ORIGINAL PAPER DOI: 10.13135/2384-8677/….

Art Teachers' Education for Environmental Awareness. *What is Hidden in Nature that we have never Seen or Heard?*

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Abstract. It is argued here that teacher education needs to make a fundamental shift in the types of knowledge and experience that count as valuable for future teachers. The article reflects on some aspects of a weeklong project involving student teachers and 5th grade students that has taken place in the Reykjavik Botanical Garden for the past four years called *What is hidden in nature that we have never seen or heard?* The project has been a part of the Children's Cultural Festival. This is a collective project where more than seventy pupils from a neighbourhood school work under the direction of a group of student teachers from the Iceland Academy of the Arts (IAA). The project focuses on the transformative power of education for sustainability (EfS), and participatory pedagogy including critical place-based learning and tacit knowledge. The settings at the Botanical Garden were developed as a part of a pedagogical course taught by the author of this article, aiming to develop the student teachers' self-efficacy and action competence. In the Botanical Garden the student teachers plan learning settings for the pupils and carry the responsibility for that week in collaboration with the local school. The work is based on their earlier learning in the pedagogical foundation course. The way of working of the student teachers in the Botanic Garden can lead to a mutual fostering of these two concepts in ways that may be expected to promote professional development and tacit knowledge. Acquiring and being able to use the concepts augments the voice of the student teachers and I discuss why such pedagogies are valuable in teacher education.

Keywords: education for sustainability, art education, action competence, self-efficacy, professionalism, tacit knowledge

ISSN 2384-8677 **DOI:** xx.xxxx/visions.07.00

Article history: Submitted January 09, 2016. Accepted (in revised form) February 13, 2017

Published online: March 2, 2017

Citation: Jónsdóttir, A.B. (2017). Art Teachers' Education for Environmental Awareness. *What is Hidden in Nature that we have never Seen or Heard? Visions for Sustainability,* 6: 00-00.

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Competing Interests: The author has declared that no competing interests exist.

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***Perspective**: Educational visions*

***Fields**: Human and natural sciences*

***Issues**: Teacher education, education for sustainability, participatory pedagogy*

Introduction

We live in critical times for teacher education. University staff that take part in teacher education are facing the need for gaining new understandings of the ecology of our planet and our world because of climate change and the dominance of unsustainable lifestyles (Gore, 2009). Thus universities need to be able to reorient their approaches to address the knowledge and values needed for sustainability. The term sustainability is increasingly used in institutions of higher education, though interpretations can differ widely from the deeply ethical to the highly technical. In schools teachers are required to address sustainability and understand the nature of *wicked* problems, as the Icelandic national curriculum for all school levels in Iceland has placed EfS as one of the fundamental pillars for all education and all subjects since 2011 (Ministry of Education, Science and Culture, 2011).

It is important to establish intermediate spaces between 'scientific knowledge' and everyday life. One way of making this link is through artistic approaches that have the potential to work with scientific facts in a creative way with a clear connection to lived experience.

The teacher education department at the Iceland Academy of the Arts (IAA) has, like many other teacher education institutions around the world, begun implementing EfS in preservice and in-service teacher education programs (McKeown, Hopkins & Chrystalbridge, 2002). The focus at IAA has been on creating firm connections between theory and practice.

In the spring 2013 a collaborative venture between IAA, a local elementary school, the Reykjavík children cultural festival, and the Botanical Garden was established. The collaboration is based on a weeklong art workshop in the Botanical Garden (WIG) connected to the Children's Cultural festival, concluding with an exhibition. For the student teachers from the IAA their involvement is an assignment. In this article several aspects of the project are presented and discussed. The overall goal of the assignment in the WIG is to provide a variety of settings for pre-service art teachers to use as they learn to organize learning experiences for children in the community. The aim of this project and the related activities is to engage learners within the context of their communities and for them to address relevant local issues with a focus on EfS. The student teachers are 12-18 in number and they create 6-8 projects or workshops for 70-80 fifth grade children, every year. It should be noted that although we speak of the children as the learners in this article, the student teachers are also learners themselves.

WIG is now an annual project with new learners and new student teachers each year and developed by student teachers that have prior to the project covered how to approach EfS in an integrated manner. They have in the preparation course discussed different learning environments such as focusing on learning through sensory experience via material (Hetland, Winner, Veenema & Sheridan, 2013; Ingold, 2011); choice-based teaching for artistic behaviour, (Douglas & Jaquith, 2006); critical place-based education (Gruenewald, 2003; Jónsdóttir, 2013; Macdonald & Pálsdóttir, 2013; Stevenson, 2008, Wakeman, 2015); and learner-directed settