisciplinary framework, I used four domains of knowledge (declarative, procedural, effectiveness and social) as the organising construct for various schools of thought on behaviour change; adapted sustainability competencies developed for higher education in order to make them applicable to the K-12 sector (systems thinking, foresighted thinking, stakeholder and group collaboration and change agency) and used an array of pedagogical approaches including real-world, experiential and problem-based learning. In targeting long-term behaviour change during the education programme, we focused on sustainable food and waste behaviours due to students’ relative control over these behaviours (as compared to transportation, for example, given that none of the students were of legal driving age) (Redman, 2013). The goal of the programme was to build skills and knowledge for sustainability while reinforcing sustainable practices and positioning sustainable actions as the norm. The first week of the programme focused primarily on food-related sustainability issues and the second week focused on waste, although the classroom practices (for instance, composting and eating sustainable lunches) were continuous.

One of the underlying tenants guiding my approach is the need to move beyond declarative knowledge when targeting behaviour change. Many education programmes proceed on the faulty assumption that information regarding socio-ecological systems will ultimately foster environmentally responsible behaviours (i.e., the information-deficit model) (Simmons & Volk, 2002). Behavioural scholars have, however, clearly established that the linear, information-deficit approach to education is insufficient in promoting behaviour change (Finger, 1994; Kollmuss & Agyeman, 2002). Meanwhile, a number of sustainability education scholars have embraced diverse forms of knowledge that integrate normative components of sustainability and suggest shifting away from scientific facts as the primary discourse in sustainability (Kaiser & Fuhrer, 2003; Frisk & Larson, 2011; DuPuis & Ball, 2013).

Expanding our definition of knowledge to include diverse, dynamic and subjective ways of knowing can move education beyond the typical deficit approach (Frisk & Larson, 2011; DuPuis & Ball, 2013; Redman, 2013). Previous research described four distinct knowledge domains in terms of prominent behavioural theories (Frisk & Larson,
Opportunities and challenges for integrating sustainability education (Redman, 2013) which here are briefly defined as each relates to education. Declarative knowledge is technical information or scientific facts that are often taught in lecture format, although there are a number of programmes that use hands-on activities to teach facts about the water cycle (Cutts et al., 2008). Procedural knowledge refers to process, action-related knowledge and how-to skills. Procedural knowledge can be taught through formal lesson plans (for instance, my students sorted trash they had collected into three piles: compostable, recyclable or landfill during an hour-long activity). Implementing associated classroom practices is also critical to reinforcing procedural knowledge and was a central part of the education programme (for instance, providing recycling, composting and trash bins in the classroom with prompts over the bins).

Effectiveness (or impact) knowledge addresses the perceived consequences associated with different behaviours as well as beliefs about who is responsible for given outcomes. One of the central ways for enhancing effectiveness knowledge is by focusing on problems that are locally relevant and at a scale with which students feel empowered to act, while also examining the positive impact of individual and collective change. Social knowledge (i.e. norms) encompasses subjective and local knowledge including the motives, intentions and actions of other people. In order to enhance social knowledge, it is critical that sustainable behaviours are positioned as normal and the desired way to act (Frisk & Larson, 2011; Redman, 2013).

During the education programme the knowledge domains were directly linked to diverse pedagogical approaches, including real-world, experiential and problem-based learning. For instance, the students built composting bins and created prompts with how-to information regarding the sorting and maintenance of organics for their households. Through this activity they gained procedural knowledge about building and maintaining a composting system through hands-on methods, meanwhile the in-classroom composting bin had given them two weeks of sorting experience. Throughout the programme, we rewarded and incentivised the students’ participation in composting, recycling and reuse behaviours, among other things in an effort to enhance social knowledge regarding sustainable actions. Table 1 reflects more information on the links between the activities and the knowledge domains, and Redman (2013) provides more details on the education programme.

The methods used during the summer programme included formal lesson plans, classroom practices, incentives for sustainable behaviours and at-home activities (Table 1). The teachers were provided with all of the lesson plans prior to the programme as well as the essential materials for modelling sustainable behaviours (for instance, they were given reusable bamboo utensils to use during lunch rather than using disposable plastic utensils). The teachers were actively involved in the implementation of the lessons and provided insights and feedback throughout the programme. While participating in the education programme, the teachers were also enrolled in a course with other teachers that were participating in different STEM programmes. Throughout the summer, the teachers shared their experiences in the sustainability programme with their peers and provided further feedback to myself and the other researchers regarding broader insights discussed during their course (which was part of their master’s degrees). The mechanism of peer-sharing was particularly useful in identifying the differing of opinions regarding sustainability amongst a larger sample of K-12 teachers.
Table 1. Sample of activities as they relate to knowledge domains and competencies

<table>
<thead>
<tr>
<th>Activity (pedagogical approach)</th>
<th>Corresponding knowledge domain(s)</th>
<th>Corresponding competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students interviewed their household members about food purchasing decisions (real-world learning)</td>
<td><strong>Social</strong>: students gained knowledge regarding the food norms (both descriptive and injunctive) in their households</td>
<td><strong>Stakeholder engagement</strong>: Engaging students’ household members in food sustainability issues is central to achieving and maintaining targeted change</td>
</tr>
<tr>
<td>Students collected their trash for a week and then sorted all the trash into compostable, recyclable and landfilled piles</td>
<td><strong>Procedural</strong>: students developed how-to skills regarding sorting of waste</td>
<td><strong>Systems thinking</strong>: Students connected their daily activities with the broader waste system and accumulation of trash</td>
</tr>
<tr>
<td>The teachers placed stickers next to students’ names on a poster titled “Caught behaving sustainably” when they noticed the students participating in a sustainable activity (i.e., composting or using their reusable water bottles)</td>
<td><strong>Procedural and social</strong>: students process skills are reinforced when they participate in a given sustainable behavior repeatedly and the sustainable behaviors are positively reinforced as the norm for the classroom</td>
<td><strong>Change-agency</strong>: For students to lead the way for sustainable change amongst their friends and family, they must first be equipped with the skills, confidence, and positive attitudes regarding sustainable behaviors</td>
</tr>
<tr>
<td>Students created action plans for implementing composting or recycling systems in their households with the assistance of their guardians</td>
<td><strong>Effectiveness</strong>: students wrote action plans based on activities they felt empowered to implement and they were positioned as leaders of sustainable change in their households</td>
<td><strong>Change-agency and stakeholder engagement</strong>: Rather than just sending the students home with composting bins (for example), students co-generated action plans to transform their household waste system with their guardians.</td>
</tr>
<tr>
<td>Students calculated their ecological footprints based on their current behaviors and then re-calculated it multiple times with variations based on adopting more sustainable food and waste behaviors</td>
<td><strong>Declarative and effectiveness</strong>: Students gained socio-ecological knowledge while also seeing the relative impact of their behaviors on the planet</td>
<td><strong>Systems thinking</strong>: As part of this activity, we connected the students’ daily activities to broader resource use, emphasising the unintended consequences and cascading effects, often associated with common consumer behaviours</td>
</tr>
</tbody>
</table>

Data collection methods

During and after the programme, I gathered data through surveys, interviews and participants’ observations. Due to the small sample size, the data gathered was qualitative in nature and included photographs of the teachers’ classrooms, video tapes from activities, written reflections and voice recorded responses. However, prior to participation in the summer programme, three of the teachers participated in a quantitative survey as part of a pilot test for a broader analysis on K-12 teachers’ knowledge in the four domains and behaviours. Redman and Redman (2013) describe the details and full survey instrument. Although the survey instrument was in its infancy and a sample size of three makes
quantitative analysis difficult, the survey did provide a sense of the teachers’ initial knowledge in each of the domain areas as well as the sustainability-related food and waste behaviours they commonly participated in.

Table 2 describes the teachers’ school positions employing pseudonyms that will be used throughout the article to protect their anonymity (in accordance with the Internal Review Board protocol). Sue was asked slightly different interview questions from the other three teachers because she did not participate in the summer programme or the pre-programme survey. Rather, she integrated a number of the activities developed for the summer programme into her classroom as part of a two-month long sustainability unit in her the 8th form science classroom. During my visits to her classroom, I was able to take photos of the students’ projects and discuss her experience with the sustainability unit. Although there are short-comings with such a small sample size, in working with only four teachers I was able to have intense and continuous collaboration and feedback during the summer programme and over the course of the year following the programme.

Table 2. Background information on the teachers involved in my research

<table>
<thead>
<tr>
<th>Teacher’s Pseudonym</th>
<th>Teaching position (at time of interview)</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelly</td>
<td>1st year the 8th form science teacher at an inner-city charter school</td>
<td>Participated in STEM summer programme as part of master’s degree</td>
</tr>
<tr>
<td>Kate</td>
<td>Applying for several positions as the 8th form maths teacher</td>
<td>Participated in STEM summer programme as part of master’s degree</td>
</tr>
<tr>
<td>Kylie</td>
<td>3rd year the 6th form science teacher at a suburban public school</td>
<td>Participated in STEM summer programme as part of master’s degree</td>
</tr>
<tr>
<td>Sue</td>
<td>4th year the 8th form science teacher at an inner-city public school</td>
<td>Received the sustainability curriculum from Kelly</td>
</tr>
</tbody>
</table>

Key findings

Barriers to integrating sustainability education into K-12 schools

Herein, I discuss the key challenges of educating for sustainability as described by the teachers in this study. While there are certainly other barriers, the ones noted below are those that came up most frequently in the surveys and interviews with the teachers in this study. Some of the barriers are specific to my focus on sustainable behaviours and knowledge in diverse domains, yet others are broad barriers to any substantive change within the education system.

Standards and standardised tests

The participating teachers stressed the importance placed on standards and standardised tests at their schools. Some remarked that although they would like to teach sustainability, they feel too overwhelmed by the standards required of them and their schedules are
just too busy to fit sustainability in their curriculum. Kelly, for instance, noted that she
did not use the sustainability lessons because of “the pressure of state standards and
making sure we get passing test scores”. As a first year science teacher, Kelly spoke
about the pressure she felt about her students getting good AIMS (Arizona’s Instrument
to Measure Standards) test scores and hoped that once the tests were finished she could
integrate more experiential, real-world pedagogy into her classroom. She stated, “As
soon as I have more time, as soon as AIMS is over, I will be able to do more.” The
strong focus on content knowledge in standardised tests meant that, although Kelly
understands the short-comings of declarative knowledge, she was not able to depart
from information-based approaches as much as she would have liked.

Kate also discussed the difficulties of educating for sustainability while teaching
traditional subjects and associated standards. In particular, Kate suggested that sustain-
ability seems to be a better fit with science standards, but when teaching maths she
would need support in learning how to create math-related sustainability lessons. Kate
suggested that the most accepted sustainability issues in schools are those related to the
environment, which also makes science the easiest subject for teaching sustainability.
The interdisciplinary nature of sustainability is a struggle for many teachers who find
that it only ‘kind of’ fits with their subject matter and standards.

In overcoming the barriers of standards and subjects, explicitly linking sustainability
curriculum to standard subjects, expected knowledge and skills will help teachers integrate
sustainability into their classrooms. There are a number of actors that can support
teachers in these efforts: 1) universities can integrate sustainability education into their
current teacher education programmes in order to explicitly link sustainability to core
subjects and standards; 2) NGOs can implement sustainability workshops (i.e., continuing
education courses) that focus on linking standards to sustainability; 3) outreach
programmes (whether a part of universities, NGOs or businesses) can focus on developing
curricula that links sustainability to core standards while also collaborating with teachers
to adapt the curricula to their local context. However, it is important that even when
focusing on standards, novel pedagogical approaches should be employed, rather than
reverting back to lecture based methods focused solely on declarative knowledge.

New teacher work-load

The participating teachers were relatively new to their respective schools, with less than
five years at their schools or in their subject areas. The first couple of years are some of
the most difficult for teachers because they have to prepare lessons, presentations,
worksheets and tests for a new subject that they may not even be that familiar with. In
her interview, Kelly said that one of the barriers for her in implementing sustainability
curriculum was her confidence regarding teaching in a new subject area.

I kind of got thrown into the science area. I think a lot of meshing standards
[science standards with sustainability] that you see, I don’t see because I
don’t have that science background. I think that has a lot to do with it being
harder to implement [sustainability] in the classroom because a lot of the
teachers don’t have confidence in the science field. (Kelly)

For Kelly being a new science teacher is overwhelming but, as she becomes more
comfortable with teaching science, she hopes to try many of the sustainability lessons
and practices in her classroom. In this way, Kelly represents the trade-offs associated with working with new teachers. While younger teachers may be more attune and open to relatively new, emerging ideas such as sustainability, they lack the confidence and experience that seasoned teachers have. On the other hand, seasoned teachers may have the confidence and seniority to try more novel approaches but are generally less familiar with sustainability issues and practices.

As a result, I suggest the development of Professional Learning Communities (PLCs) focused on sustainability in order to encourage collaboration between seasoned and new teachers. PLC’s can help foster a social norm regarding the integration of sustainability into classrooms and schools, particularly if the school establishes an incentive structure for participation in a sustainability PLC. PLCs already exist in many schools and are used to promote interdisciplinary collaboration, the development of new curriculum and co-generation and maintenance of projects (such as school gardens).

**Lack of deep knowledge regarding sustainability**

Lack of knowledge regarding sustainability itself can be a barrier to implementing sustainability projects and curricula. Teachers want to feel knowledgeable about the topics they are teaching and not feeling sufficiently knowledgeable can make them hesitant about teaching sustainability topics. Kelly felt that, with more training, she could gain the requisite knowledge to integrate sustainability into her classroom but right now she finds it overwhelming. Part of the problem, in Kelly’s point of view, is that much of the knowledge she would like to glean cannot be attained solely through reading a book or a website, rather it requires action-related knowledge and hands-on experience. The pre-programme survey (taken by Kate, Kylie and Kelly) reinforced this point because prior to participation in the summer programme, the teachers had relatively high levels of declarative knowledge but lower levels of knowledge in the other three domains in comparison.

While Sue has a strong science background, she did note that implementing the sustainability unit was a learning process for her. Sue said, “I didn’t really understand what I was getting myself into with the sustainability unit.” She was learning and researching sustainability issues along with her students. While teachers traditionally like to be the ‘experts’ on a topic before teaching it, Sue demonstrated that as long as the teacher is willing to learn along the way, lack of deep knowledge does not have to be a barrier to implementing a sustainability unit.

From the interviews, it is clear that some teachers are more hesitant about diving into new topics and approaches while others are confident enough to learn through the process. Hence, in overcoming the knowledge barrier, it is not necessary that every teacher has perfect knowledge on the myriad of complex sustainability issues prior to integrating sustainability into their classrooms but it is important to link sustainability to diverse domains of knowledge in areas that teachers are interested in (for instance, Kylie stated she would attend a workshop on integrating food systems sustainability into K-12 classrooms). It would, therefore, be beneficial to structure workshops around the teachers’ specific interests in order to delve deeper into a topic rather than focusing on surface or declarative understanding of sustainability broadly.
Lack of external and internal support

The teachers suggested that professional development and training regarding educating for sustainability in the K-12 system is lacking and much needed. In terms of training, Kelly said, “I have always wanted to learn a more formal approach to introduce this topic [sustainability] in order to make students more aware.” Through in-service training and professional development focused on sustainability, teachers could get the support they need to develop and implement sustainability curriculum and practices.

While external collaboration and support would be beneficial, teachers also need to feel supported in their efforts to educate for sustainability by school leaders. The teachers I interviewed were concerned about teaching topics that administrators and parents would find unacceptable. For instance, Kate said, “Talking about plant-based diets as opposed to eating meat is not as socially acceptable and probably would not be well accepted by administrators and parents.” Kelly also had concerns about pushing the boundaries of what is taught in part because sustainability is not traditionally a part of her school’s science curriculum. If administrators were openly supportive of sustainability education then much of the concern expressed by Kelly and Kate would be alleviated.

Universities can be a part of enhancing both internal and external support. Administrators and teachers filter through the university system in order to get undergraduate (and often graduate) degrees. By integrating sustainability and diverse domains of knowledge into university courses, regardless of discipline, the graduates of universities will, ideally, be supportive of these constructs in their future careers.

Opportunities for integrating sustainability education into K-12 schools

The barriers to implementing sustainability education seem daunting; however, there are also opportunities that can be capitalised on. In particular, the teachers expressed interest in educating for sustainability and transformative change. They value a sustainable future and see K-12 education as a critical part of transitioning towards sustainability. The students are equally enthusiastic and when given the opportunity will engage deeply in sustainability issues. Additionally, sustainability curricula, when adapted by a knowledgeable teacher that has internal and external support, can meet the standards and increase students’ engagement in the targeted topics.

Enthusiastic teachers

Despite teachers’ heavy workload, each of the teachers I surveyed and interviewed expressed excitement about integrating one or more lessons/practices into their classrooms (Table 3). In the post-summer programme survey, Kelly wrote, “I think all the material and ideas you presented were inspiring, meaningful and important” and “I look forward to multiplying the effect in my classroom.” Kate said that seeing the students’ reactions to the sustainability material during the two-week programme, reminded her of how important it is for students to learn about sustainability and understand how everything is connected. Sue was also enthusiastic about sustainability education and felt that the sustainability unit was moving and powerful. She said, “I don’t care what subject I am teaching I really want to teach this [sustainability] every year.” The enthusiasm expressed
by the teachers demonstrates that if they were to have support in implementing sustainability curriculum and practices they would be happy to do so.

Table 3. Sustainability lessons and practices selected by the teachers as their ‘favourite’

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Favourite activity</th>
<th>Justification (how and why the activity fits in with the teacher’s classroom)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelly</td>
<td>Composting and eating healthy as part of everyday classroom practices</td>
<td>Kelly is overwhelmed by the standards so she prefers to integrate sustainability into her classroom practices (i.e., recycling) rather than in formal lessons or curriculum.</td>
</tr>
<tr>
<td>Kate</td>
<td>Sorting trash activity</td>
<td>Kate stated that through watching the students sort their trash into compostable, recyclables and landfilled piles, she was able to physically see what they had learned about waste management. In this way, the lesson served both as a hands-on, real-world relevant activity and as an assessment of what the students learned.</td>
</tr>
<tr>
<td>Kylie</td>
<td>Ecological footprint activity</td>
<td>Kyle wrote that she used the ecological footprint activity with her students on the Earth Day, because “it really helped them see the impact of consumer choices” and “raise consciousness among students regarding the choices they make.”</td>
</tr>
<tr>
<td>Sue</td>
<td>Cereal re-design</td>
<td>Sue used the cereal box re-design lesson as her first activity in the sustainability unit, because it allowed her students to engage in the inquiry process (which is Strand 1 of the 8th form science standards).</td>
</tr>
</tbody>
</table>

As previously discussed, the teachers I interviewed were relatively new teachers so it is possible that more seasoned teachers will see sustainability as just another “wave of reform” (Hargreaves & Goodson, 2006, p. 18) and may, therefore, lack the excitement expressed by these new teachers. Other scholars have found that mature teachers with longer careers, often see reform and change as another phase that will ultimately not last so rather than engaging in the suggested change, they just try to ride it out (Hargreaves & Goodson, 2006). Thus, in order to capitalise on the enthusiasm of the new teachers while also utilising the experience of seasoned teachers, I would reiterate the need for PLCs as a method of bringing new and mature teachers together.

**Student interest and engagement in sustainability topics**

Teachers are constantly seeking ways to increase student interest in learning and educating for sustainability certainly seems to get students excited and engaged in learning. Even teachers that may be less enthusiastic about sustainability as a topic may be convinced to implement some sustainability lessons in order to increase student engagement. In Sue’s words:

> about 99% of her students said the sustainability unit was the most important thing they learned all year…Even kids that I have never been able to touch
all year long, I’ve had a whole entire year with them, kids that I have never been able to break through to, they are stopping after class asking questions, coming in at lunch, wanting to know more information.

Sue was surprised at all the outside of class time her students were spending on sustainability because typically homework is seen as a burden but with the sustainability unit the students were, “just off on their own doing their own investigating”. The students commented on how because of the sustainability unit, they saw sustainability issues all around them and felt that the topic was relevant to their lives and the real-world. The problems presented in class were relevant and tangible (real-world based) and spurred conversations with the students’ peers and families.

Adaptability of sustainability lessons

Sue used many of the activities and materials that I created but adapted them to fit her class schedule and structure. The first lesson she used during her sustainability unit was the cereal redesign lesson (this lesson was used about 1/3 of the way through the summer programme) in which students redesign cereal boxes based on the ingredients in the product (contact author for lesson plan). The students commented that “the box lies!” and from there began to question what else was in their food that they didn’t know about. By the end of this activity, the students were asking broader food system questions regarding nutrition, chemicals and food marketing.

Building upon the students’ curiosity, Sue presented information on the food system beginning with the Green Revolution and industrial agriculture. She tied the Green Revolution into previous science units by having the students use this case to discuss the relationship between ethics and science. By starting with a fun, creative, hands-on activity, Sue was able to get the students asking questions and investigating on their own.

Sue also modified some of the details of certain activities. For instance, during the summer programme the students evaluated three different types (organic, conventional and local) of salsa, actual brands; not hypothetical ones, based on environmental, economic and social equity criteria. For this activity, I wrote narratives about the companies’ practices and policies regarding employees, farming practices and distribution (contact the author for full lesson plan). Sue, on the other hand, had the students bring in the salsa they most frequently ate at home (homemade salsas included). The students had a few days to research the salsas and return to class with their findings regarding the life cycle of their salsas, including labour and farming practices, production and shipping operations as well as end of life management (waste processes). In Sue’s adaptation, she not only used real-world salsa brands, as it is done in my original lesson, but she went beyond and used brands (or homemade equivalents) that were present in the students’ everyday lives and situated the students as the researchers.

Sustainability curriculum and science standards

During the interview, Sue went through her Arizona standards book (Cambridge-based curriculum) and pointed out how the sustainability unit fit into each of the standards, strands and concepts. For instance, Sue explained that, with Strand 2: History and Nature of Science, they discussed the history of science as a human endeavour while
Opportunities and challenges for integrating sustainability education...

integrating food issues regarding the pros and cons of biotechnology, pesticides and the mechanisation of the food industry. Sue also discussed how well the sustainability unit fit with the scientific process and inquiry (Strand 1: Inquiry Process) – “applying scientific processes, observing questions, comparing, classifying, all of this has to do with sustainability issues; it all fits well with the sustainability unit”.

She explained that the sustainability unit allowed her to expand on other standards such as the changing environment, analysing environmental risks, analysing environmental benefits of human interactions with biological or geological systems, science and technology in the environment and science in personal and social perspectives. For instance, life science standards include populations of organisms and ecosystems and analysing the relationship among organisms and their environment, so the students looked at monoculture farming and how it has wiped out ecosystems. Then, by comparing food chains and food webs, they looked at the bio-accumulation of pesticides in the environment due to industrial agriculture.

Sue, having an undergraduate degree in biology, felt that any teacher with a strong science background could easily integrate sustainability into their science class. Overall she felt that the sustainability unit:

*totally tied in every concept that we covered this year. It wrapped it up in a beautiful package and put a beautiful bow on it. They could just see how every aspect of science came together in the sustainability unit, from chemicals to pollution, chemical reactions, physical and chemical properties and Newtonian mechanics. They could see how there were connections with everything they have learned. It was amazing because it [the sustainability unit] brought everything together.*

Table 4 illustrates Sue’s approach to integrating sustainability with the state science standards for her classroom.

### Table 4. Integrating sustainability education with the 8th form Arizona science standards

<table>
<thead>
<tr>
<th>Strand 1: Inquiry process</th>
<th>Sue had a school garden in which students conducted experiments about how plants grow under different conditions. For instance, students could grow plants using purchased soil, hot-compost and vermin-compost and then discuss the sustainability implications as well as the plant growth.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept 1: Observations, questions and hypotheses</td>
<td></td>
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<tr>
<td>Concept 2: Scientific testing</td>
<td></td>
</tr>
<tr>
<td>Concept 3: Analysis and conclusions</td>
<td></td>
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<tr>
<td>Concept 4: Communication</td>
<td></td>
</tr>
<tr>
<td>Strand 2: History and nature of science</td>
<td>Sue discussed the Green Revolution with the students, and they reflected on how the technology (pesticides, genetically modified organisms (GMOs), fertilizers) had negative cascading effects. They discussed how plants developed in the U.S. were spread to other countries in which the culture (customs) and even climate made the crops less successful than was anticipated.</td>
</tr>
<tr>
<td>Concept 1: History of science as a human endeavour</td>
<td></td>
</tr>
<tr>
<td>Concept 2: Nature of scientific knowledge</td>
<td></td>
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</tbody>
</table>

Sequel to Table 4 see on p. 18.
Strand 3: Science in personal and social perspectives
  Concept 1: Changes in environments
  Concept 2: Science and technology in society

Sue assigned her students to read chapters from the book Garbology (by Edward Humes). They discussed the problem and watched a video on the Great Pacific Garbage Patch. Then they brainstormed solutions (composting, recycling, reusing) and asked to present at least one solution on their sustainability unit exam.

Strand 4: Life sciences
  Concept 1: Structure and function in living systems
  Concept 2: Reproduction and heredity
  Concept 3: Populations of organisms in an ecosystem
  Concept 4: Diversity, adaptation and behaviour

In the 8th form, this strand is primarily focused in concept 2. Sue discussed GMOs with her students and explained genetic drift (gene migration from GMO crops to non-GMO crops). They also discussed how this has led to monocultures and reduced genetic diversity.

Strand 5: Physical science
  Concept 1: Properties and changes of properties in matter
  Concept 2: Motion and forces
  Concept 3: Transfer of energy

When discussing the transfer of energy, students learn about entropy. Through entropy, students examine what happens when we eat higher on the food chain (loss of energy, 10% rule). Students can clearly see that eating higher on the food chain results in greater energy loss.

Strand 6: Earth and space (no performance objectives for the 8th form)

There are no concepts for the 8th form science in regards to this strand.

**Recommendations**

Based on research in academic literature, the interviews with the teachers as well as experience at other schools, I recommend: 1) teacher training focused on sustainability and enhancing sustainability in diverse domains of knowledge; 2) PLCs focused on supporting each other in developing sustainability lessons and linking seasoned teachers with newer teachers; 3) internal and external support for integrating sustainability into the school and classroom. These are not recommendations based on transforming the entire school system but rather tools for integrating sustainability into current K-12 schools based on the key barriers and opportunities described above. I have briefly introduced each of these recommendations throughout the text in regards to confronting specific barriers or capitalising upon unique opportunities. Table 5 provides a brief synopsis on how the below recommendations link to the education approach and barriers/opportunities cited above. We cannot wait nor hope for a perfect school system or all the absolutely best answers but must muddle through, implementing and improving our approaches as we go. Herein, I revisit each of these recommendations and explain how they build support for sustainability education.
Table 5. Linking recommendations to pedagogy & the knowledge domains

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Suggested linkages to pedagogy</th>
<th>Suggested linkages to the knowledge domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop pre-service and in-service training focused on novel sustainability curricula while also integrating standards (i.e., reduce standards barrier while focusing on local adaptability of sustainability curriculum)</td>
<td>• Focus on experiential, real-world curriculum</td>
<td>• Focus training on diverse domains of knowledge, while shifting away from declarative, information-intensive approaches</td>
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<tr>
<td></td>
<td>• Have teachers adapt sustainability lessons for different subjects/standards and pilot the lessons during the training</td>
<td>• Discuss existing social knowledge and methods to position sustainability as the norm</td>
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<tr>
<td>Develop a sustainability PLC that brings new and seasoned teachers together (i.e., assist with new teacher work-load, while capitalizing on new teachers’ enthusiasm)</td>
<td>• Develop classroom as well as school-wide projects</td>
<td>• Create incentive structures for participation in PLCs, hence fostering positive social norms/knowledge regarding the integration of sustainability into the school</td>
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<tr>
<td></td>
<td>• Emphasise the interdisciplinary nature of sustainability cross-subject projects</td>
<td></td>
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<tr>
<td>Foster internal and external support for sustainability in schools and classrooms (i.e., integrate normative components of sustainability into admin training and universities)</td>
<td>• Discuss post-normal views of science in universities</td>
<td>• Focus on social and cultural forms of knowledge that are often neglected in positivistic views of science</td>
</tr>
<tr>
<td></td>
<td>• Develop/use sustainable infrastructure as a learning opportunity</td>
<td>• Link sustainable campus operations to curriculum in order to reinforce effectiveness, social and procedural knowledge</td>
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</table>

Provide teacher training (pre- and in-service) focused on sustainability

Some teachers, like Kelly, do not have strong science backgrounds and need support in linking sustainability curriculum to their required standards. During Kelly’s interview, she stated that she would like to have a teacher in-service training that focuses on sustainability. Through external support from universities and NGOs on how to integrate sustainability into their subjects and standards, some of the burden would be taken off already over-committed teachers. Teachers are currently required to take continuing education classes every year, so devoting one of the sessions to sustainability would not add to their already busy schedule. Teachers are not going to become experts on all aspects of sustainability, so it is essential that a supportive environment for teachers to learn along with students in sustainability units (as Sue did). Administrators and parents supportive of the benefits of these co-learning approaches will be necessary. By integrating sustainability and post-normal science into undergraduate and graduate programmes, deeper knowledge and acceptance of sustainability and subjective ways of knowing (for instance, effectiveness and social knowledge) would likely occur.
There are currently NGOs, such as the Green Education Foundation (GEF, 2013) and the Sustainability Education Network (Wheeler & Byrne, 2003), that are focusing on developing in-service training for teachers regarding sustainability. Additionally, universities, such as Arizona State University, have outreach programmes that are tasked with supporting and collaborating with teachers and students to integrate sustainability into schools (http://sustainableschools.asu.edu/). Yet, many of the existing programmes still have a nature-centric approach and focus on global issues rather than action and individual responsibility (Blumstein & Saylan, 2007). While it is progress to see a growing number of organisations and institutions focusing on sustainability education in the K-12 sector in order to promote the transformative change need to progress towards sustainability, the training needs to move out from under the approaches common to environmental education.

**Develop PLCs focused on sustainability education**

While teacher training would be useful for many teachers, some teachers such as Sue already have a clear understanding of how sustainability relates to their subject and standards. For teachers like Sue, having a PLC that focuses on sustainability lessons, projects and practices would be helpful. Sue manages the school garden and she started composting in her classroom but if more teachers got involved with sustainability education, she could have support with some of these school-wide projects rather than managing them by herself. PLC’s typically bring together a group of teachers and staff in order to collaborate, learn from each other and share responsibility for the targeted project (LaFee, 2003); so while Sue would benefit from having others to share the responsibility of the garden, teachers like Kelly would benefit from learning how Sue integrated sustainability with the science standards.

PLC’s have also been known to increase buy-in of new projects or ideas (LaFee, 2003), therefore the development of a sustainability PLC may also encourage seasoned teachers to engage with sustainability and support newer teachers in their efforts to try novel pedagogical methods. Members of PLC’s can also share their lessons and successful adaptations with their colleagues, hence reducing the workload of each individual teacher. Many schools already have PLCs and have set aside time during the school day for PLC meetings. Building upon these existing programmes and structures allows for the teachers to focus on integrating sustainability without adding to their already over-crowded schedules.

**Increase internal and external support for sustainability education**

Schools can be tricky political environments. In the interview with Kate, she talked about how careful she will have to be when integrating values and subjective knowledge into the classroom. In particular, new teachers have a difficult time pushing the boundaries of what is typically taught. Kate said that while she understands that declarative knowledge on its own is not enough to create change, the behaviours that can be advocated for and the values that can be taught are largely dependent upon the school environment. In terms of integrating subjective knowledge into the classroom, Sue had strong support from her administration. Sue openly discussed behaviour change in her
classroom and even had questions on the students’ exam about how they were going to change the way they ate. In terms of her administration’s reaction to this approach, Sue said, “In my final evaluation [the principal] said this is exactly our mission statement, we want kids to be competitive in a global society and we want them to be community builders, we want them to make big changes at the local level and this [sustainability unit] totally goes along with everything that our school stands for.”

Unfortunately, many schools are still generally stuck in the positivist view of science – in which science is value-free and the teachers should not be advocating for certain behaviours or teaching controversial topics but rather just imparting ‘facts’ and other types of declarative knowledge. Sue was able to integrate subjective knowledge and discuss values, attitudes and behaviours in her classroom because her principal was incredibly supportive of her efforts to integrate sustainability. This support enabled Sue to fully engage her students in the normative aspects of sustainability and if more schools can take this approach to education and see it as an opportunity to foster community leaders and change agents then sustainability can much more successfully diffuse throughout our society. In order to increase internal support for sustainability, universities (for instance, through undergraduate and outreach programmes) and NGOs could also tailor programmes for administrators in order to increase awareness and acceptance of subjective forms of knowledge.

Even with a supportive administration, there needs to be supportive infrastructure for many of the sustainable behaviours suggested in this article to be modelled. For instance, having the water-bottle refilling stations at the schools allows teachers to model using and refilling their water-bottles. Also, having a school-wide recycling programme is essential to create the norm of recycling within the school. Much of schools’ operations are run by outside businesses or the infrastructure is installed by outside businesses. If the external businesses could support schools in their sustainability initiatives by providing monetary incentives or materials at little cost (for instance, recycling bins), then the behaviours would be far easier for money-strapped school to engage in. For behaviours like recycling, supportive infrastructure is as critical as supportive policies, hence businesses are a central part of creating change within schools.

Conclusion

Drawing on the experiences, difficulties and aspirations of active teachers interested in sustainability, I have identified several key lessons and actions which can be taken to support teachers in their efforts to educate for sustainability. The challenge of educating for sustainability and transformative change in K-12 schools is not just in the hands of teachers and principals, but rather is a burden that must be shared by universities, researchers, NGOs and even parents. Transformational education change requires structural change (adding things like water bottle filling stations in order to position refillable water bottles as the norm), institutional and financial support (to build gardens and composting systems like Sue did), as well as increased support from administrators, parents and seasoned teachers. However, through collaboration and a commitment to change and action, we can build education processes that promote systems thinking, encourage long-term strategising and place a value on the future while empowering the next generation of leaders to be agents of change for sustainability.
Progressing towards a more sustainable future requires changes in education structure, content and process (Williams, 2008). Many sustainability education scholars have suggested that this shift necessitates educating for the whole person—not just for increased literacy and cognitive outcomes, but rather, for the head, heart and hands as well in order to promote empathy, develop skills and integrate multiple ways of knowing (Sipos et al., 2008; Williams, 2008). The methods suggested throughout this article support this call for change through shifting away from modernist, positivistic approaches to education. However, there are external forces, such as university approaches and perspectives regarding science that influence the acceptability of post-normal perspectives and subjective forms of knowledge in K-12 classrooms. Further research could explore the relationship between positivistic views of science in universities and K-12 approaches to science using a more empirical approach with a larger sample of teachers.

In addition to exploring the impact of university environs on the K-12 system, further research could explore the relationship between teachers modelling sustainable behaviours and the diffusion of those behaviours amongst the student population. Based on the interviews conducted as part of this research, teachers rarely think about the impact modelling sustainable behaviours could have on their students. There is such an emphasis on formal lesson plans which leads to practices, operations, social norms and action-related knowledge often being neglected in the education agenda.

There is also much room for further research on how to educate for diverse domains of knowledge through novel pedagogy without increasing the burden placed upon teachers. One promising approach is the flipped classroom (http://www.knewton.com/flipped-classroom). Teachers can use pre-recorded videos that take the place of traditional lectures and focus on content knowledge (in other words, declarative knowledge). Students watch these videos outside of class-time and then class-time can be spent doing experiential, hands-on learning that focuses on other forms of knowledge. The flipped classroom would be particularly beneficial for schools that want accountability regarding whether or not the teacher has touched on all the standards as the videos are easily shareable with administrators and could be organised by standard. Additionally, non-profits and non-government organisations could focus on producing the video lectures, hence reducing teacher workload while increasing external support for sustainability education. The flipped classroom is just one suggestion that would reduce commonly cited barriers to sustainability education and would allow teachers to spend less time focused on declarative knowledge when having face-time with their students.

Although, there may be resistance to novel methods of educating for sustainability in K-12 schools (by school boards, administrators, etc.), the K-12 teachers that participated in this research were interested in those activities which targeted diverse domains of knowledge through experiential, real-world approaches. Kate, Kelly and Kylie all said they would enjoy a teaching environment that allowed them to further integrate sustainability curriculum and practice and would be interested in professional development that fostered the necessary skills. The teacher that did implement an extensive sustainability unit found that not only were the students more engaged in the content but sustainability topics provided a great platform for integrating many of the standards targeted throughout the year. Teachers are well positioned to promote responsible citizenry and empower change agents of the future but they cannot do it without broader acceptance and support for educating for sustainability.
Acknowledgements

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CLEARING THE PATH THAT HAS BEEN LAID:
A CONCEPTUALISATION OF EDUCATION
FOR SUSTAINABLE DEVELOPMENT

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Abstract

Education for sustainable development (ESD) has become so crucial that we have tried to smear it on anything and everything that’s teachable. The consequence is that almost everything we do may be said to contain weak attributes of ESD even if we know nothing significant about it. This paper attempts to reveal an understanding of ESD that is informed by an exploration of policy language and agenda and recent literature in the field. The exploration of policy reveals the possible cause for previous inadequate implementation of ESD. An exploration of policy and literature reveals some key competencies that are advocated for through ESD. Insight into how policy has shifted from an ecological to a development focus and substantiation for why this shift is important in addressing current sustainable development issues serves to inform the interpretation of ESD. Finally, the analysis of policy and literature is triangulated to develop a framework that may assist ESD stakeholders in identifying ESD competencies in policy and practice. It is hoped that through this engagement with selected texts a more informed and complex insight into ESD and its features may be developed.

Key words: education for sustainable development, sustainable development, competencies, action competence, sustainability literacy

Introduction

Sitting in the shade of an acacia tree on a hot day deep in the Umfolozi wilderness area, which is totally devoid of any human structure, our ranger and guide Colin Johnson handed each of us boys our lunch ration. It consisted of a sandwich and a hard-boiled egg. Colin asked us not to break the egg, but just to hold it and look at it. He held up an egg and asked us the question: ‘If this egg is our Earth, what part of it would be the air that surrounds us?’ We all said ‘the shell’. He was silent for a moment, before cracking the egg on his head. He carefully and slowly pealed the shell away, exposing the thin, delicate membrane that lay beneath. Lifting a piece of the opaque skin away from the egg, he held it to the light. ‘This is how fragile our planet is’ he said slowly. ‘This thin membrane is the only thing protecting us from whatever lies beyond. This is our thin layer of atmosphere and we must pro-
tect it at all costs.’ [...] Even then so long ago I felt frightened at the vulnerabil-
ity of our planet. After the silence Colin asked a simple question, a question
that changed my life: ‘You are privileged to be here’, he said calmly, ‘on this
course and on this Earth. What are you going to do to make a positive
difference to our Earth, when you get back to school?’ He did not say ‘when
you finish school’, or ‘when you retire one day’ but ‘when you get back to
school.’ He was not giving me the escape that so many people use: ‘one day,
when I have time’. He meant now! (Malherbe, 2010, p. 31)

Education for sustainable development (ESD) not only calls upon educators to teach
about ESD, it also requires educators to involve children and students in activities that
contribute towards sustainability. In many policies, education has been dedicated the
responsibility of tending to the environmental crises of today. Many environmental and
sustainability policies have been developed, such as the Tbilisi (United Nations Educa-
tional Scientific and Cultural Organisation-United Nations Environment Program
[UNESCO-UNEP], 1978) and CRE-COPERNICUS (Copernicus, 1994) Declarations,
Agenda 21 (United Nations Conference on Environment and Development [UNCED],
1992), the Earth Charter (IECC, 2000) and the United Nations Decade of Education
for Sustainable Development (United Nations [UN], 2002). All advocate for the promo-
tion of a sustainability literacy which is hoped to offer an avenue for sustainability
understanding and action, a sense of citizenship that promotes a liberal and sustainable
society (Huckle, 2009). However, it is still unclear exactly what an education that pro-
motes sustainability should look like. What should one understand by the term ‘sustain-
ability literacy’ which is intended to realise the greater plight of sustainable development
(SD) locally and globally?

A sustainability literate person is able to: understand the need to change to
a more sustainable way of doing things; have sufficient knowledge and skills
to decide and act in a way that favours sustainable development; and recog-
nise and reward other people’s decisions and actions that favour sustainable
development (Parkin, Johnston, Brookes, Buckland, & White, 2004, p. 30).

It appears that the key to identifying sustainability literacy lies in initially understanding
what SD means in the realm of education. The main goal of education for sustainable
development (ESD) is to promote sustainability literacy through the taught curriculum.
In the attempt to define and simplify sustainability literacy, it is inherent that one also
looks at the key concepts underpinning ESD.

At this point, the paper moves on to explore relevant ESD related policy and
literature. It is from this exploration that key concepts and competencies are highlighted
and discussed. The major challenges and criticisms of ESD are also presented as an
attempt to provide a more informed understanding of ESD. This analysis of policy and
literature is corroborated to develop a framework that may assist ESD stakeholders in
identifying ESD competencies in policy and practice.

A conceptual analysis of ESD

ESD has been criticised for its lack of clarity and thus difficulty to incorporate into an
already crowded curriculum. The following analysis of literature and policy serves to
identify how policy has been and can be interpreted to assist in the conceptualisation
Clearing the path that has been laid: A conceptualisation of education..

and realisation of ESD implementation which is the responsibility of the educator ultimately. The intention is not to simplify or reduce ESD but rather to embrace its complexity through an exploration of various texts. It is hoped that, through an exploration of these selected texts, a more informed and complex insight into ESD and its features may be developed.

SD – a key concept

The terms ‘sustainability’ and ‘SD’ for that matter bares a particular degree of ambiguity and qualitative meaning as it represents a Shangri-la that cannot possibly be identical for all (Pittman, 2002). Pittman (2002) further argues that the term ‘SD’ is a less appropriate term than ‘sustainability’ as its definition documented in the World Commission on Environment and Development (Brundtland, 1987) is highly anthropocentric focusing only on satisfying human needs now and in the future. Such a focus stands the risk of promoting development in a socially equitable manner even if it is ecologically unsustainable. This goes to show that there is not only contention about the definition of such terms, but also about the agenda behind their historical use.

Jickling (1994) raises his own concerns about the term ‘SD’ and its practical implications. Firstly, he explained that the term ‘SD’ is a vague term that may be manipulated in either an eco-centric or techno-centric manner. Secondly, because ‘SD’ persists to be an abstract conception in individuals’ minds, it is largely open for interpretation meaning that there is no one overall agreed goal for SD. Jickling (1994) specifically highlights the argument that the term ‘sustainable’ juxtaposes the term ‘development’. He further concludes that, if ‘development’ becomes the main agenda of economists or those policy planners and implementers who are not concerned with the ecological environment as main priority, then the term ‘sustainable’ will be left to mean sustaining development at a cost to the ecological environment. Jickling (1994) offers a critical insight to the anthropocentric ways in which the term can be viewed, warning that this term in the wrong hands can bring about the opposite affect than what is hoped for. Barsan, Nastasecu and Barsan (2011) attempt to clarify such ill or ‘weak’ interpretations of SD, as that put forward by Jickling, in their description of the Strong Model of Sustainable Development, which involves three concentric circles. The inner most circle represents the economy, the second circle represents society and the outer most circle represents the ecological environment. This model illuminates the dependency of the economy on society and society on the environment. However, even after the presentation of this Strong Model of Sustainable Development, Jickling in a discussion between himself and Wals stated:

\textit{I’m doubtful that the idea of sustainable development is adequate to the task of enabling thoughtful and effective responses to local and global issues (Jickling & Wals, 2012, p. 51).}

Jickling (1994) refers to the need for contextualised action, something more than a conceptual understanding of what SD means. Considering the strong model definition of SD, it is now possible and necessary to look at how ESD has been conceived and conceptualised in terms of the three and now more recently the four pillars of SD. This exploration assists in bringing the paper closer to the presentation of an informed ESD framework.
ESD – a holistic education

Much has been written and said about the nature and implications of implementing ESD. However, it has been suggested that, amidst all of this, educators still want to know one thing.

*Perhaps the greatest obstacle to reorienting the world’s educational systems toward sustainability is the lack of clarity regarding goals. In simple terms, those who will be called upon to educate differently want to know, what am I to do differently? What should I do or say now that I didn’t say before?* (Hopkins & McKeown, 1999, p. 2).

To clarify what is not being implied is that we need more content added to the curriculum as even the most highly educated countries in the world live unsustainably. Rather what is being suggested is that perhaps we need a different type of education, one that aims to develop knowledge, skills, attitudes and values that are geared towards achieving a sustainable global society and future (Hopkins & McKeown, 1999). Education functions at a local level, addressing the competencies that support the regional and national context. Therefore to provide an example from two very different contexts, education in South Africa, for instance, may focus on providing learners with competencies that equip them to contribute towards social and economic development in the attempt to reduce poverty. However, education in Norway, for instance, may focus on providing learners with competencies that equip them to contribute towards the management of natural resources in relation to agricultural development. ESD suggests that these contextually based SD issues are important to address through the curriculum. Also, local issues should be linked to global issues in order for learners to realise the implications or significance of local action.

Before listing the attributes or principles of ESD, a glance at mentioned challenges and criticisms of ESD can provide a more informed perspective of the type of education that is being defined here. This chosen format may seem disagreeable to some however, in many ways it acknowledges readers’ assumptions and criticisms upfront, laying everything out on the table opening the way for an uncluttered engagement with the remaining text.

Tilbury (2002) points to a common misinterpretation of ESD whereby educators do not see environmental education for sustainability and ESD for that matter as a process of learning. As a result, they often reduce it to content that must be incorporated into relevant subject specialisations. To reiterate ESD is not about adding content to an already crowded curriculum. ESD is not only to be seen as a process of learning knowledge and skill competencies, more specifically the learning process itself should empower learners. It should encourage critical and creative thinking that allows for an eventual critique of the ESD worldview itself and the assumptions it is supported by (Tilbury, 2002). To clarify what Tilbury (2002) means by this, I turn to one of Jickling’s (1994, 2012) well quoted criticisms of ESD.

*... education is concerned with enabling people to think for themselves. Education for sustainable development ... or education “for” anything else is inconsistent with that criterion* (Jickling, 1994, p. 5).

For Jickling (1994), an education for anything is one that trains one’s mind to think in a predetermined way for a predetermined end.
The very idea that education should be for something like sustainable development remains as questionable as ever (Wals & Jickling, 2012, p. 51).

This is unacceptable when attempting to transform society and its thinking. Semantically this argument is sound, however, due credit should be given as the intentions and implications of ESD go beyond this, as noted by Tilbury (2002). Surely, all education involves educating for some type of curriculum. The question now should be: Would you like that curriculum to perpetuate the way things are currently? or Would you prefer a new paradigm all together? I believe ESD is trying to acquire that new paradigm, not in the way suggested by Jickling (1994), but in the way promoted by Tilbury (2002). An education where the very methods of learning encourage learners to be critical about the foundations on which their education and SD is based. ESD is a transformative education that promotes critical and reflective thinking on assumptions and existing structures.

This constant transformative agenda will assure that ESD is not only relevant, it is also current best practice. It is also important to recognise that, although ESD has a transformative agenda, it also has a purpose towards SD change. This requires that learners’ capacity to identify the need for changes and enforce changes in terms of appropriate and sustainable decision making is developed (Connor & Dovers, 2002). ESD, so far, has been described as having good intentions, intentions that promote a holistic education. The competencies that teachers would need to develop to ensure a holistic education, at this point, are still unclear.

**ESD – a type of quality education**

ESD should be seen as a process of learning competencies that may be applied and taught across all disciplines and, thus, maintain its relevance to all educators and their specialisation subjects (Mogensen & Schnak, 2010). This will be touched on further along in the paper. First, we need to understand how ESD has been conceptually defined by current leading researchers in the field. We also need to explore how these definitions serve to clarify or in some instances mystify understandings, thus motivating for the development of a comprehensive ESD framework.

Defining ESD is something that challenges us all (Pigozzi, 2010). Pigozzi (2010) attempts to define the educational aspect of ESD by stating that it is fundamentally ‘quality education’ that also “includes the range of ideas and concerns that emerged out of the World Summit on Sustainable Development (WSSD)” (Pigozzi, 2010, p. 258). Pigozzi (2010) further defines a quality education.

> A quality education understands the past, is relevant to the present, and has a view to the future. Quality education relates to knowledge building and the skillful application of all forms of knowledge by unique individuals who function both independently and in relation to others. A quality education reflects the dynamic nature of culture and languages, the value of the individual in relation to the larger context, and the importance of living in a way that promotes equality in the present and fosters a sustainable future (Pigozzi, 2010, p. 258)

This sort of clarity is not much help to any educator who wishes to know how ESD fundamentally changes their practice in the classroom. However, we have been provided
with some sort of solace as we were warned right at the beginning that defining ESD is a challenge for all.

Gadotti (2010) offers a critical insight into the ESD concept, consequently adding confusion to the beginner who is searching for the meaning and implications of ESD. Gadotti (2010) from the start claims education for sustainable living and education for sustainability as preferred concepts to ESD. He takes this stance as he finds that ESD does not recognise the ambiguity in the term ‘sustainable’ and ‘development’ and thus starts with a premise. One may argue that the pedagogy of ESD encourages the critical reflection on the meaning of SD as mentioned previously, however authors such as Gadotti (2010) can complicate matters when they largely focus on the semantics. In a further attempt to define ESD, Gadotti (2010) in one instance throws together a series of terms and principles, unexplored or defined further and, in this way, unintentionally clutters the path to understanding sustainability. It is important to acknowledge here that an advanced reader on the subject may not concur with these beginner difficulties. Gadotti (2010) may appear absolutely clear to many advanced readers in the ESD field. However as an educator and beginner who is just trying to grasp the concept in order to implement it practically, descriptions such as the one below, provide a very broad guide that stands the danger of being implemented incorrectly or just as vaguely.

Education for Sustainable Development is an integrative (it integrates education, health, jobs, sciences, and so on) and interactive concept. Despite its ambiguity, ESD is a positive vision for a humane future, a consensus supported by a broad majority. With the global warming issue, ESD is very up-to-date, and it can contribute to the understanding of the current crises. ESD requires changing the system, respecting life, caring for the planet and for the whole community of life. That means to share fundamental values, ethical principles and knowledge: respect Earth and life in all its diversity; care for life with understanding, compassion, and love; build democratic societies that are fair, participatory, sustainable and peaceful. ESD is a central point to the educational system facing the future. However, it is not enough to change individual behaviours; we need political initiatives to set standards.

ESD is more than a collection of knowledge related to the environment, economy and society. ESD should take care of the way to learn new attitudes, perspectives and values that guide and impel people to live their lives in a more sustainable way (ibid, 2010, pp. 225–226).

This description serves to make one wonder what is this way of learning and how does one guide people to live in a more sustainable manner? Interesting is the major emphasis on the ecological perspective of sustainable development, implying that ESD would be focused on the ecological aspects of SD issues. Less emphasis is placed on the societal pillar, no mention of the economic pillar and very little to suggest that the important interconnection between these pillars be engaged with. It would be important for Gadotti (2010) to explain to novices that ESD needs to be grounded in context and that development can include more than ecological development. In many undeveloped countries, SD issues such as poverty and access to education implies a focus towards socio-economic development. Albeit not to the neglect of the ecological pillar, rather to the consideration of social, economic and ecological aspects and how these all need to be considered when an SD issue concerns socio-economic development needs.
Thus far the importance of the three pillars of SD has been emphasised yet the fourth political pillar should not be forgotten as it runs across the other three in interconnected ways. However an exploration of how policy developed reveals how rising SD issues changed the focus of education over the years. This shift in focus reveals the needs based nature of education, supporting the newer ‘development’ emphasis inherent in defining ESD.

**Defining ESD: A historical perspective**

When trying to adequately define ESD, one cannot ignore the definition of SD which ultimately serves as the foundation on which ESD rests. The previously mentioned strong model of SD is supported in two documents crucial to ESD, Agenda 21 (UNCED, 1992) and the United Nations Decade for Education for Sustainable Development [DESD] (UN, 2002). However the Tbilisi Declaration is briefly reflected on to reveal the change in orientation from an ecological focus to a more socio-cultural focus in Agenda 21 and the DESD. The Tbilisi declaration offers an insight into the first movements towards understanding education as a process that involved an education in, about and for the environment.

Agenda 21 was informed by the recommendations of the Tbilisi Declaration, which focused on the then phrased ‘environmental education’ (EE) with a much stronger ecological justice focus. A more recent application of EE is what we now refer to as ESD, with a stronger development focus, in the interest of human rights and equity. Perhaps this is where a lot of confusion has crept in as far as applying ESD is concerned. An opening statement in the report of the Rio+20 Conference in June 2012 stated, “Eradicating poverty is the greatest global challenge facing the world today and an indispensable requirement for SD. In this regard we are committed to freeing humanity from poverty and hunger as a matter of urgency” (UN, 2012, p. 1). It is therefore not so alarming to notice the shift in policy from the ecological justice focus to the stronger development focus. In a world where poverty and hunger is a global problem, how can we justify an education that focuses on ecological justice and ignores the socio-cultural and socio-economic issues that are rife? It is also important to mention that science and technology hold the innovative power to promote and develop ‘environmentally sound technologies’ that not only serve to address socio-economic needs but also ecological needs (UN, 2012). Development is inevitable, therefore it is crucial that we understand the implications of development and consider them in future development. An education that only focuses on promoting ecological needs is not effective in preparing decision-making citizens for a developing world. For it is a global reality that major SD issues concern socio-economic needs, and, if learners are not exposed to an education that engages all four pillars of SD (social, economic, ecological and political), then they will remain unequipped to make informed decisions that assist SD locally and globally.

At the other extreme, many institutions and educators have resorted to a ‘greening’ focus of ESD as just mentioned this was the major previous orientation of EE. As a result, this has left many educators feeling that either ESD should be delivered as a separate subject on its own, or that perhaps their discipline is not suited for the inclusion of ESD all together. A recent survey sent out as part of my doctoral study, received many replies from teacher educators in the mathematics, languages and education studies department, who felt that SD was related to the sciences and thus irrelevant to them.
They apologised profusely for not being able to take part in the study and wished me well for its further progress. Perhaps then it is our misunderstanding of ESD and previous weak knowledge of EE that restricts us from making the necessary paradigm shift.

A closer look reveals that the Tbilisi Declaration poses that environmental problems may be better understood and resolved by bringing together the knowledge from different disciplines. This was to pave the way for the implementation of the strong model in education. Instead of seeing EE and ESD as something that needs to be incorporated into a crowded curriculum, the Tbilisi Declaration suggests that it be looked at differently. The activity of EE and ESD, according to the Tbilisi Declaration, should be seen as the using of knowledge from different disciplines to address SD and environmental issues.

_**A basic aim of environmental education is to succeed in making individuals and communities understand the complex nature of the natural and the built environments resulting from the interaction of their biological, physical, social, economic, and cultural aspects, and acquire the knowledge, values, attitudes, and practical skills to participate in a responsible and effective way in anticipating and solving environmental problems, and in the management of the quality of the environment*** (Tbilisi Declaration, 1978, p. 25).

What is implied is that an EE or ESD should not only impart knowledge competencies about SD, but rather that skill competencies be developed through active learners’ engagement in order to address SD issues.

In analysing the Tbilisi Declaration, the main principles of EE are highlighted. These principles mention competencies that both the educator and the learners need to aspire towards. A few of the knowledge competencies include the understanding that nature is a complex system that involves the interdependence of the physical, social, economic and cultural spheres; a realisation that local decision making has global impacts; and socio-economic growth directly influences the biophysical environment. Skill competencies include the demonstration of agency towards solving environmental problems using critical thinking and problem-solving skills. Value and attitudinal competencies involve those related to environmental agency. These principles can be identified further on in the ESD framework that has been constructed using the key principles from major policy and literature on ESD. An educator who has previously been exposed to the ecological thrusts of classical EE would interpret the term ‘environmental problems’ to mean ecological problems. It is for this purpose that the ESD framework was developed.

As mentioned earlier, it was out of the recommendations of the Tbilisi Declaration that chapter 36 of Agenda 21 was formulated. In analysing Chapter 36 of Agenda 21, the main principles of ESD are highlighted. These principles, like those in the Tbilisi Declaration, mention competencies that both the educator and the learners need to aspire towards.

The knowledge competencies mentioned include the understanding that all disciplines should address the biological, socio-economic and human development needs as well as an insight into how environment and development are integrated in all disciplines, revealing local issues. Skill competencies include teachers and learners becoming agents of change who solve environmental and development problems using critical and creative thinking. Value and attitudinal competencies involve those related to social agency using indigenous and local knowledge as well as considering science and culture when addressing human development issues.
Yet words such as ‘development’, ‘development issues’, ‘human development’ and the constant referral to human rights and needs prioritises the anthropocentric focus of ESD. This is the major difference in focus between the Tbilisi Declaration and Agenda 21. This is not to fault Agenda 21, but rather to explain how we have shifted from the ‘green’ concept of EE to a more socially ESD to address the current pressing issues relating to poverty and unemployment. At this point, I find it necessary to note that if Agenda 21 is not viewed through the lens of the strong model, there is a chance of misinterpretation.

With this in mind, when analysing the list of knowledge principles listed under the Tbilisi Declaration and then within Agenda 21, one can begin to see that not only the social and economic aspects are considered within the natural biophysical environment, but also human development is seen as important when considering sustainability of the natural environment. A strong human focus is introduced in Agenda 21 where humans must gain from sustainability actions. This notion is reinforced under the list of ‘Attitudes and values’ as social needs are emphasised before the needs of the environment. Education policy makers should understand and be critical about the shift in focus and how it impacts on the focus that education needs to take. Agenda 21 does not promote a piecemeal green education because it comprehends the tri-complex (societal, economic and biophysical aspects) nature of SD and the current need for a development oriented education. Agenda 21 would serve as the supporting policy to a pivotal policy for ESD, 10 years later.

ESD – the United Nations Decade

It was in 2002 at the WSSD where it was recommended that the DESD be developed and implemented. Later the DESD international implementation scheme (UNESCO, 2005) was developed.

The DESD international implementation scheme report begins by stating in seemingly specific and clear language.

*The overall goal of the DESD is to integrate the principles, values, and practices of sustainable development into all aspects of education and learning. This educational effort will encourage changes in behavior that will create a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations* (UNESCO, 2005, p. 6).

This definition reveals the outright acknowledgement of the four pillars of sustainability accompanied by an understanding that education should promote action towards the address of SD issues. A deeper look into the document will guide ESD stakeholders in finding a more practically applied meaning.

*Understanding and addressing these global issues of sustainability that affect individual nations and communities is at the heart of ESD. These issues come from the three spheres of sustainable development – environment, society and economy. Environmental issues like water and waste affect every nation, as do social issues like employment, human rights, gender equity, peace and human security. Every country also has to address economic issues...*
such as poverty reduction and corporate responsibility and accountability. Major issues that have grabbed global attention such as HIV/AIDS, migration, climate change and urbanization involve more than one sphere of sustainability. Such issues are highly complex and will require broad and sophisticated educational strategies for this and the next generation of leaders and citizens to find solutions (UNESCO, 2005, p. 7).

The shift in focus from mainly ecological needs to developmental needs, not only mirrors the current pressing global needs related to society and economy, it also allocates responsibility to every member of society to take action in a socio-economic and ecologically considerate manner. It seems clear also that knowledge of sustainability issues is pertinent for meaningful action taking and decision making to occur. Huckle (2001) offers a list of concepts that education should develop about SD, which consequently offer a better understanding of what is meant when referring to SD issues:

- developing students’ knowledge of biophysical systems, their potentials and limits;
- developing students’ knowledge of the technologies societies use to ‘exploit’ these bio-physical systems and the environments they create in the process;
- developing students’ knowledge of the economic systems that shape investment in environmentally appropriate or inappropriate technologies, for instance, investing in automobile companies as opposed to the public transport sector;
- developing students’ knowledge of the political systems (local, national, regional and international) which regulate the social use of bio-physical systems and the environment, for instance, national coastal regulations on fishing and use of four wheeler vehicles on sand dunes;
- developing students’ knowledge of social systems (the economic, political, civil and private spheres of people’s lives) which embrace the interests, power and strategies of different racial/gender/religious/economic/groups;
- developing students’ knowledge of the different cultural systems (technologies, beliefs and values) and how these may help or hinder people in understanding and/or improving their environmental predicament, for instance, traditional sustainable ways of cultivating indigenous medicinal plants.

SD issues are innately contentious. When looking at ESD, it must be understood that it is an education that engages learners and students in dealing with contentious issues. Such engagement ultimately requires critical and creative thinking, relevant and meaningful decision making and problem solving in the interest for a more sustainable future, whatever that may mean to various contexts. The shift from an ecological focus of EE to a development focus of ESD becomes substantiated as current contentious SD issues constitute the educational focus. SD issues, for instance, land conservation versus job creation touches on the types of contentions that exist between the four pillars of SD.

The DESD not only refers to the knowledge competencies that learners should develop through an engagement with SD issues, but it also makes a reference to the kinds of skills and values that should accompany such exploration.

With sustainable development comes valuing biodiversity and conservation along with human diversity, inclusivity, and participation. In the economic realm, some embrace sufficiency for all and others equity of economic oppor-
Clearing the path that has been laid: A conceptualisation of education...

This excerpt suggests a specific type of teaching and learning as it makes a reference to human diversity, inclusivity and participation. This suggests that learning should not only involve knowledge about complex sustainability issues, but also the diverse knowledge that various cultures bring and the important role individuals should play in their attempt at participation.

More clarity regarding a suggested ESD teaching pedagogy is offered when the declaration clarifies ESD as a kind of quality education. As one reads the list of characteristics of quality education, words such as socially just education, responsible citizenship, active participation, ESD values and attitudes, indigenous knowledge, problem solving, community development spring to mind. Social development is clearly important here, yet reference to responsible citizenship and community development also makes clear links to the importance of the economic and ecological pillars. Finally, the last two pages of the DESD (UNESCO, 2005) offer a long list of ESD principles, with the acknowledgement that there exists no universal model of ESD, as educators in each context will interpret the principles slightly differently according to the values, needs and priorities of their particular context. However, it appears that there exists a general set of ESD principles (UNESCO, 2005).

Education for sustainable development:
- is based on the principles and values that underlie sustainable development;
- deals with the well being of all three realms of sustainability – environment, society and economy;
- promotes life-long learning;
- is locally relevant and culturally appropriate;
- is based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs often has international effects and consequences; engages formal, non-formal and informal education;
- accommodates the evolving nature of the concept of sustainability;
- addresses content, taking into account context, global issues and local priorities;
- builds civil capacity for community-based decision-making, social tolerance, environmental stewardship, adaptable workforce and quality of life;
- is interdisciplinary. No one discipline can claim ESD for its own, but all disciplines can contribute to ESD;
- uses a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills [critical and creative thinking].

These essential characteristics of ESD can be implemented in myriad ways, so that the resulting ESD programme reflects the unique environmental, social and economic conditions of each locality (ibid, pp. 30–31).

On a journey to defining and essentially understanding ESD, it has not been enough to merely look at the leading document that guides ESD. Important and crucial to its conceptualisation has included a historical glance at its development and an engagement with other leading researchers’ thoughts on the challenges and limitations of ESD. An
insight into how policy has shifted from an ecological to a development focus and substantiation for why this shift is important with regards to current SD issues serves to inform the interpretation of the ESD principles listed here. ESD is not easy to define and, due to its contextual application, is not uniformly defined. It is at this point that I suggest one more concept be introduced and considered for a meaningful address of ESD.

**Action competence: Promoting a development oriented education**

Action competence has been introduced recently as a compatible concept with ESD even though the concept itself has been around for more than thirty years. Action competence may be the key to understand how knowledge about SD issues may be implemented in a meaningful way.

According to Mogensen and Schnak (2010), action competence is concerned with “liberal education, democracy, human rights, sustainable development and equal (herrschaftsfrei) communication” (p. 60). Considering this, it becomes helpful to recognise that action competence is very closely aligned to cultural theory (Scott & Gough, 2003) and the concept of Bildung. Bildung, much like action competence and the ideal of sustainability education, values the development of the reflective individual who has the power to question assumptions, ‘facts’, agendas and opinions about current living conditions and activities. Bildung “emancipates people to become political subjects – and not just the objects of control and guidance exercised by other people” (Hellesnes, 1976, p. 18). In an ecology focused curriculum, a human development orientation to education such as this one would more than likely not serve the purpose of the curriculum. However, in a SD focused curriculum, it would promote the core principles.

It is important to note that the action competence approach promotes the democratic element that avoids the dogmatic educating for component that Jickling (1994) protests. The educational context does not involve a private or personal attainment of knowledge and skills. Rather it is defined by a learning organisation of critically reflective people who make decisions that impact the community. Action competence can contribute to the implementation of ESD as it emphasises context, critical discussion and responsible action.

The action competence approach to ESD is a worthwhile and well-suited approach (Mogensen & Schnak, 2010). Instead of trying to iron out the complexities of SD and ESD, action competence embraces the complexity. It does this as it focuses on the democratic action that might result when trying to address these complexities. However, this does not make it any easier for practitioners to understand and implement ESD. What it will do is to place practitioners in the correct frame of mind, a paradigm of thought that is critical and reflective in its stance to education.

ESD principles, as mentioned earlier, have been identified as an attempt to define ESD and not as an attempt to provide a conclusive set of indicators that need to be ticked off when implementing an ESD-oriented curriculum. Therefore the suggested ESD framework presented next must be viewed for what it is, a guideline or accompaniment to the professional intuitive knowledge of the learners/students and their context.
A suggested ESD framework

An analysis of the literature and major policies on ESD has suggested a workable framework that practitioners and even policy makers may refer to in an attempt to determine whether or not their practice or policy is aligned to the greater intentions of ESD. The first category is explored to demonstrate specifically how literature informed the design of the associated sub-categories or indicators.

The first category of ESD principles are related to ‘teaching and learning’ and can be classed into two main groups: (1) action competence and (2) alternate knowledge systems. Action competence sub-categories pay attention to active learning, learner centeredness, community engagement and decision making. Connor and Dovers (2002) referred to developing learners’ capacity to identify the need for change in terms of sustainable decision making. Also, the Tbilisi Declaration (UNESCO-UNEP, 1978) spoke about the need for citizens to “participate in a responsible way” (p. 25). Huckle (2001) highlighted the importance of various knowledge competencies in order to engage in meaningful decision making. Tilbury (2002) encouraged critical and creative thinking and learner empowerment. The sub-category ‘alternate knowledge systems’ is further informed by Agenda 21, UNESCO (2005) and Huckle (2001) all of which refer to the importance of local and indigenous knowledge when engaging in debate around SD issues.

Table 1. An ESD framework for analysing practice

<table>
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<tr>
<th>Categories of ESD related themes</th>
<th>Sub-categories of ESD related themes</th>
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<tr>
<td><strong>ESD teaching and learning approaches</strong></td>
<td>Development of action competence participates in decision making and community-based decision making (for instance, debates and action plans) engages in community and social development activities active learning approaches (for instance, environmental impact assessments) learner-centered approaches participatory and collaborative learning activities</td>
</tr>
<tr>
<td><strong>Alternate knowledge systems approach to sustainability</strong></td>
<td>considers different knowledge systems as an important starting point for exploring issues of sustainable development</td>
</tr>
<tr>
<td><strong>ESD skills</strong></td>
<td>Critical and creative thinking explores ways of solving local contextually relevant problems considers society, economy and environment while problem-solving carries out critical analyses of current knowledge and situations and their implications for future decisions</td>
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Sequel to Table 1 see on p. 38.
Exploring the creation of the category ‘Teaching and learning approaches’ further (Table 1), Jickling and Wals (2012) made a reference to lifelong learning, social cohesion and collective action, alluding to ‘participation in decision making and community-based decision making’ as well as ‘participatory and collaborative learning activities’. Pittman (2002) referred to the contextual interpretation of the SD concept, and this is acknowledged in some way by the sub-categories that refer to ‘learner-centered approaches’ and ‘alternate knowledge’. The Tbilisi Declaration (UNESCO-UNEP, 1978) also referred to the need to understand that local actions have global impacts. The Tbilisi Declaration also assisted in constructing the sub-category ‘active learning approaches’. According to UNESCO, ESD “is based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs often has international effects and consequences; engages formal, non-formal and informal education” (UNESCO, 2005, p. 30–31). This understanding

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<tr>
<td>Systemic thinking</td>
<td>engages in looking for links to solve complex problems understands that systems are complex that usually involve more than the sum of their parts engages in partnership building to address needs and solve problems</td>
</tr>
<tr>
<td>Future thinking</td>
<td>recognises the need for changes searches for a way to attain a sustainable future understands the short and long term effects of current decisions the importance for renewing knowledge about evolving sustainability theory and models</td>
</tr>
<tr>
<td>ESD knowledge competencies</td>
<td>promotes an understanding of various sustainability issues both local and global, for instance, food security, economic and social justice, democracy, distribution and use of resources etc. promotes an understanding of how society, economy and the ecological environment play a part in these sustainability issues promotes the sustainable use of and care for natural resources promotes the understanding that all disciplines can explore ESD through their subject knowledge connects relevance of subject knowledge to society, environment and economy</td>
</tr>
<tr>
<td>ESD values</td>
<td>promotes an environmental stewardship promotes social tolerance and equity promotes collaboration in decision making and problem solving</td>
</tr>
</tbody>
</table>
assisted in forming the indicator ‘Engaging in community and social development activities’ for this framework. For purposes of tediousness the other categories shall not be similarly dissected. However, it only takes a glance at the other categories to identify the knowledge, skill and value competencies that have been engaged with throughout the paper.

This framework is not an isolated tool rather it is a guiding framework that needs to be informed by the presented understanding of the historical and locally relevant perspectives of ESD, as well as the perspectives offered by researchers in the field. To reiterate the main argument, an understanding of how policy has shifted focus from an eco-centric (ecological) perspective to a development perspective can assist in interpreting the objectives and thus implications of ESD. Education is geared towards local and national needs. Understanding that SD issues engage these social, economic and ecological needs and that these are interconnected and complex is a key to successfully understanding ESD and its implications in practice.

Paving a clear path for ESD

In paving a clear path for a sustainable ESD, it is clarity that is sought. De Haan, Bormann and Leicht (2010) pose it is important to avoid the relativist tendency to label almost everything ESD. They suggest that most authors and researchers in the field have accepted that anything to be labelled ESD should at least integrate the three pillars of SD (environment, economy and social/socio-cultural) with a participatory component. Once again, it is not ignored here that the fourth ‘policy’ pillar runs throughout these three pillars. Such a definition, although simplifying things drastically, manages to assist in an inductive approach to making meaning of ESD in practice. ESD is a process that involves political, economic and societal dimensions and is not merely content to be incorporated. It requires a particular cultural change that has sustainability at heart (Tilbury, 2002). The process of cultural change needs to be co-operatively engaged in and involve a democratic space for change towards sustainable development, even involving learners, educators and community members alike (Sterling, 1996).

From the exploration of policy and literature, it is my notion that ESD, when correctly understood and engaged, has the potential to transform education and society in a socially responsible manner. It must further be said that a historical exploration of the shift from a classic eco-centric type EE to a development oriented education can assist in making meaning of ESD, removing ambiguity. Development is inevitable and should not be contested for development in science and technology serve as crucial instruments for attaining sustainable social, economic and ecological development.

References:


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MANAGING COGNITIVE DISSONANCE: EXPERIENCE FROM AN ENVIRONMENTAL EDUCATION TEACHERS’ TRAINING COURSE IN THE CZECH REPUBLIC

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Abstract
This paper presents a qualitative evaluation of seven in-service environmental education teacher training courses conducted in the Czech Republic in 2009–2011. The evaluation applied a grounded theory approach. 14 focus groups, 13 interviews and two post-programme questionnaires were used. The evaluation describes a process of managing cognitive dissonance between the participants’ concepts of effective teaching and environmental education and concepts presented by the courses. The paper discusses the strategies applied by the course managers for facilitating a conflict and defensive mechanisms used by the participants. The paper also discusses the implication of this experience for future courses.

Key words: in-service teachers’ training, cognitive dissonance, environmental education, qualitative research, evaluation

Introduction
Effective environmental education (EE) calls for effective educators. However, what competencies should an effective EE educator possess? And what teaching strategies should be applied for work with a group of in-service environmental educators?

Although authors have investigated environmental literacy of pre-service or in-service teachers (Boyes, Chambers, & Stanisstreet, 1995; Corney, 2000; Hsu & Roth, 1999; Pe’er, Goldman, & Yavetz, 2007; Matejcek & Bartos, 2012), much less research has been carried out on teachers’ competence in EE. Ham and Sewing (1988) found various barriers to EE caused by a narrow focus of teachers on cognitive aspects of EE and the lack of commitment to teach EE. Stevenson (2007) mentioned contradictions between school practice and EE. According to him, EE calls for an interdisciplinary approach, real practical problems and cooperation, but school curricula are usually discipline-based, solve abstract problems and support individualism. It is reasonable to suppose that environmental educators need special competencies in addition to their common in-service training.

There is no universal definition of what competencies environmental educators should have. The North American Association for Environmental Education (NAAEE, 2010) defines a comprehensive set of competencies for environmental educators. The
guidelines include the six main themes required for teachers: educators must be competent in skills and understanding enlisted in guidelines for EE at elementary and secondary schools; they must understand goals, theory, practice and history of EE; they must understand and accept the responsibility associated with EE; they must be able to design and implement effective instruction, motivate pupils in open inquiry and investigation; they must possess competence for assessment and evaluation.

In the Czech Republic, however, such guidelines do not exist. Regardless of the effort of Horka (2003) and others, there is still a lack of consensus about what competencies environmental educators should have. As a result, there are many different pre-service and in-service training programmes that focus on different sets of competencies and apply different instructional strategies.

Moreover, effectiveness of such programmes is rarely evaluated, making it difficult to determine what strategies work and what do not. Winther (2005) questioned the effectiveness of short-time training courses. According to him, short-time courses may have a negative effect on teachers’ self-efficacy and motivation. Moseley, Reinke and Bookout (2002) found no immediate effect of a 3-day outdoor training course on teachers’ self-efficacy and a negative effect in the longer time-period. Winther, Volk and Schrock (2002) noticed problems with implementation of new methods in the school context. Corney and Fortner (1999) reported success of extensive teacher training in science on students’ process skills and environmental knowledge. Pace (2010) found that a key factor that influenced the effects of pre-service teachers programmes on EE and education for sustainable development was its experiential methodology rather than its content.

In the Czech Republic, a coordinator of EE should work at every school. According to the guidelines launched by the Czech Ministry of Education (MSMT, 2008), coordinators are supposed to participate in a 250-hour training course. Although the content of such courses is roughly provided, the guidelines miss clear objectives that would allow them to be evaluated. As a result, participant satisfaction has become the main indicator of success. However, such an indicator may be highly deceptive. The qualitative evaluation of selected courses for EE coordinators showed that, although graduates were highly satisfied with their courses, they had a poor understanding of both the goals and the means of EE (Cincera, Gilar, & Sokolovicova, 2010).

The aim of the project conducted in cooperation of seven Czech EE centres, the Technical University of Liberec and the Association of Environmental Education Centres Pavucina was to redefine goals, objectives and content of EE training courses. As a part of the project, supported by the European Social Funds and the Czech government, seven courses in different regions of the Czech Republic in 2009–2011 were conducted. This paper presents the qualitative part of the project’s evaluation.

**Programme**

All of the courses followed the same guidelines. The participants developed their competencies for planning, coordinating and applying EE in their practice. To achieve this, they learned to analyse educational and organisational needs in their respective schools in order to set specific and measurable goals and objectives and to select appropriate means to achieve them, to evaluate their effectiveness, to design a new project proposal, to present their projects to an audience, etc. The programme’s theory was underpinned by two essential assumptions that we could call a concept of EE and a concept of effective teaching.
The concept of EE was based on the acceptance of responsible environmental behaviour as the ultimate aim of EE (Hungerford & Volk, 1990). The participants were supposed to understand strategies needed to develop key variables associated with responsible environmental behaviour, like environmental sensitivity, issue analyses, action competencies etc. (Hungerford, Peyton, & Wilke, 1980; Hungerford & Volk, 1990).

The concept of effective (or good) teaching has been discussed in many publications and usually subsumes more aspects, like subject knowledge, teaching skills, etc. (Parpala, Lindblom-Ylänne, & Rytkönen, 2011). In the programme, it simply expressed the importance of planning curricula ‘from goals to means’ and not from the content or familiar activities. Participants had to prepare a sound plan of EE, applying knowledge of the programme theory, learning models or evaluation strategies (Braus & Wood, 1993; Hungerford, 2005; NAAEE, 2004).

Although the courses followed the same guidelines, differences in implementation appeared. The course managers had to adjust the course activities to the needs of their groups. In some cases, they also tended to highlight different areas of the course content.

**Evaluation methodology**

This paper focuses on two evaluation questions: How was the course interpreted by its students? and What factors influenced this interpretation?

To answer them, the following set of instruments for data collection was used:
- focus groups with up to ten students in the first part of the courses (seven groups, n=52);
- focus groups with the same participants in the last part of the courses (seven groups, n=52);
- post-course questionnaire with open-ended questions for all the participants on the last day of their courses (n=139);
- post-course questionnaire with open-ended questions for all the participants six month after finishing their courses (n=144);
- interviews with the course managers three—five months after the courses (n=13).

The data was collected by the four evaluators and (with the exception of the interviews) in the absence of the programme managers. All of the interviews were recorded and transcribed. The analysis followed principles of the grounded theory (Glaser, 1978, 1998; Corbin & Strauss, 2008). In the first step, the evaluator selected the data segments for the following coding procedure (Saldana, 2009). In the first level of coding, all of the segments were coded in an open coding process that generated substantive concepts and memos. In the second level, the coding process and more general categories were developed. In the last part, the categories were integrated around a newly emerging core category – managing cognitive dissonance. The new theory seemed to be powerful enough to explain social processes that occurred in the group. To increase its reliability, the theory was further discussed with the course managers. When all of them supported its relevance, the analysis was finished.

The number of respondents varied among different sets of data. Table 1 provides information about the total number of participants. All of the participants were asked to fill in post-course questionnaires. For the focus groups, the participants were purposefully selected to obtain heterogeneous groups. Although a purposeful sampling is the recommended strategy for qualitative evaluation (Patton, 2002), the groups’ heteroge-
neity contradicts the recommendation for focus groups. According to Morgan (1997), homogenous groups allow for more free-flowing conservation and are more appropriate for focus groups. However, even if differences in opinions in the groups might appear, the similarities based on their common profession and interest established a common ground for open discussions.

Table 1. Participants of the courses

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Age (mean)</th>
<th>Sample for focus groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>149</td>
<td>9</td>
</tr>
<tr>
<td>Men</td>
<td>27</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>(mean)</td>
<td>Women in focus groups</td>
</tr>
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<td></td>
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</tr>
</tbody>
</table>

The interviews were recorded with 13 of the 14 course managers from all the seven courses. Since differences in opinions among the managers were supposed, the interviews were conducted individually. In the analysis, full anonymity of respondents was granted.

Results

Initial clash

Although motivation for participating in the course and participants’ experience in EE differed, some of the participants had practiced EE for a long time. Because of this, they supposed the course would be a ‘stock-market’, an opportunity for exchanging ideas about their experience and practice. They expected to learn new activities, useful contacts and finally receive a certificate that would increase their status at schools. They often had a fixed set of concepts of EE and effective teaching; they believed they were good environmental educators and did not expect to change their mind.

According to the most common concept of EE, it was ‘nature education’. The participants believed that, if pupils learned about nature, they would not damage it. They also believed that the goals of EE were clear and intuitive.

(EE) is not a science; it is a matter of opinion ... what is important for me is if children will not break branches. (a male participant)

The participants were not usually used to planning their lessons. If they taught EE, they prepared lessons intuitively, based on topics they believed were associated with EE or on activities they knew and liked. As a result, the participants’ concepts of EE and effective teaching clashed with concepts presented by the courses. During this clash, strong negative emotions appeared.

The first homework was like a shower, and we all were feeling stupid and did not understand a word. What language do they speak with us? (a female participant)

Managing cognitive dissonance

In the evaluation, managing cognitive dissonance was identified as a core category. It defines the ways the participants dealt with the clash between their initial concepts and
the concepts presented by the courses. The participants had to choose between two options. They could reject new and retain their original concepts, or they could reject original and accept new concepts. Such a decision was facilitated by a strategy applied by the course managers and self-vindicated by a defensive strategy applied by the participants.

Being confronted with negative emotions of their participants, the course managers chose one of possible strategies for managing the conflict. In some of the courses, the coordinators decided to calm the negative emotions by diminishing a space for activities connected with the new concepts (like goal setting) and focusing on activities expected by the participants (like educational activities). As a result, the groups’ satisfaction grew. The participants also reflected increased motivation. On the other hand, most of them did not change their initial concepts.

In other courses the coordinators were not successful in managing the conflict. For a certain part of each of the courses, the participants were disagreed with their coordinators. They reflected their coordinators as ‘unpleasant’ or ‘not sympathetic’. Although the level of satisfaction was low in these groups, in the course of time, the majority of these participants were able to cope with it and at least partially open themselves for the new concepts.

The coordinators were successful in facilitating the conflict. They did not try to avoid it, but managed it without strong negative emotions. The coordinators were able to express a sympathetic attitude towards participants, but they did not give up on teaching the concepts presented in the courses. It should be noted that the majority of the participants opened themselves towards the new concepts.

Three other factors of successful facilitating appeared: modelling, linking a theory with the practice and management of break-points. When the course managers were congruent with the concepts of the courses, they were also able to apply them in their lessons. This strategy promoted the participants’ thinking about the concepts and modelled a way EE might be conducted in the school environment. On the other hand, the coordinators who had objections against some part of the concepts usually did not apply them. The new concepts were introduced in separate lessons as theoretical units. It caused that participants who did not want to replace their original concepts labelled the new concepts as ‘theory’, separated from their living ‘practice’.

To avoid such a classification, it was necessary to link the new concepts with what the participants knew as ‘practice’. There were three dimensions of linking: in a lesson, between a lesson and the participants’ practice and among activities in the course. When teachers learned to formulate measurable objectives, they needed to practice them in the lesson. They needed to apply them to homework connected with their school practice. Finally, the new knowledge needed to be repeated, reinforced and modelled during subsequent course activities.

Unique opportunities for changing the participants’ concept in a single moment appeared during some of the courses. When it happened, the way the managers were able to manage these break-points could have influenced the rest of the courses. In one of the courses, the participants experienced a field trip with simple nature observation activities. During this, a manager asked the participants if they thought they were doing EE. This question opened a heated discussion. The participants’ concept of EE as nature education was confronted and deconstructed.

A big clash and even a breakpoint for some occurred there, they said, OK, it might be different than I had thought ... It was good feedback, in fact, the
Managing cognitive dissonance: Experience from an environmental education...

fact that they kept going back to it, discussed the walk, wanted to talk about it in the evening. And, there, I think the crash was ... that what we did was what they had been usualy doing. They had been going out with children and supposed it was environmental education. And so we discussed what we could do to change a trip to the countryside into environmental education.

(a female course manager)

Being confronted with new concepts, facilitated by the course managers, the participants could vindicate their original position by applying various defensive mechanisms. Three of them were the most common: ‘theory is for theoreticians’, ‘not in my school’ and ‘new labels for old things’.

In all of them, the participants evaluated the new concepts as useless. As ‘practice’ they classified learning content that did not contradict their initial concepts and expectations. Examples of activities, school presentations and educational materials could be easily implanted into participants’ practice. Needs analysis, goal setting, learning models or evaluation strategies could not be easily implemented without changing participants’ concepts of effective teaching and so were classified as ‘theory’.

Other participants admitted some importance of theory. However, they stated reasons why it could not be applied to their schools. Usually, they complained about the lack of cooperation among teachers, lack of support from their head teachers and lack of time.

A coordinator of environmental education should be properly paid and ... should have fewer lessons to have time for the job. My experience is that our headmaster is absolutely unsupportive of this and my colleagues bugger it too. (a female participant)

Finally, for some of the participants, the new concepts were just new labels for old things. They believed that theory is just af complicated description of a common practice. Because of this, they believed that no changes in the way they teach are needed.

Conceptual shift

As a result, shallow or deep learning occurred. At the shallow level, the participants acquired knowledge, skills and attitudes that did not change their initial concepts. The participants learnt new activities, got new contacts, designed project proposals and increased their motivation. They also verified their initial concepts.

What I got from the course: contacts with super mates and their friendship, some knowledge about environmental education and especially confirmation that I am a man who does not like theory. (a male participant)

At the deep level, the participants reported deep changes in their practice. They reflected that the conceptual change helped them to re-create a school system of EE and re-organise their curricula.

Only now, I realise that theory is important and even interesting and only now I would need another course ... because what I have taken from this course is that what I had done (in environmental education) was by no means good ... (a female participant)
Because these participants acquired competencies useful for any subjects, they increased their status at school.

*Environmental education at our school is now systematic, not single shots here and there. More people have joined. I have learnt to engage people in a problem, better organise my work.* (a female participant)

**Discussion**

The cognitive dissonance as an issue in in-service environmental educators’ training is not new. Winther et al. (2002) reported a similar experience from courses of issue investigation and the action training model (Bardwell, Monroe, & Tudor, 1994; Marcinkowski, 2004). The respondents admitted that the new curriculum differed from their practice and complained about its difficulty. They also reported their colleagues’ incomprehension.

Being confronted with new concepts, students might refuse a change and assimilate new knowledge into existing concepts, or they can accommodate new concepts and reject the old ones (Kolb, 1984). The process of cognitive dissonance might be challenging. In the study, the experienced participants with long practice and high self-efficacy reacted highly emotionally to the new concepts.

According to Bandura (1977), self-efficacy is one of the key motivational drivers and behavioural precondition. It is defined as a belief that one can perform successfully using their skills adequately (Postareff, 2007). In the teaching context, it is important for teachers’ motivation towards their job (Ignat & Clipa, 2010; Moseley, Reinke, & Bookout, 2002). Self-efficacy develops on the bases of successful experience, external evaluation and self-evaluation (Bandura, 1977; Ignat & Clipa, 2010).

However, the lack of evaluation culture is a weakness of the Czech educational system. Teachers are not used to receiving feedback about their practice (Santiago, Gilmore, Nusche, & Sammons, 2012). It may lead to a conclusion that teachers’ self-efficacy was developed on the basis of inappropriate feedback. Teachers were aware that by infusing experiential activities into their curricula they would increase enjoyment of their pupils and believed that a higher effectiveness of their lessons would be the result. Teachers might believe that the implementation of experiential activities is enough to be an effective teacher. Because of this, their concept of effective teaching was focused on content and activities, not on goals and planning. After years of experience, these teachers were sure in what they did and what they wanted. Challenging this in the course meant challenging the way teachers had been interpreting themselves for years.

Rich and Hannafin (2009) argue that, in order to prevent teachers from discarding evidence contradicting with their beliefs, it is essential to provide experience in a way that does not threaten their self-concept. However, if teachers are supposed to accommodate new concepts, they must go through a painstaking process of challenging their self-efficacy. It opens a way not only towards an emotionally demanding conflict but also towards deep learning.

The emotionality of the process might be further explained by the theory of single and double-loop learning. According to Argyris (1976, 1995), we are often faced with a contradiction between espoused theory and theory-in-use. Reasons for such contradictions might be the lack of feedback, self-evaluation or the school context collectively maintaining old practice. When students are not aware of this, single-loop learning
appears. Old practice is maintained, although enriched with new skills. Being made aware of the discrepancies between their espoused theory and the theory-in-use, students usually react emotionally and use various self-defensive mechanisms. They typically defend their standpoint and attribute their failure to external causes.

This is what happened in the study: the teachers defended their standpoint by criticising ‘theoreticians’ or by attributing their failure to the lack of cooperation, dysfunctional relationships, overwhelming paper-work or other problems in their schools. Only when these mechanisms are overcome, double-loop learning where students challenge their common practice and try to harmonise it with their espoused theory might start.

Conclusion

This paper described the process of managing cognitive dissonance as a crucial aspect of in-service teacher training course in the field of EE. In the light of this, cognitive dissonance should be accepted as a natural part of learning process in teacher training courses. Even if this process might temporally decrease the level of participants’ satisfaction, course managers should avoid temptation to calm it down by replacing challenging concepts with more acceptable topics. To successfully facilitate cognitive dissonance, the managers should pay attention to congruency between what and how they teach in the course. Special attention should also be paid to linking new concepts with practical examples from school environment. Although this paper identified some effective and ineffective strategies for dealing with cognitive dissonance, a better understanding of the process is needed, as it opens an opportunity for further either qualitative or quantitative research.

References:


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COMPETITIVENESS AND QUALITY OF HIGHER EDUCATION: GRADUATES’ EVALUATION

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Abstract
The aim of the paper is to find the competitiveness of Latvian university graduates in Latvia and the European Union labour market concerning aspects of entrepreneurship education. To achieve the purpose of this study to determine the competitive and qualitative levels of Latvian universities and necessary improvements that need to be made, a survey of 4,909 graduates (from the years 2006–2011) representing six Latvia universities was performed between November–December, 2011. Results indicate that, in general, the graduates consider themselves competitive in the Latvian labour market. The graduates have positive opinions concerning the quality of theoretical knowledge as well as the abilities to present information and to evaluate, analyse and systematise it. At the same time, there are serious improvements that are necessary in regard to entrepreneurship education and to increase the competitiveness of Latvian universities, which can be done by improving the quality of the study process, the content of courses, teaching (learning) methods and the attitudes of academic staff to better motive students to develop their skills emphasising the practical side of the study process.

Key words: higher education, competitiveness, quality, entrepreneurship education, entrepreneurial skills and competences

Introduction
Nowadays the most important precondition of competitiveness of higher education is the development of a competent individual. This places new and much higher demands for the development and education of human capital – implementing the development of competence-based education. Consequently, the implementation of competence-based education represents a new perspective on the formation of educational content, which presently includes the development of the eighth key competences, determined by the European Commission (EC, 2002, 2012b). One important competency is to develop entrepreneurial competencies, which are to be developed within an education process by everyone starting from early childhood and continuing throughout life.
Encouraging the entrepreneurial spirit in young people is a precondition to achieving progress – at least in the longer term – in the innovation, employment, growth and competitiveness in any given national environment (EC, 2006). Therefore entrepreneurship in education and training is recognised as a central element in the European Union (EU) entrepreneurship policy.

The term entrepreneurship education is often narrowly defined to either running a business or being an employer or self-employed. Entrepreneurship education is much wider than just training persons on how to start businesses. According to the EC (2008), entrepreneurship education may include following elements: 1) developing personal qualities, attitudes and skills that form the basis of an entrepreneurial mindset and behaviour (creativity, making decisions, communication, responsibility, risk taking, independence, self-confidence, leadership, team spirit, etc.); 2) providing specific business skills and knowledge concerning what must be done to establish a new enterprise and how to be successful in developing an idea into a practical, goal-oriented enterprise; 3) working on concrete enterprise projects and activities; 4) raising students’ awareness of self-employment and entrepreneurship as a career options (become not only an employee, but also an entrepreneur). Together these main elements will give young people entrepreneurial competence.

As for higher education, in the EC (2008) project ”Entrepreneurship in higher education, especially in non-business studies”, it is stated that the aspects of developing entrepreneurial competencies should be integrated as an important part of the curriculum, spread across different subjects, and require or encourage students to take entrepreneurship courses.

Reacting to the new conditions, the Latvian government has already passed the regulations (Latvijas Republikas Ministru kabinets [the Cabinet of Ministers of the Republic of Latvia], 2001) to make a course obligatory to develop basic social, communicative and organisation skills focused on developing professional competences for entrepreneurship. The module should have 6 credits (9 ECTS) and be included in all bachelor degree programmes. The module mostly includes methods of competence training, business games, coaching, etc.

Today, entrepreneurship education has become an important aspect for measuring higher education competitiveness and quality, and study programmes should be adjusted to involve components of entrepreneurship education.

The most important problems concerning entrepreneurship education in Latvia concern the prevailing traditional approach towards this type of education. Very often, education systems concentrate on transmitting professional or vocational skills, leaving the personal qualities and skills (competences) more or less to chance. However, these can be developed and encouraged in parallel throughout vocational skill instruction. Research shows that, where this is done, the effectiveness of teaching increases (Bikse & Riemere, 2013).

The aim of this work is to determine the competitiveness of Latvian university graduates in the Latvian and the EU labour market, inter alia concerning aspects of entrepreneurship education.

The questions addressed in this paper are the following: What does competitive and qualitative education mean? and What are the main problems identified in Latvia, inter alia in entrepreneurship education?
Research methodology and participants

To reach the aim, theoretical concepts were studied and the EC documents (EC, 2012a, 2012b) analysed, among others for the theoretical concepts of competitive, sustainable and qualitative education. To get a deeper insight into the problem, a survey was undertaken in all Latvian universities and an analysis of the results has been prepared. The survey was performed during the period November – December 2011, and 4,909 graduates (from 2006 to 2011) representing all Latvian universities were surveyed via the internet (WAPI). In total, there were 17,160 potential respondents who were originally invited to take part in the survey, by using the email addresses made available in the university databases. Of this potential response, 6,500 completed questionnaires were returned. Among the other replies, 332 questionnaires were considered as inappropriate for the target group, and 1,529 questionnaires had not been filled out as prescribed. Thus, 4,909 remaining questionnaire responses were considered as suitable for the purposes of this study. The survey was analysed and the data processed by the SIA “Marketing and Public Opinion Research Centre” (SKDS Ltd) in November – December 2011, within the framework of the project “Universities Investment in the Latvian Economy” (LUA (Latvijas Universitāšu asociācijas) projekts “Universitāšu ieguldījums Latvijas tautsaimniecībā” [Project of universities investment in Latvian economy (UILE)], 2012).

Most of the respondents were women (70.4%). 81.5% of the respondents were aged between 18–34. 46.3% of them had a bachelor’s degree, 39.7% – a master’s degree and 2% – a doctoral degree. Other participants had a first or second level professional higher education.

The distribution of the persons surveyed (%) was the following – the University of Latvia – 34.1%, Riga Technical University – 28.8%, Latvia University of Agriculture – 13.4%, Rīga Stradiņš University – 4.3%, Daugavpils University – 8.3%, Liepāja University – 11%. Most of the respondents (89%) had studied in one university only. 10% of the respondents had studied in two higher education institutions, and 1% – in three or four higher education institutions. The largest number of respondents who had studied in several higher education institutions were the graduates from Rīga Stradiņš University (19%).

With regard to the educational thematic groups/fields in which the graduates had studied, the proportional breakdown of the graduates was as follows: social sciences, commercial sciences and law – 37.3%; engineering sciences, production and construction – 16.6%, natural sciences, mathematics and information technologies – 14.0%, teacher education and educational sciences – 9.7%, humanitarian sciences and the arts – 9.5%, healthcare and social welfare – 6.2%, services – 4.7% and agriculture – 2.0%.

Taking into account the large number of aspects related to entrepreneurship education competitiveness and quality, in this paper, the authors will focus on the following components – higher education graduates’ opinions of the skills gained during their studies and their opinions regarding higher education competitiveness.

Employability status of the respondents

A part of the survey was dedicated to finding the employment status of graduates. When characterising employment in the first year after graduating from university, 61.8% of the graduates noted that they continued to work in the same working place where they worked during their studies (inter alia 49.3% of the graduates with a bachelor’s degree, 70.9% – with a masters’ degree and 86.2% – with a doctoral degree), 29% of the res-
pondents continued their studies, 18% – became employees (found a new job) and 10% – were searching for a job, but couldn’t find it (inter alia 14% of the graduates held a bachelor’s degree, 7.7% – held a masters’ degree and 3.2% – held a doctoral degree).

The survey proved that, out of 4.909 respondents, many were employed as employees in the private sector (41.09%) and in the public sector or municipalities (31.3%). 212 out of the respondents or 5% were employers (entrepreneurs). 258 of the respondents or 6.1% had gained the status of self-employed, inter alia they became self-employed after graduating from university or started their own entrepreneurship. In comparison with the survey results of the 2002–2005 graduates, “5% from them were employers and only 3% were self-employed” (Professional activities of graduates of higher and vocational education institutions after graduation, 2007, p. 5).

By characterising the economy branch that has to correspond to the working place of the respondents, 20.4% of them were employed in production spheres (production, agriculture, construction, electro-energy, etc.), 19.5% – in education, 9.1% – in state institutions, 7.9% – in health and social care, and others were employed in different services sectors.

A considerable number of graduates were employed in management positions – 38% out of the respondents, inter alia 256 of 5.5% – at a higher level management, 975 or 20.3% – at a medium level management, 587 or 12.2% – at a lower level management. The biggest proportion of the graduates from agriculture (37.9%) and services were those who held the higher and medium level management positions.

Only 14.4% of the graduates were planning to start their own entrepreneurship within the next three years.

The main advantages that motivate the respondents to gain a status of the self-employed is to act independently and to realise his/her potential to full extent, by performing the job that is interesting. At the same time, these respondents that prefer being employees, consider a good job and regular incomes as the main advantage. Besides, they consider a good salary in the state administration to be an important asset.

The main obstacles for starting entrepreneurship among graduates are financial problems (46.2%) as well as lack of competencies and skills that are necessary for forming their own enterprise (31.8%). Many of the respondents consider that income is not guaranteed then (27.5%) and they are not willing to take risk (27.6%), besides there are complicated administrative procedures in the country (25.2%), and there are no ideas on how to start entrepreneurship (23.5%) as well as lack of susceptibility is indicated (19.4%).

Thus, it may be concluded that most of the graduates are employed as higher or medium level managers. Nevertheless, most of the recent graduates are employees, and a number of employers (entrepreneurs) among them is comparatively low. Even more, most of the respondents are not willing to establish their own enterprise in future, to become self-employed.

Research findings

*Higher education quality and competitiveness: Theoretical aspects*

Education has become an important tool in the whole world for ensuring economic and social progress. It is the basis of increasing of intellectual and education potential. Invest-
ments in education and self-development create added value for a person, accumulate additional income in the future and is one of the main factors for ensuring competitiveness in the labour market. Importance of education has changed considerably in the 21st century, since adjustment to internationalisation of the world economy, changes in science and information technologies have to be ensured. Education quality and challenges concerning the necessity to increase competitiveness has become a question of importance in the whole world, inter alia in the EU.

The internationalisation aspect shouldn’t be distinguished from the aspect of quality. Taking into account internationalisation processes, education quality has become an international term, since it is measured internationally and universities are compared within each other all over the world.

There is also a growing debate on what qualitative education means, as Federkeil (2008) states.

The EC (2011) states that higher education enhances individual potential and should equip graduates with the knowledge and core transferable competences they need to succeed in high-skill occupations (EC, 2011). The use of skills and growth projections and graduates’ employment data (including tracking graduates’ employment outcomes) should be encouraged in course designs, delivery and evaluation, adapting quality assurance and funding mechanisms to reward success in equipping students for the labour market (EC, 2011). Universities, public administrations and enterprises must ensure a strong commitment on the issue of employability. Apart from higher education quality, different research has been performed studying the opinions of students and graduates concerning their studies. For instance, a study of Gendjova and Kamusheva (2012) seeks a relationship between learning at the Faculty of Chemistry at Sofia University and the career development of the graduates. For this purpose, an online-based survey of 100 students was conducted. The students graduated with a bachelor’s or master’s degrees over the past five years (2006–2010). Based on their experience, the graduates determined the generic skills and competences, which they believed to be the most important for their career and the extent to which these competences are developed in the university (Gendjova & Kamusheva, 2012).

As regards to education, professionalisation will become central both at the bachelor’s and master’s levels. To deliver the appropriate teaching, curricula must be co-designed with industries, industry actors must be involved in teaching, and academic careers should be reshaped to reward the teaching involvement (Poisson, 2012). Business leaders also recognise the essential contributions that universities make in providing their companies and their regional economies with a competitive advantage through highly skilled workers, advanced technology, unparalleled knowledge and practical know-how (Bokhari, 2010). Employment of postgraduates is the permanent theme of higher education in every country and higher education institutes and professors should pay attention to postgraduates’ employment competitiveness (Qi, 2011).

On the one side, there is still a big debate on what competitive education means. Many scientific articles state that higher education must be competitive (Daun & Arjmand, 2005; Viederyte, 2009; Zernov, 2009; Adcroft, Teckman, & Willis, 2010; Fadeeva & Galkute, 2012). At the same time, the question still remains open: What does competitive higher education mean? The aspect that is often linked with competitive education is sustainability (Dawson, Burnett, & O’Donohue, 2006; Dobson, Quilley, & Young, 2010; Krivova & Myachin, 2011; Fadeeva & Galkute, 2012).
Summarising the definitions characterising higher education sustainability, the authors suggest that sustainability involves several aspects, for instance, reaction to quantitative and qualitative changes in the labour market and regular measurement of higher education quality, inter alia by organising regular surveys of higher education institutions’ graduates and by analysing the survey results.

With special requirements in education at global level, educational institutions adopt various approaches, methods, innovations to answer the rising demands of competitiveness and efficiency for learners of all categories and ages (Acqui, 2012) that goes hand in hand with reaction to quantitative and qualitative changes in the labour market. As well, the opinions of students and graduates are usually included in the higher education institution measurements for higher education competitiveness. At the same time, the authors hold the view that this aspect is not evaluated as significantly as it should be. Thus the next chapter is devoted to the analysis of Latvian graduates’ opinions on the quality of higher education.

Graduates’ evaluation on the acquisition of necessary knowledge and skills, while studying at universities

The theoretical part of the paper stresses the necessity to ensure quality of education. Thus the graduates evaluated knowledge and skills gained during their studies, and provided their attitude towards different statements related to higher education (Project of Universities Investment in Latvian Economy [UILE], 2012).

First, the graduates’ opinion on knowledge and skills gained while studying at university is reflected. The ranking of graduates of knowledge and skills acquired at the highest level is the following: (percentage of graduates who assessed these skills in the scale – maximum 100%):

- a possibility to gain theoretical knowledge in the chosen level, ability to work with information, to evaluate analyses and systematise it (62.6%);
- skills gained for working in a team (54.1%);
- skills to plan, organise and manage their own work (53.7%);
- skills to take decisions, relying on the previous information analysis (52.4%);
- skills to present information to public (51.2%).

The following possibilities are evaluated as being at a medium and a low level:

- discuss to public and support the opinion (48.9%);
- provide innovative solutions for problems of different difficulty level (51.4%);
- apply theoretical knowledge to practical work (52.2%);
- gain research skills (53.2%);
- gain skills in preparing documents and reports (52.9%);
- learn terms in the field of academic study in foreign languages (50.9%).

The following skills were evaluated as being acquired at a low and a very low level:

- work with specific computer programmes of the branch (24%);
- gain skills for starting entrepreneurship (31.5%).

The graduates’ evaluation concerning the level of knowledge acquisition and skills development at the university leads to a conclusion that possibilities to gain theoretical knowledge received the highest evaluation. The same regards to the abilities to present
information and to evaluate, analyse and systematise it. The basis of theoretical knowledge is very important, since the theory provides analytical instruments that are necessary for understanding the meaning of concrete facts and analysing them, for helping to take purposeful decisions on personal and socio-economic questions. Therefore the necessity to gain theoretical knowledge is obvious. At the same time, the knowledge should be applied to practice. The research proves that many of the skills necessary nowadays are acquired at the university at the medium or even low level. Too little attention is paid towards a practical side of the study, for instance, the possibility for students to work in projects, research, to find solutions, to use information technologies, to develop the necessary skills corresponding to the present labour market requirements.

One should not exclude that graduates consider that entrepreneurship education is implemented insufficiently at universities. The graduates’ answers show that the knowledge in entrepreneurship has received the lowest level. 1,340 or 27.3% of the respondents have not learned the skills at all, 1,549 or 31.5% – have learned the skills at a low or very low level, and 1,328 or 27.1% – have learned these skills at a medium level. Only 623 or 12.7% of the respondents have learned the skills at a high and very high level. The analysis performed on education thematic groups proves that the biggest part of the respondents who have had no possibilities to learn skills in entrepreneurship while studying at university were from the academic field of humanities and art (50.6%). More detailed information is provided in Table 1.

Table 1. Graduates’ evaluation of the level of acquired skills in entrepreneurship education in the frames of thematic groups*

<table>
<thead>
<tr>
<th>Thematic group</th>
<th>Didn’t learn %</th>
<th>At a very low level %</th>
<th>At a low level %</th>
<th>At a medium level %</th>
<th>At a high level %</th>
<th>At a very high level %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>33.9</td>
<td>8.6</td>
<td>19.9</td>
<td>25.5</td>
<td>9.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Humanitarian sciences and art</td>
<td>50.6</td>
<td>5.8</td>
<td>12.6</td>
<td>17.3</td>
<td>5.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Social sciences, commercial sciences and law</td>
<td>21.8</td>
<td>8.1</td>
<td>20.2</td>
<td>31.6</td>
<td>14.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Natural sciences, mathematics and information technologies</td>
<td>32.7</td>
<td>14.7</td>
<td>26.1</td>
<td>17.9</td>
<td>5.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Engineering sciences, production and construction</td>
<td>19.6</td>
<td>16.9</td>
<td>23.9</td>
<td>26.8</td>
<td>8.8</td>
<td>2.0</td>
</tr>
<tr>
<td>Agriculture</td>
<td>4.1</td>
<td>4.1</td>
<td>32.0</td>
<td>39.2</td>
<td>14.4</td>
<td>6.2</td>
</tr>
<tr>
<td>Health care and social welfare</td>
<td>27.2</td>
<td>8.9</td>
<td>24.8</td>
<td>28.5</td>
<td>7.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Services</td>
<td>20.3</td>
<td>6.9</td>
<td>18.5</td>
<td>34.5</td>
<td>15.3</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>27.3</td>
<td>10.2</td>
<td>21.3</td>
<td>27.1</td>
<td>10.6</td>
<td>2.1</td>
</tr>
</tbody>
</table>

* Just one response is given in each row. The total response of 100% does not apply because some of respondents did not provide an answer to this question.
Table 1 reflects that not only the graduates from the academic field of humanities and art, but also graduates from the thematic group of education (almost one third) didn’t learn skills for starting entrepreneurship, and others have learned the skills at a very low level (28.5%) and a medium level (25.5%). Only 11.1% have learned the skills sufficiently. Thus future teachers, while studying at university, were not able to learn knowledge and skills necessary for integrating components into study courses for developing entrepreneurial abilities for pupils to the full extent. It means that, after graduating from university, the young teachers are still limited in their skills to ensure a new type of learning. In the authors’ opinion, the evaluation could be better among the education thematic group of social sciences, commercial sciences and law respondents, since there is a number of courses in the study programmes of economics and management that stimulate entrepreneurship development. Nevertheless, 50.1% of the respondents note that they have not gained any skills in entrepreneurship education or have learned the skills at a low or very low level. It testifies that the EC (2008, 2012) guidelines and the regulations of the Cabinet of Ministers of the Republic of Latvia (Latvijas Republikas Ministru kabinets [the Cabinet of Ministers of the Republic of Latvia], 2001) on the necessity for all young persons to develop entrepreneurial skills are not followed completely.

The opinion of the respondents regarding the higher education in general is included. By analysing the answers to a number of statements, the following statements have received the highest evaluation: The education gained has prepared me for continuing education (90% out of the respondents agree to the statement to the fullest extent or note that they rather agree); The level of education gained corresponds to my personal investments (in terms of time and efforts) (84% out of the respondents agree to the statement to the fullest extent or note that they rather agree) and The education gained has provided sufficient investments for development of my skills (83% out of the respondents agree to the statement to the fullest extent or note that they rather agree). More detailed information is included in Figure 1.

Figure 1. Graduates’ evaluation of higher education in general
In general, the students’ evaluation is above the average, except for the evaluation universities investments in entrepreneurial skills development, preparation of specialists for development of their enterprise in future. Negative answers were provided only by 60.5% of the surveyed respondents. Only 6.9% out of the graduates surveyed were fully satisfied. Comparatively low was the evaluation for the statement \textit{whether the education gained is competitive in the EU labour market}. The respondents’ evaluation concerning the statement is reflected in Table 2.

Table 2. Respondents’ evaluation of the statement “Education is competitive in Latvia’s and the EU labour market”\footnote{Just one response is given in each row. The total response of 100\% does not apply because some of respondents did not provide an answer to this question.}

<table>
<thead>
<tr>
<th>Thematic group</th>
<th>Competitive in Latvia’s labour market</th>
<th>Competitive in the EU labour market</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>don’t agree</td>
<td>agree</td>
</tr>
<tr>
<td>1 Education</td>
<td>19.9</td>
<td>79.7</td>
</tr>
<tr>
<td>2 Humanitarian sciences and art</td>
<td>38.5</td>
<td>61.1</td>
</tr>
<tr>
<td>3 Social sciences, commercial sciences and law</td>
<td>23.2</td>
<td>75.7</td>
</tr>
<tr>
<td>4 Natural sciences, mathematics and information technologies</td>
<td>13.8</td>
<td>85.0</td>
</tr>
<tr>
<td>5 Engineering sciences, production and construction</td>
<td>16.9</td>
<td>81.4</td>
</tr>
<tr>
<td>6 Agriculture</td>
<td>15.5</td>
<td>84.5</td>
</tr>
<tr>
<td>7 Health care and social welfare</td>
<td>15.6</td>
<td>82.1</td>
</tr>
<tr>
<td>8 Services</td>
<td>18.5</td>
<td>81.0</td>
</tr>
<tr>
<td>9 Total</td>
<td>21.1</td>
<td>77.8</td>
</tr>
</tbody>
</table>

447 respondents taking part in the survey had worked or are working abroad. When comparing the data of Table 2 and Figure 2, there is a correlation between evaluation of competitiveness in the EU labour market and the employment performed abroad compliance towards the speciality gained. The statements that the education gained is competitive in the EU labour market have been evaluated at the highest extent by the respondents having studied in health care and social welfare and natural sciences, mathematics and information technologies. Most of the graduates work in accordance with their speciality abroad.

The respondents were requested to indicate whether the current (or the last job, in case the respondent is not working at present) is related to the speciality gained (Figure 3).
Figure 2. Graduates’ evaluation of the extent to which their job abroad was/is related to the obtained speciality (study programme)

Figure 3. Graduates’ evaluation of the extent to which their current job is related to the obtained speciality (study programme)

Figure 3 shows the following trend: the respondents having graduated from the thematic group of health care and social welfare, agriculture, education, natural sciences, mathematics and information technology (80%–87%) are, to the greatest extent, involved in the jobs related to their field of studies. To the lowest extent, the respondents having graduated from the field of humanities and arts (54%) or social sciences, commercial sciences and law (60%) work in the job related to their studies.

Apart from calculations, there is a number of suggestions that universities’ graduates have provided. These are provided in the next chapter.
Graduates’ suggestions regarding the possibilities to gain better entrepreneurship education during their studies

In order find out the possibilities for developing entrepreneurial abilities during the study process and to establish their own enterprise and in order to find out what the higher education institutions should do in this field, the respondents had to provide answers to two open questions: What are the necessary knowledge and skills for entrepreneurship to be learned and gained at university? and What should universities do for encouraging graduates’ involvement in entrepreneurship?

Almost all the respondents have provided answers to these questions, even more – the answers are exhaustive. Summarised, analysed and grouped commentaries of the respondents (in total 1.000 answers were evaluated), testify that most of the respondents suggestions are extended not only to development of entrepreneurial skills, but to the whole study process in general. Taking into account the large amount of suggestions, based on the frequency distribution, only the most important opinions are included in the paper.

Most of the respondents provide answers on the necessity to ensure much more competitive education in Latvian universities by improving the study process quality, improving the contents of study courses, teaching (learning) method and by changing the attitude of academic staff, by motivating students to develop their skills. In this context, they suggest implementing a new education system model by ensuring qualitative study process in accordance to the ongoing changes in society and labour market demands. Besides, it is suggested that universities develop study programmes in cooperation with employers to improve and renew the study programmes in accordance to the new trends of economy, to ensure positive environment for ideas generation that would promote self-initiative, courage, innovative thinking and increase interest as well as promote development abilities that would be useful in entrepreneurship. It is also important to involve the courses that are actual for today’s situation and encourage students’ interest for entrepreneurship in study programmes.

Some comments include: one should escape from using old study materials in lectures, escape from formal teaching; teaching staff should be interested in order to provide high quality of education. Study programmes at universities should be developed in order to raise entrepreneurs, employers, people who generate their business ideas, involve actual development trends and see the free niches, the successful scenarios in other world. As one of the respondents suggest: not all people should be entrepreneurs, yet the study course in entrepreneurship should be the compulsory course. Even in case the profession gained is not related to entrepreneurship, it should be taught at university at a sufficient level.

As regards improvement of study courses contents, many respondents stress the necessity to balance possibilities for learning theory and practice (by increasing the amount of contact hours in favour of practical seminars). The study programmes should be analysed and renewed constantly by providing courses with the newest trends and the most actual information. They suggest that, during the study course “Entrepreneurship”, the students should elaborate a business plan, which is directly related to the faculty specifics, by showing how, for instance, a musician, a designer, a historian, a nature specialist, etc. could solve innovative ideas in entrepreneurship in relation to the study field.
Others do suggest to involve a compulsory part of development of students’ enterprise within the period of all four years in the study to allow students to be involved in all stages of enterprise development – from the beginning till production phase or phase for providing services – as it is important to gain real idea on the process of enterprise development and the activities performed in the frames of it. In case there are losses for the enterprise, the evaluation of students’ knowledge is insufficient. Many people provide idea that both in professional and academic study programmes the elaboration of students practical works should be foreseen in accordance to the requests of economy. For several lectures and seminars, specialists of different spheres should be invited more often. One of the respondents wrote that all the study courses should foresee innovative solutions not from the perspective of employee, but from the perspective of employer. It is important to divide entrepreneurs (ready to take risk) and managers (not willing to take risk), and more attention should be paid to getting practical training: managers for training in management, entrepreneurs for training in entrepreneurship. During the whole study process, nobody even tried to encourage us as potential entrepreneurs or employers.

Many respondents stress the necessity to change attitude of the academic staff towards students, to motivate students to develop their skills in order to become highly qualified and competitive specialists. Graduates note the necessity not to break the backbone of the potential entrepreneurs by making students feeling scared. Creative thinking should be promoted, new ideas and skills should be evaluated positively and not righted in order for them not to be frightened to realise them. Universities should more provide practical knowledge, offer and stimulate starting of some kind of entrepreneurship. As one of the respondents note, in general, the task of the higher education institutions is to encourage, but, unfortunately, hindering and criticising appears more. There are also commentaries concerning the necessity to improve professional competence of academic personnel to ensure teaching of study courses with highly qualified, professional, progressively thinking academic staff members (holding experience both in practical work and in research). According to their opinions, the knowledge gained in higher education institutions is very theoretical, and a more practical approach is necessary in all spheres. Students should be provided with a possibility to act individually, to learn the real situation in entrepreneurship. Practical training is necessary as well. Cooperation with entrepreneurs should be developed in order to adjust study programmes to the requirements of labour market and to provide the necessary skills.

Conclusions and suggestions

Labour market challenges in the 21st century, its quantitative and qualitative changes, and an increasing role of human capital nominate higher requests for education. Throughout the scope of internationalisation higher education itself has to be competitive, sustainable and qualitative. There are different definitions of these terms, inter alia different approaches on measuring higher education. Yet one of the components taken into account when evaluating education quality is the evaluation of the university graduates’ opinions on their education quality and competitiveness. Besides, the EC policy planning documents state that the graduates should have skills in entrepreneurship, this component is more and more involved in quality surveys.
For evaluating higher education quality in Latvia a survey of 4,909 graduates (2006–2011) representing six Latvian universities was performed from November 2011 to December 2011. The graduates both evaluated their education quality and provided suggestions for its improvement, inter alia concerning the possibilities to improve entrepreneurship education.

Survey results of university graduates (2011) indicate the most positive opinions on having gained theoretical knowledge, abilities to present information and to evaluate, analyse and systematise it. At the same time, the report found that too little attention is paid to the practical side of the study process: the possibility for students to work in projects and research in order for them to find solutions, to use information technologies, to develop the necessary skills that correspond to today’s labour market requirements.

Previous research papers prove that the EC guidelines on the necessity to promote entrepreneurial skills for all the young people are not fully implemented in Latvia universities. There are a high number of students who haven’t developed entrepreneurial skills during their studies. In case study courses are provided in context of entrepreneurship education, they are mainly oriented towards gaining theoretical knowledge. Entrepreneurial skills are developed at a low or very low level.

Findings of the research allow to conclude that, in general, the new specialists in Latvia universities are prepared in accordance with the present labour market challenges and are competitive in the Latvian labour market, but their competitiveness in the EU labour market a bit lower, yet more than half of the graduates from all the thematic groups evaluate their education to be competitive in the EU labour market.

It is necessary to review the regulations of the Cabinet of Ministers of the Republic of Latvia of November 20, 2001 (Latvijas Republikas Ministru kabinets [the Cabinet of Ministers of the Republic of Latvia], 2001) by foreseeing in them entrepreneurship education possibilities for all students and by integrating entrepreneurship development elements in different study courses in all study programmes and by introducing 12 credit points (18 ECTS) module instead of 6 credit points (9 ECTS) module in all study programmes, according to the faculty specifics.

In order to ensure competitive higher education and to increase its quality, it is important to introduce improvement system of academic personnel competencies in Latvia. Contents and quality of study courses should be changed substantially by involving more unification of theory and practice in study courses and by providing possibilities for students to study by doing in order to confirm their skills in concrete activities, by searching innovative approaches for solving economic problems.

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RESEARCH INTO LEARNING PROCESS
IN A VOCATIONAL SECONDARY SCHOOL
IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

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Abstract
The paper provides an insight into the results of a lesson designed and carried out at Riga Construction College in the study subject “Building Constructions”. The aim of this study is to better understand the impact of learning environment reorganisation into juvenile groups while teaching technical study subjects. In particular, the research conducted at this vocational secondary school focused upon introducing a particular form of integrative collaboration amongst the learners. Criteria were developed to respond to the question: How is the organisation of the learning process based on the Learners’ Integrative Collaboration Model changing? A formative teaching experiment, which analyses learners’ integrative collaboration through structured observation at the beginning and end of the acquisition of the study subject “Building Constructions” points at positive changes associated with the model’s criteria: working in a team, mutual learning, business communication and creativity action.

Key words: vocational school learners, working in a team, mutual learning, business communication, creativity action, learners’ integrative collaboration

Vocational education in the context of sustainability
Modern construction needs professionally qualified specialists able to use knowledge, skills and experience, along with attitudes acquired in a professional school that serve in real life. Therefore, the task of a vocational secondary school is to train specialists who are able to quickly adapt to dynamic processes that take place in the field of design, production, work management and control; specialists who are professionally mobile and are able to continue their education abroad and, thereby, compete in the international labour market. However, there is a gap between the demand for highly-qualified skillful specialists and the realities of qualification and capacity. The Riga Technical vocational bachelor’s degree programme “Building” report of 2006 expresses employers’ dissatisfaction concerning the practical training level of entry level construction specialists regarding their deficient ability to work in interdisciplinary teams and organise collective work.

Currently, in Latvia, radical changes are taking place that affect almost all spheres of life and have a significant impact on everyone’s lives. Latvia’s development plan
prioritises education and knowledge using creativity, tolerance, cooperation and participation as a strategic pillar of Latvia’s sustainable development (NAP – Latvijas nacionālais attīstības plāns: 2007–2013 [Latvian National Development Plan: 2007–2013], 2006). The transition to a market economy with all of its contradictions, to some extent, determines vocational training objectives and content and advances new rules and priorities, which, in turn, affects the development of the education system as a whole. It has some qualitative change: training programmes have become more sophisticated and more closely related with specific specialties.

At the same time, changes have concerned both the teaching and learning processes in the classroom as well as the teacher’s tasks. It should be noted that the pedagogical activity of today’s teachers has a subjective character. Their task is to organise the educational process so that it can promote a greater learner’s autonomy, help develop their creative individuality and personality (Eriksons, 1998; Gudjons, 2007; Žogla, 2007; Mīts, 2008). Evaluating the content of educational literature in compliance with national education standards, a number of educators (Andersone, Maslo, Krūže, Rutka, & Žogla, 2008) note a discrepancy between theory and practice in a pedagogical process; they also focus on interactive teaching methods and learners activity into focus, which, in their view, can cause specific difficulties when put into practice.

The author of this research believes that a dogmatic educational environment type prevails and that authoritarian teaching styles are more common in various national training institutions. In such a type of environment, a developing personality is characterised by almost total passivity and dependency, which is least acceptable to people in a democratic society, but very beneficial for a non-democratic society.

Consequently, it is important to organise the teaching and learning process in such a way that it permits learners to take an active position in dealing with creative tasks, teaches them to think creatively, to draw conclusions, to resolve conflicts amicably, to seek information, to understand the different knowledge spheres of mutual relationships and to be independent researchers. It has been pointed out that only those human sustainable developments headlining practical skills that contribute to the further education after graduation promote long-term viability prospects (United Nations Educational, Scientific and Cultural Organisation [UNESCO], 2005). Sustainable development is widely discussed in various educational sources and has been analysed by a number of well-known researchers (Dewey, 1997; Hansen, 2002; Sterling, 2003; Kelly, 2006; Salite & Pipere, 2006; Gray, Chang, & Radloff, 2007; Pyrch, 2007; Reunamo, 2007; Salite, Micule, Kravale, Ilisko, & Stakle, 2007; Lukk, Veisson, & Ots, 2008; Salite, 2009). Latvian scientists and educators (Geriste, 2004; Kravale, 2006; Gudjons, 2007; Žogla 2007; Kāposta, 2011) note that training highly-qualified specialists requires extending fundamental knowledge, educational content differentiation and integration, the strengthening of vocational orientation and the development of prospective professionals’ creative thinking and research competence.

The peculiarity of secondary vocational education is expressed in two types of professionals – in mainstream education and in vocational and technical training. In traditional training programmes, especially in technical disciplines, insufficient attention is being paid to learners’ creativity and its potential for growth. The teaching and learning process focuses more on the reproduction of the study material rather than on the creation of something new. In the context of sustainable development, there is a need for a new education quality assurance according to the selected competencies. Sustainable
development strategies aim to achieve a balance between human, natural and social interaction. During the educational process, teachers have to organise the teaching and learning process in order to promote learners’ development through the construction of knowledge and decision making.

Learners need to integrate diverse knowledge and skills, because a directly integrated body of knowledge determines the quality of education these days. To promote the reorganisation of the teaching and learning process in vocational schools, socio-cultural aspects were implemented. As highlighted in the introduction, the growing requirements of society as well as changes in the field of science bring the problem of integrating teaching and upbringing into focus in vocational schools. The education system focuses on the development of intellectual personality as a picture presenting an integrated view of world phenomena and the process of deep interrelations. The lack of integration of knowledge among study subjects, the inability to apply previously acquired knowledge at the beginning of the professional school and the lack of practical experience in construction causes serious difficulties related to the creation an integrated world picture and a secure self-determination in within societal structure. Therefore, the problem of integration in school today is very important and topical. Integration is an important modern learning process precondition where full implementation would be a transition to a qualitatively new level of education. It should be noted that the integrative links between technical study subjects and social disciplines in vocational secondary schools are weak and quite controversial. Even among researchers, there is no conformity of opinions concerning the essence of these links.

Thus, in a vocational school, the teaching process with its dominant dogmatic educational environment neither contributes to materialising creative individuality nor develops the ability to quickly adapt to dynamic processes in the fields of design and work organisation. Consequently, the teaching and learning process that enhances the development of creative potential, the ability to work in an inter-disciplinary team and organise collective work should be organised. This kind of learning in vocational schools is possible by creating a special course of technical study subjects based on the Learners’ Integrative Collaboration Model developed by the author. The criteria were developed to respond to the question: How is the organisation of the learning process based on the Learners’ Integrative Collaboration Model changing?

The structure of the Learners’ Integrative Collaboration Model

The Learners’ Integrative Cooperation Model was developed and the form of interaction between learners and a teachers was determined. Learners’ integrative collaboration presents a process of developing linking in a team context where learners act as a united unit, constructively reconciling their actions, where each participant is responsible for his/her own part of the work. This requires a common objective and fulfilling tasks assigned by the teacher in which each individual expresses his/her creativity and individuality as part of a fully integrated team. Creative activities convert learners’ collaboration into integrative cooperation.

According to the developed model, the aim of organising learners’ integrative cooperation is to promote the acquisition of learning skills and to further professional self-education, including the development of creative potential. The didactic principles of organising the educational process are also reflected in the model: learners’ cognitive
activation; learning process intensification; learning material flexibility; knowledge
evaluation to ensure the continuous and efficient management of the learning process;
the democratic principle; the principle of succession; the principle of differentiation; the
reflection principle.

The main pedagogical conditions of the study reorganisation process for professional
schools include content enrichment, compromise and cooperation as strategies for conflict
resolution; non-verbal communication tools and a change of approach towards learners’
evaluation.

Learners’ integrative collaboration include problem-solving, project work, discussion,
professional business games, visualisation and personification. Further, some
features of learners’ integrative collaboration are defined in the model.

- The learning function is related to knowledge of the physical-mechanical pro-
  perties of building structures and their calculation according to the borderline
  position method.
- The socio-cultural function is related to the values and norms of the profession.
  Learners, being involved in the team project development, simulating constructors’
  office work, getting to know construction labour rules and regulations. When acting
  as a team of designers, each learner acquires learning interaction and cultural co-operation skills.
- The communicative function is related to communication in which each learner
  is engaged, thus enriching his/her communicative experience.
- The self-realisation function is related to the integrative collaboration as
  learners play the roles in diverse situations and roles. This gives participants
  the opportunity to test their ability to find their own strengths and weaknesses,
  acquire new knowledge, develop skills and enrich the experience.
- The diagnostic function is related to the observation of learners’ activities in
  integrated collaboration to determine the characteristics of the learner in
  various fields while the learners are able to identify their strengths and weak-
  nesses.
- The correction function is related to the possibility of adjusting the learners’
  behaviour and activity during integrative collaboration.
- The motivating function is related to expression free from stress and towards
  positive emotions.

Methodology of the study

The author suggests using a team project method (the Learning Environment Reorgani-
sation Model) in the lessons of the study subject “Building Constructions” at Riga
Construction College, which is based on integrative learners’ collaboration. Three years
(2008–2010) were devoted to pilot-studies (Martinsone & Pipere, 2011; Žogla, Kalniņa,
& Antiņa, 2012) which helped to detect some weak points in learners’ integrative col-
aboration in class and introduce corrections into the suggested method of teaching.
This paper presents the main pedagogical experiment with convincing proof for an
increased creativity level as a result of corrections introduced into the teaching method.

Three groups of learners studying basic level building management were studied;
two experimental groups (20 and 21 learners respectively) and a control group (22
learners). The duration of the experiment entailed one semester. After a short introductory lecture, learners in the two experimental sections joined together in teams of three to four members. A quantitative data analysis method was applied (structured observation – 160 minutes) at the beginning of the experiment and four learning hours (160 minutes) at the end of the experiment were employed to analyse changes in the learning environment of the control and experimental classes. After a short introductory lecture, learners in the two experimental sections joined together in teams of three to four members. To see the impact of the model on the dynamics of changes in the development of learners’ professional skills, the criteria of learners’ integrative collaboration were developed: working in a team, mutual learning, business communication and creative action (Table 1).

Working in a team, learners act as a single system, sharing duties and constructively matching their individual actions with others. Mutual learning is a possibility to use all the team members’ knowledge with effective exchange of experiences in order to create systemic knowledge. Business communication is the distribution of roles in teams. Each learner takes responsibility for his/her own work. Creative action includes fast, flexible thinking, bright imagination, curiosity, a sense of humour, interest, conscious self-education, creativity.

Table 1. The criteria of learners’ integrative collaboration

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Working in a team</th>
<th>Mutual learning</th>
<th>Business communication</th>
<th>Creative action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working in a team</td>
<td>optimum links building process during a team activity in which learners act as a single system, sharing duties and constructively matching their individual actions with others</td>
<td>a possibility of using all the team members’ knowledge with effective exchange of experiences in order to create systemic knowledge</td>
<td>distribution of roles in teams, each learner taking responsibility for their own work</td>
<td>fast, flexible thinking, bright imagination, curiosity, a sense of humor, interest, conscious self-education, creativity</td>
</tr>
</tbody>
</table>

The focus of observation was the learners’ integrative cooperation. The researcher’s role was that of an active participant of the observation process. Throughout the experiment, my colleague-expert, who does not work with the learners in their third year, and I were the observers in the classroom. Communication with the learners provided an explanation, and the two teachers secretly observed the learners’ interaction in the classroom, evaluating their integrative collaboration.

The effectiveness of the Learners’ Integrative Collaboration Model was measured in accordance to the developed criteria. In order to get a better overview of the dynamics of the changes, the levels and indicators of learners’ integrative collaboration were determined (Table 2). Note that, in this case, the teacher’s role in the classroom significantly differs from the role of the teacher in the traditional approach. According to the model, the teacher’s participation decreases gradually, and each learner’s learning autonomy increases as his/her collaborative experiences organise the learning process towards mastery (Żogla, 2001).
The effectiveness of the Learners’ Integrative Collaboration Model was measured in accordance with the developed criteria. In order to get a better overview of the dynamics of the changes, the levels and indicators of learners’ integrative collaboration were determined (Table 2). Note that, in this case, the teacher’s role in the classroom significantly differs from the role of the teacher in the traditional approach. According to the model, the teacher’s assistance decreases gradually, and each student’s learning autonomy increases as the student’s collaboration experiences organise the learning process independently towards mastery (Zogla, 2001).

Table 2. Indicators of learners’ integrative collaboration

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Indicators’ level and characteristics</th>
<th>Phenomenon is expressed</th>
<th>Phenomenon is rather expressed</th>
<th>Phenomenon is poorly expressed</th>
<th>Phenomenon is not expressed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3 points</td>
<td>2 points</td>
<td>1 point</td>
<td>0 points</td>
</tr>
<tr>
<td>Working in a team</td>
<td>communicates well, coordinates work with the team members well according to the duty allocation</td>
<td>communicates well, but unable to participate in the work for a long time, maintains respect of division of responsibilities</td>
<td>communicates occasionally, intermittent respect of division of responsibilities</td>
<td>works only individually, often ignores the joint action</td>
<td></td>
</tr>
<tr>
<td>Mutual learning</td>
<td>able to design independently as a team member, consulting others</td>
<td>able to design only in consultation with others</td>
<td>able to design only in consultation with the teacher</td>
<td>cannot recommend anything to others, works under the supervision of a teacher</td>
<td></td>
</tr>
<tr>
<td>Business communication</td>
<td>able to explain and justify opinion while consulting with others</td>
<td>fragmented business links are formed</td>
<td>communicates with difficulty, taking responsibility for his/her own work</td>
<td>business links are not formed</td>
<td></td>
</tr>
<tr>
<td>Creative action</td>
<td>works creatively, always with own original ideas for solving the problem</td>
<td>works creatively, but intermittently</td>
<td>designs independently, but unable to create new original ideas, self-educates consciously</td>
<td>no creativity, unable to design independently, can only reproduce</td>
<td></td>
</tr>
</tbody>
</table>

Results

The research results into learners’ integrative collaboration in the 1st and the 2nd experimental group as well as in the control group are provided in Tables 3, 4 and 5. As seen in Table 3 and Table 4, at the beginning of the experiment, no differences between the 1st experimental group and the control group (chi-square tests, p>0,05) are seen (van Gejeka, 2013). At the beginning of the experiment, the 2nd experimental group and the control group are essentially indistinguishable (chi-square tests, p>0,05) (van Gejeka, 2013). Therefore, there are no significant differences between the groups at the beginning of the experiment. In contrast, at the end of the experiment, the 1st experimental group and the control group are significantly different (chi-square tests, p<0,05).
as well as the 2nd experimental group and the control group. Both experimental groups essentially differ from the control group in integrative collaboration indicator characteristics (chi-square test, p<0.05) (van Gejeka, 2013).

Table 3. Results of learners’ collaboration abilities (the 1st experimental group and the control group) (van Gejeka, 2013)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>1st experimental group</th>
<th>Control group</th>
<th>Chi-square</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>working in a team</td>
<td>6 6 5 3 2</td>
<td>7 7 7 6 2</td>
<td>0.950</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30% 30% 25% 15%</td>
<td>32% 32% 27% 9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mutual learning</td>
<td>7 10 3 0</td>
<td>6 14 2 0</td>
<td>0.654</td>
<td></td>
</tr>
<tr>
<td></td>
<td>35% 50% 15% 0%</td>
<td>27% 64% 9% 0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>business communication</td>
<td>13 5 2 0</td>
<td>14 4 4 0</td>
<td>0.697</td>
<td></td>
</tr>
<tr>
<td></td>
<td>65% 25% 10% 0%</td>
<td>64% 18% 18% 0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>creative action</td>
<td>13 4 3 0</td>
<td>14 6 2 0</td>
<td>0.762</td>
<td></td>
</tr>
<tr>
<td></td>
<td>65% 20% 15% 0%</td>
<td>64% 27% 9% 0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>working in a team</td>
<td>1 6 4 9 2</td>
<td>5 8 7 2</td>
<td>0.043</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5% 30% 20% 45%</td>
<td>23% 36% 32% 9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mutual learning</td>
<td>0 3 10 7</td>
<td>5 13 3 1</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0% 15% 50% 35%</td>
<td>23% 59% 14% 4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>business communication</td>
<td>1 1 10 8</td>
<td>13 5 4 0</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5% 5% 50% 40%</td>
<td>59% 23% 18% 0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>creative action</td>
<td>0 4 10 6</td>
<td>14 6 2 0</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0% 20% 50% 30%</td>
<td>63% 27% 9% 0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the course of the experiment, working in a team changes significantly in the 1st and 2nd experimental groups. At the end of the experiment, the learners who work hard within the team remained only 5% in the 1st experimental group (at the beginning of the experiment the 1st experimental and the control groups are not essentially distinguishable – 30% and 32% of the learners who hard work within the team). Consequently, we can argue that during the experiment, the learners were encouraged to cooperate.

There is a significant growth in the number of learners that create a fragmented business communication: at the beginning of the experiment – 10%, at the end of the experiment – 50% in the 1st experimental group. Business communication increased in the 1st experimental group (with 35%) and the 2nd experimental group (with 48%).

The number of learners who worked creatively increased by 30% in the 1st experimental group and by 33% in the 2nd experimental group. The number of learners who worked creatively only fragmentally increased very significantly: from 14% to 42% in the 1st experimental group and from 10% to 50% in the 2nd experimental group. The control group where the Learners’ Integrative Collaboration Model was not proposed designed constructions traditionally. An analysis of learners’ integrative collaboration indicators before and after the experiment in the control group show that only very minimal changes occurred.
Table 4. Learners’ collaboration abilities (the 2nd experimental group and the control group) (van Gejeka, 2013)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>2nd experimental group</th>
<th>Control group</th>
<th>Chi-square p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working in a team</td>
<td>4 6 8 3 7 7 6 2</td>
<td></td>
<td>0.715</td>
</tr>
<tr>
<td></td>
<td>19% 28% 38% 14% 32% 32% 27% 9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutual learning</td>
<td>4 12 4 1 6 14 2 0</td>
<td></td>
<td>0.572</td>
</tr>
<tr>
<td></td>
<td>19% 57% 19% 5% 27% 64% 9% 0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>11 7 3 0 14 4 4 0</td>
<td></td>
<td>0.522</td>
</tr>
<tr>
<td>Communication</td>
<td>52% 33% 14% 0% 64% 18% 18% 0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative action</td>
<td>14 6 2 0 14 6 2 0</td>
<td></td>
<td>0.439</td>
</tr>
<tr>
<td></td>
<td>64% 18% 18% 0% 64% 27% 9% 0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Simultaneously, evaluating the criteria of learners’ integrative collaboration (working in a team, mutual learning, business communication and creative action), there were no changes in the learning environment in the control group with a conventional teaching method, where the method of integrative collaboration was not used.

Table 5. Learners’ collaboration abilities (the control group) (van Gejeka, 2013)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Before the experiment</th>
<th>After the experiment</th>
<th>Chi-square p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working in a team</td>
<td>7 7 6 2 5 8 7 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>32% 32% 27% 9% 23% 36% 32% 9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutual learning</td>
<td>6 14 2 0 5 13 3 1</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>27% 64% 9% 0% 23% 59% 14% 4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>0 2 9 10 13 5 4 0</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Communication</td>
<td>0% 10% 43% 47% 59% 23% 18% 0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative action</td>
<td>0 2 12 7 1 4 6 2 0</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>0% 10% 57% 33% 63% 27% 9% 0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Therefore, the results of research into the learning environment by using the method of integrative learners’ collaboration in class gave rise to improved learners’ integrative collaboration.
Discussion and conclusions

In vocational secondary schools, training of mid-level specialists capable of professional mobility, able to quickly adapt to dynamic processes in design, manufacturing and work organisation, is a very important task. Unfortunately, at present, Latvian employers are dissatisfied with the level of practical competence and ability of graduates to work in interdisciplinary teams and organise collective work. The problem of learning process organisation in vocational schools has not been sufficiently explored: the learning process in comprehensive schools has been studied, but, in Latvia’s professional schools, such studies have not been carried out. Having analysed the theoretical literature in the context of the situation, we can infer that the integrative links between specific technical study subjects and social disciplines in a vocational school are insufficiently developed and are contradictorily expounded; in addition, there is disagreement among researchers concerning the understanding of the nature of the links.

The Learners’ Integrative Collaboration Model for technical study subjects was developed and experimentally verified in this research. The Learners’ Integrative Collaborative Model has been tested and can be used for teaching the study subject “Building Constructions” at Riga Construction College. This is shown by the comparison of learners’ individual achievements in the study subject “Building Constructions” in the experimental groups and the control group.

The main characteristics of the model are compromise, learning process intensification, teaching material flexibility and evaluation of learning outcomes. The learners’ integrative collaboration organisational process cycle include: the analysis of team members’ cooperation in problem solving, action plan development, implementation of the project, team project presentations, project discussion and reflection (a critical assessment of the team project and self-evaluation). Learners’ integrative collaboration was achieved through a common understanding of the most important topics for the special technical study subject “Building Constructions”.

It can be concluded that all the criteria characterising integrative collaboration have significantly increased. Thus, it can be stated that the type of activity provided in the framework of the experiment helps learners by promoting cooperation.

Riga Construction College secondary school teachers (the author’s colleagues) are considering the possibility of using learners’ integrative collaboration for learning process by customising a model organisational structure for each technical study specification, objectives and tasks. Riga Construction College secondary school teachers stated that the use of the Learners’ Integrated Collaboration Model facilitates discipline in the classroom and positive attitudes towards the organisation of the teaching and learning processes.

References:


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Primary School Teachers’ Views on a Holistic Approach to Facilitating the Acquisition of Musical Cultural Values

Jelena Badjanova
Daugavpils University, Latvia

Abstract
Recent tendencies in education highlight the need to align the system of general education in Latvia with the tenets of sustainability. In keeping with this broad target orientation, this paper re-examines international and Latvian experiences and perspectives on the application of a holistic approach to the content of primary education. This review of good practice is set against the backdrop of different theories and approaches concerned with the essence and principles of holism. More specifically, the paper addresses the issue of ensuring successful acquisition of musical cultural values in primary school via a holistic approach. In this regard, the latter is construed as movement towards the new that facilitates positive attitudes towards musical cultural values among learners and is both physically and spiritually nurturing. The paper proposes a theoretically and empirically grounded model for the usage of a holistic approach with a view to enabling acquisition of musical cultural values in primary school. The gradual development of the model is traced in the course of theoretical and empirical inquiry, the latter involving a survey and an interview with five experts.

Key words: values, musical culture, musical cultural values, holistic approach, sustainable development, holistic development, primary school teachers

Introduction
Various studies (Little, 1991; Kopełoviča & Žukovs, 2004; Maslo, 2006; Salite & Pipere, 2006; Quince, 2006; Katane, 2007) discuss the need for conceptual changes in education. International normative documents contain lengthy discussions about imminent educational reforms. For instance, the United Nations Economic Commission for Europe Report dating from 2011 (United Nations Economic Commission for Europe, 2011) clearly states that education should be reoriented to target skills and positive attitudes, critical thinking and creativity. Also, an interdisciplinary approach is discussed in this document, focusing on solutions to real life problems. Unfortunately, most of the approaches currently in use in educational contexts are designed to facilitate knowledge acquisition and fail to address the development of fundamental skills, capabilities and attitudes (United Nations Economic Commission for Europe, 2011).
In this paper, a holistic approach is analysed in the context of content delivery in primary education. Drawing sharp distinctions between the stages of primary education is considered irrelevant; instead, the system of primary education is viewed in its entirety, in keeping with the principle of unity in a holistic approach (Schreiner, 2005). The paper re-evaluates the theoretical and contextual content aspects in formal and holistic education as well as illuminates the views of Latvian primary education teachers regarding the viability of using a holistic approach to support the acquisition of musical cultural values in primary school. Thus, this research aims to ascertain the views of primary education teachers on a holistic approach with a view to designing a theoretically and empirically grounded model for the usage of a holistic approach to facilitate acquisition of musical cultural values at all stages of primary education.

A holistic approach and the content of primary education: Theoretical perspective

In many studies (Miller, 1993, 2000; Capra, 2002; Forbes, 2003), a holistic approach is construed as a possibility to facilitate learners’ integral development, which should be spiritual as well as physical. Several researchers (Belickis, 2000; Salite, 2002) argue that the formation of learners’ individual experiences and their making unique discoveries is contingent on the teaching strategies employed in primary school. Hence the need to integrate different approaches and insights of established scholars into primary school teachers’ practice, which should rest on the application of a holistic approach and its integrated content (Wilber, 2001) with a view to contributing to the learners’ sustainable development is equally important.

Much research on a holistic perspective in education has been done both globally (Schreiner, 2005; Bundsgaard & Hansen, 2011) and in Latvia (Sile, 2000; Ilisko, 2005; Salite, 2008; Pelnēna & Kļaviņš, 2009). A holistic approach to education represents a facet of sustainable development which manifests itself in educational practice (Rose, 2005). It rests on an assumption that access to education is insufficient in itself, which means that quality and quantity are recognised as equally important, and learner-centredness is a fundamental aspect of education (Salite, 2002; Pelnēna & Kļaviņš, 2009).

As suggested above, a holistic approach to education has been thoroughly studied. Palmer (1998) construes it as integrated schooling. Miller (1993) defines it as education that focuses on the links between mind and body, between linear thinking and intuition, among different scientific disciplines, between individual and community, between the individual self and the transcendent self – a distinction underpinned by an assumption that spiritual traditions exist independently of discrete human egos. Miller (1993) also refutes dividing schooling into stages and advocates viewing it as a continuous process that features subtle transitions from concrete to abstract concepts.

Miller (2000) attempts to deconstruct the concept of life in the context of holistic education and its theory. For Miller, human life is a target, a direction, a meaning and a purpose that transcends one’s personal ego and particular physical or cultural conditions. According to Lemkow (1990), holistic education aims to bridge the gaps in contemporary civilisation that dichotomises mind and body, intellect and emotion, rationality and intuition, science and art, individual and society, humanity and nature.
Jeœena Badjanova

Forbes (2003) considers holistic education to be formative and underpinned by faith in learner’s independence and capacity for decision making. An analysis of Forbe’s studies enables one to pinpoint the target orientation of a holistic approach – that of reshaping the learning process to enrich learners’ social experience.

Nava (2001) distinguishes between mechanistic and holistic educational paradigms, compares a mechanistic, formal and a holistic teacher and lists the key features of holistic education with a particular emphasis on the intrinsic connections between science, ecology, society and spirituality.

Clark (1997) explores complex issues such as spiritual life and its value system, integrity and connections with the Universe.

Gang (1993) perceives the content of holistic education as a synthesis of concepts, freedom of choice at every point of the learning process, spirituality, connections throughout human life as well as interdisciplinary relations. According to Gang (1993), to create the subject matter of a holistic education, it is the learning environment that should be shaped to accommodate both individual and group learning, thereby facilitating analytical and inductive thinking and by process- rather than outcome-oriented strategies.

Based on the opinions of representatives of holism (Gang, 1993; Schreiner, 2005; Rose, 2005), it is possible to define miscellaneous aspects of the content of holistic education. Firstly, holistic education is transformative. It requires transformation in both individuals and communities. Hence it also demands transformation of educational institutions, policies and actions which would result in the establishment of holistic practices at all levels of education. Holistic education asks for a multidisciplinary perspective, and it invites addressing the development of an individual as a whole and recognising the mutual dependencies of theory, research and practice. Secondly, in order to achieve the aforementioned transformation, holistic education should make use of various means and different approaches. Holistic education should enhance a person’s ability to develop critical competence through the analysis of diverse social and political contexts as well as facilitate life-affirming practice. Thus, holistic education can be interpreted as the antithesis of the material perspective that currently permeates human thinking and action. Thirdly, researchers respect new developmental tendencies in different branches of science and philosophy that have embraced holism and holistic thinking. Fourthly, holistic education addresses the development of individuals as a whole within the context of a community, including their physical, social, moral, aesthetic, creative and spiritual being as well as their intellectual and professional development. Meanwhile, nowadays formal education tends to be cognitively-oriented and neglect other essential dimensions of human life. Fiftly, holistic education respects the uniqueness and creativity of individuals and communities while recognising their interrelatedness. It attests to the possibility of establishing true learning communities where people learn from each other’s differences, appreciate each other’s strengths and develop the willingness and ability to help each other. Sixthly, holistic education facilitates active participation in the global community. It encourages mutual understanding and respect towards the diversity of cultures and religions which are now brought closer together than ever before in the history of civilisation. Seventhly, holistic education encompasses the depths of human nature that elucidate the spiritual grounds of reality. It is the issue of harmony between internal and external life. Eighthly, holistic education facilitates the creation of new knowledge as well as new practices of teaching and learning that involve reflection and action.
In Latvia, a holistic approach to facilitating the acquisition of musical cultural values has not been researched widely. Therefore the following section of the paper highlights the importance of a holistic approach to facilitating the acquisition of musical cultural values in primary school, considering experience of both international and national theoreticians and practitioners.

A holistic approach to facilitate the acquisition of musical cultural values in primary schools

In the context of music pedagogy, Zarinš (2003) defines musical culture as the entirety of music-related material and spiritual values created as a result of the humankind’s physical and spiritual labour. Among the creators of musical cultural values, he includes professionals who participate in the processes inherent in musical culture – teachers, learners, the audience, musicians and composers. Meanwhile, musical culture is construed as a relatively autonomous system of values that exist within a particular system of music making (Zarinš, 2003).

Several researchers (Jorgensen, 1997; Ruismäki & Juvonen, 2009) acknowledge that, by taking the view of culture as a system of values created by humanity, musical culture becomes a system of musical values and musical creation, which makes musical cultural values a complex set of spiritual phenomena underpinned by a specific notion of beauty, a certain mentality, a particular environment and relevant samples of musical culture.

Bezborodova and Aliyev (2002) maintain that learners should develop unbroken, whole notions of the art of music for continued self-education through autonomous interaction with art. Consequently, they argue that musical education in primary school should aim for the following:

- artistic and figurative inquiry with a view to cognising the world;
- feelings of belonging and altruism in one’s relationship with the world;
- emotional growth and development of the culture of feelings;
- humanistic and spiritual development;
- acquisition of national and universal, past and present musical cultural values;
- nurturing creativity;
- integration of learners’ personality traits into national and global artistic culture.

Bezborodova and Aliyev (2002) recommend teaching music by retaining and reinforcing the implicit connections among music, other forms of art, nature and human life rather than focusing on distinct forms of artistic expression that are forced out of the context of the greater whole.

Ruismäki and Ruokonen (2009) underscore that teachers ought to facilitate learners’ social, cultural and creative development and help them form a holistic attitude towards musical cultural values with a view to orienting learners towards retaining sustainable attitudes in the long run. At the same time, the content rather than the outcomes of learning should be emphasised in the teaching and learning process concerned with multicultural and global issues (Ruismäki & Juvonen, 2009). Wilber (2001) suggests examining any phenomenon, whether individually or in groups, by integrating subjective and spiritual experiences and awareness into a single system that yields objective descriptions of the
material, biophysical and empirical world. According to Wilber (2001), such a holistic approach bears favourably on the four aspects of human existence: individual or mental experience, examination of behavioural or physiological processes, cultural and social existence.

Jorgensen (1997) maintains that art should be used as a link that brings together spiritual and earthly worlds to enable learners to perceive the nuanced beauty of musical cultural values. He proposes an interdisciplinary approach to the understanding of musical cultural values and argues in favour of integrating music-related knowledge and skills into other realms of human experience: children learn in an unbroken, direct (natural) and cohesive fashion, and music making is not an isolated occurrence in their lives. According to Jorgensen (1997), learners make music a set of interrelated elements integral to their daily life; they can make music during any lesson and at any time. Birzkops (1999) observes that music making involves several interrelated components — thinking, hearing, memory, rhythm, movement and emotion, successive and simultaneous perception. When performing songs with lyrics, both mnemonic forms are activated at the same time — verbal memory and short-term musical memory. Playing a musical instrument is a complex psychological act that can be examined through the prism of different scientific branches — not only the theory of music or psychology of music and instrument play, but also mathematical psychology, kinaesthetic physiology, neurology and even psycholinguistics. According to Birzkops (1999), knowledge can be accumulated throughout one’s entire lifetime whereas the time one has to develop one’s abilities is fairly limited.

Cropley’s (1999) research into creativity boils down to the conclusion that creative activity requires striking a fine balance between the social environment and an individual’s personality traits, attitudes, perceptions of reality and acceptance of the latter.

A holistic approach to the perception of musical images can be discussed in the context of a values-oriented education as construed by Bėlickis (2000), who argues that the latter can be values-oriented only provided that it is implemented in keeping with the principle of holism. He concludes that a values-oriented lesson warrants an emotional experience of spiritual values as uniform structures in conditions conductive to understanding fundamental ideas implicit in specific values. According to Bėlickis (2000), an entirety, a complex and a whole are related concepts that denote an attitude towards the objective which is tantamount to that towards the subjective.

All the aforementioned theoretical considerations suggest the principles of applying a holistic approach to facilitating the acquisition of musical cultural values. Most importantly, artificial distinction of implicitly related concepts, actions and developmental areas is pointless. What is more, the original, historical perspective on creative musical activity is not that of artificial categories such as musical styles, forms, rhythm or tune or their arbitrarily isolation from the human being and Nature viewed as a whole; a holistic approach to facilitating the acquisition of musical cultural values features an inclusive philosophical conception of music as an empirical, analytical, holistic, natural and uniform phenomenon.

The following section of the paper proposes a review of the empirical groundings of the model of a holistic approach and its application to facilitating the acquisition of musical cultural values that was developed by the author of this paper.
Research instrument and participants

The research stage of 2012/2013 featured a focus group interview with experts (Creswell, 2003). The research instrument was expressly designed with a view of creating a viable theoretically and empirically grounded model of a holistic approach to facilitating the acquisition of musical cultural values. It was hoped that primary school teachers might find this model useful for shaping the content of primary education. The following phases can be identified in the aforementioned study: focus group interview with experts in preparation for designing the model; generalisation of findings from theoretical and empirical investigations; a model design and expert interpretation of data.

The focus group interview involved 10 primary education teachers from 10 primary schools from different regions of Latvia. Specific criteria were set for granting prospective participants an expert’s status and thereby validating their suitability for the study. The mean age of the participants was 44.5 years with 25% of the cohort older than 50; meanwhile, their mean pedagogical experience was 20 years.

Carefully worded questions were used in order to procure more accurate and detailed information:

- How much and what kind of valuable and valid fundamental components and conditions would you recommend for inclusion in a theoretically and empirically grounded educational model?
- What categories of learners’ development would you recommend targeting in holistic acquisition of musical cultural values?
- Do you consider the content of the categories of learner development as befitting the criteria for evaluating learners’ acquisition of musical cultural values at all levels of primary education?

Every expert’s evaluation was given separately from other experts. The procured individual evaluations were eventually combined through content analysis. Ethical concerns inherent in the usage of focus group interviews required preservation of participant teachers’ anonymity, so their names were coded.

Findings and their interpretation

Most experts who participated in the focus group emphasise that successful application of a holistic approach requires creative teachers who are capable of developing their learners’ creativity and figurative and constructive thinking (Forms 1–9) with due regard for the course of their psychic and physical development. The experts’ assumptions about musical cultural values appear up-to-date and conductive to the formation of learners’ attitudes towards the humanity’s shared cultural experience, supportive of learners’ active participation in the creation of new material and spiritual values and bearing a favourable influence on their acquiring and retaining a stable positioning and orientation towards particular values. For instance, one expert believes that acquisition of musical cultural values involves a particular individual and social experience the hallmarks of which are love towards musical art, emotionality with regards to it and a cultured musical taste (Arija). The experts are unanimous in singling out learners’ participation in various kinds of musical activity. They advocate a holistic approach to the art of music, which takes into account the humanity’s universal cultural context and
makes use of innovative ideas and novel forms of aesthetic education with a view to facilitating the acquisition of musical cultural values. This is considered important not only in regard to autonomous development of each learner’s spirituality but also to their social life. As to music lessons in primary school, the experts embrace the idea of incorporating acquisition of musical cultural values into the content of all school subjects as well as emphasise the importance of networking among schools. In addition, the experts argue in favour of taking a holistic perspective on the teaching and learning process and underscore the diversity and multiplicity of cross-subject connections.

In the proposed theoretically and empirically grounded model, the principle of unity is evaluated by the experts as its amalgamating component. What is more, they underscore its importance in acquiring musical cultural values and lament the fact that this process still focuses on teaching discrete topics, which is not seen as conducive to simultaneous all-round development of learners in the framework of one lesson. The experts approve the proposed indicators of reflection and claim that this model could change not only the learners’ but also the teachers’ attitude towards musical cultural values and the very process of their acquisition because, as a rule, this process requires methods that facilitate understanding of meaning rather than formal memorisation ... frontal work with learners has become an established practice, which should change ... any kind of monotony, including an unvarying mood, kills learners’ interest (Erika).

The study suggests that the key criterion for evaluating the acquisition of musical cultural values is combining learners’ cognitive activity and emotional resonance with music to solve various creative tasks both in groups and individually. The perspective of 10 experts of a holistic approach to facilitate the acquisition of musical cultural values in primary schools in different regions of Latvia enabled the author to create a theoretically and empirically grounded model the fundamental components of which include categories that mark the level of learners’ development, school lessons concerned with acquisition of musical cultural values and aspects of reflection. Practical application of the model warrants further investigations.

Figure 1. A theoretically and empirically grounded model of a holistic approach to facilitate the acquisition of musical cultural values
The content of the proposed model is grounded in features of sustainable education and those of holistic education viewed as a manifestation of sustainability in education.

Features of sustainable education: understanding of musical cultural values, responsibility and respect towards them and the totality of humanity’s cultural legacy; positive attitude towards the necessity to preserve this legacy for future generations. Learners demonstrate understanding of musical cultural values that are vital for sustainable development – improve the quality of their lives and those of future generations without destroying the planet, understand and are able to envisage desirable future as well as assess the chances of achieving it. When forming learners’ beliefs about living in harmony with the environment, teachers should focus on self-awareness – learners ought to be aware of their responsibility for achieving sustainability. Pedagogical practice is oriented towards facilitating learners’ awareness of their lifestyle and guiding them towards the vision of ecological and social sustainability – the new planetary vision (Sterling, 2004).

Features of holistic education: learners’ physical and spiritual development in all its manifestations viewed systemically. A holistic approach to facilitating the acquisition of musical cultural values in primary school is underpinned by interrelatedness and interaction among such components of the teaching and learning process as content, organisation and social relations as well as by teachers drawing from the totality of diverse methods and pedagogical techniques. While facilitating the acquisition of musical cultural values, the teacher does not separate, for instance, the integrated approach from the humanistic one but rather views them as indivisible and highlights the individualistic approach that focuses on all-round development of the learner’s personality as quality warranty of the teaching and learning process. A favourable learning environment is construed as the classroom atmosphere that emerges from the quality of the teacher-learner relationship and encourages creative learning. During a school lesson, the learners’ creative activity shapes their individual musical experience. Thus, a holistic approach to facilitating the acquisition of musical cultural values combines the creative process with the development of learners’ thinking processes, intellectual capabilities and experience.

Observation of the features of sustainable and holistic education requires shaping the teaching and learning process in ways that make acquisition of musical cultural values beneficial for the learner.

The conceptual basis of the proposed theoretically and empirically grounded model of a holistic approach for facilitating the acquisition of musical cultural values is complex.

*Individualisation and differentiation of learning.* The teaching and learning process should consider alternative possibilities and conditions for reaching the intended outcomes as well as respect each learner’s interests, individual needs and natural involvement in creative activities (Krastiņa & Pipere, 2004). Individualisation of outcomes is based on learners’ prior knowledge and psychic development. Learners’ activity, whose quality and effectiveness are contingent on their current emotional state and self-assessment. For this reason, instructional activities should target learners’ abilities (Gardner, 1993) by using different learning styles as well as seek to promote learners’ spiritual and physical development via appropriate content selection and adequate choices as regards the methods of its delivery (Beyers, 2009).

*Social constructivism.* This conception underpins concern for development of learners’ social flexibility (Powell & Kalina, 2009) which will enable their social integration. Learning is construed as an interactive process – learners’ ability to build relationships, exercise communication skills and develop knowledge and skills in cooperation...
with other learners. Thus, the teaching and learning process is interpreted in ecological terms as one that considers the needs of learners, school, family and society. Teachers should help learners master essential competences and skills that would assist their social adaptation (Krastiņa & Pipere, 2004).

**Humanistic approach.** This approach to the organisation of the teaching and learning process is learner-centred; the teacher performs the role of advisor (Rogers, 1967; Kopeleviča & Žukovs, 2004). At the same time, the teacher’s concern is harmonising learners’ freedom with perceived needs as well as supporting their autonomy (Little, 1991). In this respect, an empathetic understanding and an ability to see the world through the eyes of the learners is crucial (Bateson, 2000).

**Integrated approach.** It is focused on practical activity and targets learners’ critical thinking (Rubene, 2008) and creativity (Sīle, 2000) that are addressed through constructing educational situations. Content acquisition is oriented towards developing basic skills vital for the learners’ social integration. The approach is underpinned by Wilber’s (2001) insights about the union on the systemic level as well as on that of the worldview which includes learners’ consciousness: objects are construed as complex systems, as natural compounds that include the human in an essential way. Meanwhile, the universe is interpreted as a network of interrelated occurrences. Interdisciplinary connections are another essential worth mentioning.

**Shaping a holistic learning environment.** It requires teachers’ professional development and self-actualisation on the personality level while creating a trusted, interdisciplinary learning environment (Powell & Kalina, 2009) because integration and trust are the structural bedrock of a learners’ personality. Lack of trust in a relationship generates fear, which limits the natural opportunities for learners’ personality development. In teacher-learner interaction, dominance should be relinquished in favour of partnership (Ilisko, 2005). Fundamental decisions that concern all aspects of the teaching and learning process should be made jointly by teachers, learners and school administration.

**Principle of holism or unity.** It means observing the interrelatedness and interdependence of all components in the teaching and learning process, which requires a shared understanding on the part of the teacher and the learners about the subject matter and the methods of its acquisition (Kostakos, 2012). In the proposed model, all categories are connected in keeping with this principle. It also involves targeting the acquisition of musical cultural values as a whole in that the contents of the categories in the model envisage learners’ holistic development in the framework of one lesson.

To recapitulate, application of a holistic approach to the acquisition of musical cultural values transforms it into a creative and artistic process. Acquisition becomes a process that involves emotional, physical, social and spiritual levels of learners’ consciousness. Teaching is no longer perceived as transfer of ready-made knowledge but rather viewed as a means to encourage transformation. Knowledge is conceived broadly as an integration of scientific elements, logics, intuition, cognition, aesthetics and spirituality. Thus, a holistic approach to facilitating the acquisition of musical cultural values can ensure that learners not only understand and interpret knowledge, but also become actively and creatively involved in the lesson. Theoretical and empirical inquiry enabled the author to create the above-described holistic model for facilitating the acquisition of musical cultural values at all levels of primary education.
Concluding reflections

The findings from the experts’ interviews suggest that designing a model of a holistic approach to facilitating the acquisition of musical cultural values in primary school requires taking the following fundamental steps:

- formulation of structural components that include all principles of each learner’s holistic development;
- anticipation of content-related categories that enable evaluation of the acquisition of musical cultural values at the end of the lesson or upon completion of the three stages of primary education;
- differentiation of principles that regulate the application of a holistic approach;
- inclusion of structural elements of lesson delivery and continuity to ensure holistic acquisition of musical cultural values;
- definition of criteria that enable evaluation of the acquisition of musical cultural values;
- consideration of the following fundamental aspects of lesson planning in keeping with each learner’s individual needs: the principle of unity; sustainable approach; facilitation of reflection; a process-oriented lesson; integration of specific values into the aims and objectives of other lessons; integration of subject matter into different contexts to facilitate understanding of their importance in modern life; differentiated evaluation in keeping with the content and principles of a holistic approach; purposefully organised activities presenting values to become learners’ personal gains.

It can thus be concluded that what matters most in facilitating the acquisition of musical cultural values is achieving learners’ readiness to perceive music while the importance of cognitive teaching and learning aims becomes secondary.

The teacher’s role becomes that of a helpmate whose task is to assist the children arrive at an understanding. Mastering a specific learning strategy is only the first step, which must be followed by appropriate application. It means that teachers should focus on creating favourable conditions for the development of appreciation and adequate self-assessment among learners, beware of smothering learners’ innate initiative and creativity in problem solving and ensure freedom of choice in their learning about the world. Learners ought to be motivated to acquire musical cultural values through a personal understanding thereof, which is grounded in one’s experience, desires and interests. Values acquisition is rooted in discussing musical cultural values of particular nations and countries—a process that should involve careful analyses of contexts such as time, space, social setting, history and geographical positioning and integrate fundamental descriptors (key concepts) both in regards to theory and learners’ practical activity. It follows that the content of basic education should be taught with an approach that gives equal consequence to learners’ physical, intellectual and spiritual needs. It means that teachers accept children as they are and respect their unique life experiences. Instead of focusing on lengthy recitals of biographical details, a brief reference to relevant additional sources should suffice to guide learners towards autonomous in-depth exploration of the issue. Overabundance of definitions and dry facts is often detrimental to learners’ interest and rather conductive to indifference and a poor understanding of the topic. Consequently, in order to facilitate acquisition of musical cultural values, teachers should be competent not only in their own but also in other subjects, be proficient
in foreign languages and technologically literate, know their learners’ needs, interests
and abilities as well as be able to suggest appropriate forms of social cooperation to
specific situations in the teaching and learning process. All this is directed towards
fostering a comprehensive understanding of relevant subject matter through a set of
attitudes that find expression in the learners’ values, principles and ideals and underpin
their personal growth. Thus, the concept of musical cultural values should be construed
not only as relevant to aesthetic culture but also as germane to the culture of coexistence,
a culture of communication and interaction. Taking such a perspective should bear
favourably on developing an understanding of cultural diversity and finding personal
meaning in interaction with other people in a world of culture.

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EDUCATION FOR SUSTAINABLE DEVELOPMENT IN EARLY CHILDHOOD EDUCATION IN FINLAND

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Abstract

In the Finnish early childhood education and care (ECEC) curriculum, there is no specific content for education for sustainable development (ESD). Thus, it is not possible to get direct guidelines on how to conduct ESD in ECEC from the curriculum. We seek to look at the preferences of Finnish early childhood educators through the model of extended environmental education. Behind this model is Palmer’s tree model and an emphasis on empirical, social and ethical components of ECEC. The research method employed a survey. Altogether 924 teams in Southern Finland evaluated their learning environments. By using a factor and reliability analysis, we extracted three factors relevant to the extended Palmer’s model. The teachers primarily emphasised the understanding (learning) aspects of ECEC. The second most important aspect comprised the social aspects of education. The third most important aspect included the ethical and participant aspects of ECEC. Potential implications and indications to the practice of ESD are discussed.

Key words: education for sustainable development, environmental education, early childhood education and care, curriculum, learning, agency

Education for sustainable development in early childhood education in Finland

The human tendencies of environmental adaptation and agency have their roots in early childhood. The personal accommodative and participative relations to the environment have their origins in early childhood development. These basic early relations are not easily translated into education for sustainable development (ESD). Actually, a specific ESD for small children is difficult to define. However, because early childhood is fundamental for sustainable development, we have to study its educational premises. In this article, we do it by studying the emphasis on learning environment qualities in Finnish early childhood education and care (ECEC) in the light of ESD.

United Nations World Commission on Environment and Development has formulated the concept of sustainable development (Brundtland, 1987; Connelly, 2007). ESD expands the idea of environmental education (EE) to economic and social issues, and it tries to take into account ecological sustainability as well as sustainable social and economic development now and in the future (Tani, Cantell, Koskinen, Nordström, & Wolff, 2007; Osano & Corcoran, 2009). The United Nations World Conference on
Environment and Development, in 1992, in Rio, declared that education is an important way of promoting sustainable development (United Nations [UN], 1992). Ten years after Rio, the UN meeting in Johannesburg (UN, 2002) had to admit that the aims of Rio had not been successful, so the United Nations Decade on Education for Sustainable Development from 2004 to 2015 was declared. According to this declaration, every nation should set out the principles of sustainable development in all national curriculums (United Nations Educational, Scientific and Cultural Organisation [UNESCO], 2005).

EE and education for sustainable development (ESD) have much in common (Osano & Corcoran, 2009). ESD can be divided into three or four dimensions: ecological & physical, social & cultural and economical & political dimensions. From the viewpoint of education, it is important to consider the learning of individuals.

The physical and ecological dimension deals with nature and the built environment. These environments we should use in a sustainable way. This means, for instance, the sustainable use of materials, food, energy and water. Part of this concerns the well-being of nature and how the biodiversity is taken into account. From the perspective of children, the possibilities of using open, versatile places and spaces are crucial (Kellert, 2002). Exploration, safe adventures, multidimensional ways of moving and playing are possible when the environments have a variety of affordances and children can use these affordances. This ecological dimension has a direct connection to Palmer’s (1998) experimental learning in and about the environment. Palmer deals with individual learning, and, in her model, these personal dimensions include one’s experiences, attitudes and values, knowledge, actions and concern about the environment.

Palmer’s tree model deals with an individual’s education and growth on the part of a person who takes care of the environment. What kind of “ground” and environment nourish this growing? Does the growing need special “nutrients” in early childhood? We suggest that, in early childhood, it is important to get access to sustainable, meaningful experiments of one’s possibilities for participation and social education. Children’s welfare, possibilities for loving, having and belonging (Allardt, 1989) all provide crucial ground in caring for one’s environments. UNESCO (2005) suggested that, for instance, participatory education is one of the key educational principles in ESD.

Direct experiences in the environment form the child’s emotional and ethical engagement to the place and community (Goralnik & Nelson, 2011). Outdoors, children play, explore and interact with the environment in meaningful ways (Palmer, 1993; Ewert, Place, & Sibthorp, 2005). In day care, this means that children are able to use their spacious outdoor and indoor environments for

Figure 1. Palmer’s extended tree model of environmental education in ECEC
different purposes. Society, political and financial decisions, laws and even city planning enable or at worst prevent children’s playing and being in their physical surroundings.

Personal experiences of place and social environments create a foundation for one’s environmental beliefs and values. Sensing, positive feelings, playing and taking care of the environment are parts of these experiences. Creating positive values towards other living creatures and the physical environment depend on a number of different variables: gender, age, ethic, cultural, social and political environment and the child’s possibilities for taking part in outdoor recreational activities (Teisl & O’Brien, 2003; Johnson, Bowker, Bergstrom, & Cordell, 2004). So, part of the personal relationship towards the environment is influenced by the interaction between the child and social & cultural environments (Olli, Grendstad, & Wollebaek, 2001). We learn many, if not most, of our habits from others.

Sustainable development, from the outset, requires participation and commitment from everyone (Osano & Corcoran, 2009). We all influence social development in our different roles as playmates, consumers and members of a family and different groups in the society. In this sense, we must learn democracy early in life. To be a part of the social construction, we must be involved, committed and motivated. Concerning children, this can consist in being trained as social beings; taking notice, expressing one’s own thoughts, listening to others, respecting others’ opinions and others as fellow humans, cooperating, taking responsibility, reflecting and participating (Jutvik & Liepina, 2007). A good way of practicing these skills is participation in everyday activities, taking responsibility of and taking part in planning processes and projects. Role play is a way of learning social skills and empathy.

The economical and political dimension includes the decisions, laws, rules and financial possibilities for promoting sustainable development. In day care, this means having an influence over purchases and the guidelines for sustainability.

**ESD in early childhood education in Finland**

Sustainable development is not addressed as such in the Finnish National Curriculum guidelines on early childhood education (2005). The environment is considered as something already built or something that the educators provide. Only in one dimension is children’s active role in building their environment actually considered. This is in considering children’s play environment.

There is a strong emphasis on scientific education instead of ESD in the Finnish national curriculum guidelines on early childhood education (2005). However, ESD is not only about the environment, but should also include ethical and aesthetic aspects of the environment, as Palmer (1998) describes. In Palmer’s tree model, implications for EE come from different ideologies or perspectives. Palmer recommends that all the components of the EE model should be addressed in a systematic way. When we connect the ideas of Palmer to the dimensions of sustainable development, we get a model of personal and global EE. We call this an extended EE or extended Palmer’s model in this article (Figure 1). It means that education about the environment, in or from the environment and for the environment should go alongside, interlinked with issue-based, action-orientated and socially critical education. A sense of being part of something that extends beyond one’s own person, may be considered an important prerequisite in learning for sustainable development (Hägglund & Pramling Samulson, 2009).
It is not possible to get a holistic picture of ESD in ECEC just by evaluating curriculum or content orientations. ESD in early childhood is a pervasive relationship including empirical, ethical, aesthetic and social elements in relation to the environment. Young children do not yet have the prerequisites or need to understand the ecosystem from an analytical perspective. Neither do they have the need to be deeply worried or concerned about the environmental dangers and threats. Moreover, neither do they have the needed perspective to participate in the complicated societal or political decisions concerning environmental issues. However, the basic personal orientations to environmental phenomena, responsibilities and participation have their roots in children’s early learning. As a prerequisite, children need tools to understand environmental phenomena, compassion and empathy for others and to practice the skills needed for environmental participation.

In this article, we try to evaluate the fundamental requisites of ESD in ECEC by studying the ECEC teachers’ evaluations of their learning environment. We study the teachers’ emphasis on children’s different developmental issues needed for education about, for and in or from the environment.

Method
The purpose of the research is to study the relevance of teachers’ preferences of ECEC in the light of ESD, more precisely in the light of the extended Palmer’s model of EE. The research questions include the following:

1. What is the emphasis of the ECEC teachers on education about the environment (knowledge and understanding – learning and learning environments)?
2. What is the emphasis of the ECEC teachers on education in or from the environment, (the social dimension, communication and responsibility) aspects of ESD?
3. What is the emphasis of the ECEC teachers on the education for the environment (ethical aspects and participation)?
4. What is the emphasis of the ideas behind EE in different age groups?

Participants
The participants consisted of 787 ECEC teams and 137 childminders from southern Finland who were from eight different municipalities. Usually, there were three educators in the whole-day group and two educators in the pre-school groups. One team was usually responsible for one group. The survey was part of an official quality evaluation in the municipalities, which meant that the teams were obliged to evaluate their learning environment. The exact number of missing team evaluations is not known, but it is less than 10 percent. The childminders worked mostly alone, usually in their own homes. In the statistical analysis, the single childminders and the teams of two or three educators are all considered as teams responsible of their groups. Thus, a childminder in her home is a team of one. With childminders, the percentage of missing evaluations might be larger. In one municipality, the Swedish speaking day care centres did not participate in the evaluation. In another municipality, the private day care centres did not participate in the evaluation. It is also possible that, in some other municipalities, there were some private day care centres which did not participate in the evaluation.
There were 686 groups with at least one child not more than three years old, 149 groups with children where the youngest child was either four or five years old and 89 groups that consisted only of pre-school children. In Finland, pre-school usually starts in the year a child turns six years old.

The number of children in day-care groups varied from eight to 30 children, the mean being 17 children. A typical situation is that under-three-year-olds have are usually found in groups of 12 children, whereas 3- to 7-year-old children in full-day care were in groups of approximately 20 children and pre-schools with 6-year-old children could number up to 25 children in the groups with several children staying only half day.

**Quality evaluation**

The educators evaluated the learning environment. The quality of education was evaluated by using a 57-item survey which can be retrieved from http://www.helsinki.fi/~reunamo/apu/LE_eval12.pdf. The evaluated aspects centred on those of harmony, chaos, objectives and possibilities. The items of evaluation included the pedagogical preferences, the atmosphere of the group, the curriculum emphasis and the practice of everyday proceedings. The Likert-scale had five degrees: 1 (does not describe), 2 (describes poorly), 3 (describes somewhat), 4 (describes quite well) and 5 (describes very well). The survey is based on a learning environment comparison between Finland and Taiwan (Reunamo, Lee, Wu, Wang, Mou, & Lin, 2013).

Each team discussed the items together and filled out one shared evaluation. The learning environment evaluations were done between January and March 2012.

**Statistical analysis**

First, an explorative factor analysis was carried out to study the underlying dimensions of education. Several different methods with different number of factors and rotation solutions were applied to get a more global idea of the underlying dimensions. Different numbers of variables in the factor solution were tested to estimate the robustness of the factors. Based on the initial understanding of the underlying factors, Cronbach’s alpha was used to study the intercorrelation of the items and the properties of the summary variables. With the intraclass correlation coefficients of the individual variables, the reliability of the summary variables was evaluated. With reliability, we can get an overall index of internal consistency on each summary variable. During the reliability analysis, the summary variables were formed.

**Ethical considerations**

This research has been part of a research and development project designed to empower both the educators and the children. The educators have been considered as research colleagues in the dissemination of the research results. The educators were given feedback on tools for developing their work based on the research findings. The teams have received tools for pedagogical evaluation, where each team has also received feedback on their own group’s activities and interaction based on the preliminary results. The English web-pages of the project are available at: http://blogs.helsinki.fi/orientate/.
Results

The results are based on the educational quality evaluation of the ECEC teams. We concentrate on the three summary variables (Table 1) that are related to the extended Palmer’s model. We leave the harmonious, curriculum and chaotic summary variables out of this analysis, because they concentrate mainly on the atmosphere and curricular aspects of the educational quality which are not part of the extended Palmer’s model.

Table 1. The main factors of the ECEC learning environment

<table>
<thead>
<tr>
<th>Learning environment quality</th>
<th>Summary variable mean</th>
<th>Summary variable standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning</td>
<td>3.78</td>
<td>0.57</td>
</tr>
<tr>
<td>Social relations</td>
<td>3.43</td>
<td>0.61</td>
</tr>
<tr>
<td>Participation</td>
<td>3.16</td>
<td>0.74</td>
</tr>
</tbody>
</table>

The educators emphasised learning the most (Table 1). Its standard deviation was the smallest. This means that the educators were the most unanimous about the importance of learning. The second most important emphasis was on social relations, and it had almost as small standard deviation as learning. The participative aspects of the learning environment were emphasised the least, and the teams’ emphasis deviated from each other the most.

Table 2. The means and standard deviations of the variables in the summary variable of learning

<table>
<thead>
<tr>
<th>Variables in the learning summary variable</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children’s learning and skill development is evaluated in a versatile way</td>
<td>4.01</td>
<td>0.79</td>
</tr>
<tr>
<td>Our space has been divided into many smaller corners and activity spots</td>
<td>3.9</td>
<td>1.05</td>
</tr>
<tr>
<td>The learning and activity environment are versatile</td>
<td>3.79</td>
<td>0.78</td>
</tr>
<tr>
<td>Children’s thinking, problem solving and learning to learn are flourishing in our group</td>
<td>3.63</td>
<td>0.84</td>
</tr>
<tr>
<td>The physical learning environment (space and materials) involves children in their activities</td>
<td>3.55</td>
<td>0.91</td>
</tr>
</tbody>
</table>

The reliability of the summary variable of learning (Table 2) estimated with Cronbach’s alpha was .645, which is satisfactory. In the summary variable of learning, the importance to monitor children’s development is highlighted. The teachers have a tendency to divide the activities in different activity spots and materials, and the metacognitive aspects of development are important. The largest differences among groups were the division of the activity spots.

The summary variable fits with Palmer’s idea of *education about the environment*. The result describes the teachers’ emphasis on the environment. However, we are not sure what elements of the environment are included or how far from the classroom the evaluated learning environment extends. Learning was the most highly valued aspects of ECEC. In Table 3, the variables included in the summary variable of social relations are presented.
Table 3. The summary variable of social relations: the means and standard deviations of the included variables

<table>
<thead>
<tr>
<th>Variables in the social relations' summary variable</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a strong togetherness and consideration towards others in the group</td>
<td>3.88</td>
<td>0.8</td>
</tr>
<tr>
<td>The social relations between children are very functional and develop well</td>
<td>3.76</td>
<td>0.8</td>
</tr>
<tr>
<td>The children take responsibility in the daily tasks</td>
<td>3.66</td>
<td>0.96</td>
</tr>
<tr>
<td>Children obey rules without educator's supervision</td>
<td>3.04</td>
<td>0.96</td>
</tr>
<tr>
<td>There is a lot of drama plays (performances, plays) in the group</td>
<td>2.83</td>
<td>0.99</td>
</tr>
</tbody>
</table>

The Cronbach’s alpha describing the intra-class correlations was .700, which is satisfactory. In the summary variable of social relations, the peer relations are important. The consideration towards others is strong, the social relations develop well, the children take responsibility and follow rules without supervision. It is interesting that role playing clearly belongs to this summary variable. In role playing, the formation of social roles is essential (Reunamo et al., 2013).

The social summary variable makes sense in the extended Palmer’s model. According to Palmer, what is essential in education in or from the environment are the experiences based on senses and observation. When the experiences are shared with others, the experiences include social content and can be used in social development. When children live in a learning environment that is filled with consideration, responsibility and togetherness, the children can get an experience of a shared environment valued by everybody. Children’s experiences can include a shared responsibility. The third summary variable is participation, which is described in Table 4.

Table 4. The summary variable of participation: the means and standard deviations of the included variables

<table>
<thead>
<tr>
<th>Variables in the participation summary variable</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The adults consider children’s views in the development of the activities</td>
<td>3.74</td>
<td>0.83</td>
</tr>
<tr>
<td>Children have been given possibilities to impact the daily activities</td>
<td>3.45</td>
<td>0.88</td>
</tr>
<tr>
<td>Different projects and themes are developed often together with children</td>
<td>3.01</td>
<td>1.03</td>
</tr>
<tr>
<td>Children’s plays last and develop often for weeks</td>
<td>2.91</td>
<td>1.15</td>
</tr>
<tr>
<td>Children participate in many ways in the planning of the activities</td>
<td>2.7</td>
<td>0.99</td>
</tr>
</tbody>
</table>

The Cronbach’s alpha describing the inner consistency of the summary variable is .815, which is the highest intra-correlation of the summary variables. This means that participation is the tightest package. At the same time (Table 1), participation had the largest deviation among groups. This means that groups are different in their emphasis on participation, but, if they have participative qualities, they tend to have all the qualities described in Table 4.
When the learning is participative, the children’s views are taken into consideration. Children have possibilities to develop their own plays and ideas for long periods of time. Children also participate in the planning of the activities although children’s planning is having the least emphasis of the variables. The participative summary variable describes well the education for the environment in the extended Palmer’s model. When children learn to impact their learning environment, they probably also learn to participate in the environment on a larger scale later. When children can learn from early on that their ideas, values and actions matter, they get used to participating in the steering of the dynamics of the environment. Learning about the environment for young children involves concrete actions in which they experience making meaningful changes in the course of events. Children learn that their deeds have consequences. When children practice the planning of the learning environment from as early as possible, they learn that their ideas impact the environment. The mean for the participative summary variable was the lowest which means that education for the environment was not emphasised as much as the two other aspects of the extended Palmer’s model. In Table 5, we have acquired a perspective how the different emphasis on summary variables changed as children grew older.

Table 5. The means of the main factors in each age group

<table>
<thead>
<tr>
<th></th>
<th>Youngest child in the group is 1-3-years-old</th>
<th>Youngest child in the group is 4-5-years-old</th>
<th>Youngest child in the group is 6 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>3.08</td>
<td>3.34</td>
<td>3.53</td>
</tr>
<tr>
<td>Social relations</td>
<td>3.34</td>
<td>3.64</td>
<td>3.83</td>
</tr>
<tr>
<td>Learning</td>
<td>3.73</td>
<td>3.91</td>
<td>3.96</td>
</tr>
</tbody>
</table>

As we can see in Table 5, learning (education about the environment) was emphasised in all age groups. The difference between age-groups in learning was mainly due to the variable Children’s thinking, problem solving and learning to learn are flourishing in our group. For the youngest group, the mean was 3.51 (SD = .84), for the second group 3.94 (SD = .71) and for the oldest group 4.05 (SD = .82). The importance of metacognition increased as children got older. It can be interpreted that children get more versatile skills to steer their learning. As children become more conscious about their learning, they acquire tools that also influence their personal orientation to the environment.

According to Table 5, the importance of social relations (education in or from the environment) increased strongly as children get older. The variable The children take responsibility in the daily tasks increased the most: in the youngest group, the mean was 3.48 (SD = .97), for the second youngest group, the mean was 4.14 (SD = .68), and, for the pre-school group, it was 4.24 (SD = .77). The increase was sharp between the youngest and second youngest groups. Perhaps the youngest children are not yet ready for personal responsibility. Thus, it may not be wise to require environmental responsibility from young children. However, even in the youngest group, the item There is a strong togetherness and consideration towards others in the group had a high mean (3.87, SD = .81). It can be argued that social responsibility is best nourished in a learning environment with strong togetherness and consideration. Even though we cannot demand environmental responsibility from the youngest children, education in a socially responsible environment embeds seeds of responsibility in the schemas children learn.
Participation had the lowest mean in all age groups (Table 5). This means that participation was not valued as much or it was not seen as an essential ingredient in education as other factors. The education for environmental change is not seen as central to ECEC. The largest difference between the groups was for the item Children participate in many ways in the planning of the activities. In the youngest group, the mean was only 2.60 ($SD = 1.01$) in the second youngest group 2.84 ($SD = .87$), and, in the preschool group, the mean was 3.22 ($SD = .62$). It is quite natural that the youngest children with their short attention span and their tendency to find meaning in the present does not provide needed skills for long-term planning of activities. Nevertheless, in the item The adults consider children’s views in the development of the activities the mean for the groups with the youngest children got as high as 3.70 ($SD = .85$), which is the same as for the groups with older children. From the participative perspective, this can be interpreted that sensitive teachers help young children express their ideas for others to interact with. If the teachers can help young children to transform their intentions into concrete actions, it helps these children to grasp the connection between their motives and reality. This is the beginning of education for environment where concern meets action.

Discussion

There is always the possibility that the respondents answer the survey in a way they think they should answer. This means that the results may seem better than the reality in the kindergarten or with childminders. There is no easy way to measure the real conduct of ESD. According to Chatzifotiou (2006), EE and ESD are connected and may have similar problems. The problems may stem from an insufficient introduction to the limited knowledge and information teachers seem to possess in terms of their practices and their understanding of how new developments can procure continuity with what they are already doing. The tacit knowledge of ESD in ECEC makes the evaluation even harder. Even though the discussion about ESD in ECEC may be viewed as marginal, and the research done on the subject scarce, a historical, philosophical connection to nature-based learning in the early years can be derived already from the early philosophical works of Froebel (Edwards & Cutter-Mckenzie, 2011). According to Årlemalm-Hagser and Sandberg (2011), educators face a general dilemma: they never know what children need to know in order to meet a changing future. It is a task for pre-school staff to address these challenges and create meaningful learning activities for their charges. Through an approach where the variety of voices of the children are listened to, multi-faceted topics such as democracy, citizenship, diversity, social and economic justice, responsibility, care, respect, tolerance and peace can generate a fruitful educational environment in pre-schools. According to Sandberg and Årlemalm-Hagser (2011), play is important in mediating these values.

The emphasis on education about the environment (knowledge and understanding – learning and learning environments) was the strongest among ECEC teachers. Also its deviation was the smallest which means that the ECEC teachers share this high value of learning. The emphasis on education in or from the environment (the social dimension, communication and responsibility) was also highly valued, and its deviation was also quite small. The emphasis on the education for the environment (ethical aspects and participation) was the weakest. However, the teachers deviated in their emphasis the
most which means that some teachers tended to have different values concerning participation.

When we consider ESD for the youngest children, we do not consider understanding the laws of nature or development. We do not regard young children as responsible for the environmental change. Perhaps the best way to introduce young children to sustainability is by being a good role model (Siraj-Blatchford, 2009). We do not treat young children as if they should have sustainability on their minds as they play away in their busy everyday. However, this lack of knowledge, attitudes and skills to consider sustainable development does not mean that early childhood is not important for sustainable development. The younger the children have access to experiences of steering their learning and motives, the better equipped they are to have the needed perspective in the changes of tomorrow. The more warmth and concern in their nearest contacts the children encounter, the more concretely children can feel their belonging within a shared, even global, society. The more children’s ideas are taken into account and brought into the open, the more practice children get in making the environment better. The fundamental experiences of belonging, understanding and agency have their roots in early childhood. These early fundamental experiences give weight to later aspirations. When children get older, their knowledge and intellectual skills increase rapidly. But without a balanced development of the roots, the overall development cannot be sustainable.

The survey questions were lacking the political and societal aspects of sustainable development. The focus of the questions was in evaluating the practices of the day-care unit, not the instructions the unit had from the social services department and so on. Different municipalities have various emphases on sustainable development, for instance, the city of Espoo tries to integrate sustainable development as a part of education and everyday practices in day care (Sustainable Development Espoo [RCE], 2013). But part of the crucial skill of learning participation is also part of the political and societal aspects. And the lower emphasis on the participation (education for environment) dimension in the results raises some questions. If we want children to be equipped to cope with the fast-paced environmental changes of the future, children need to experience their own impact on the environment. Children need to practice seeing how their ideas evolve into action. Children need to practice sharing their initiatives with others and see that their initiatives have an effect on the shared environment. The more rapid the changes are in the future, the more important it will be that children learn to work together and see the consequences of their actions. We may not wait for children to become old enough to participate. By helping children to bring their ideas and motives out into the open for others to work on makes it possible for children to develop their participative skills. By helping children to experience the impact of their initiatives, we help children to develop dynamic ideas that can have real effects on the environment.

ESD for the youngest children should not be invisible or neglected. If young children learn the fundamental fact that their thoughts and actions matter, that learning can be embedded as an ingredient to all the other knowledge that children learn later on. Without that basic learning sustainable development is powerless. We would like to complement Palmer’s model with an emphasis on the roots, without which the tree cannot survive.
References:


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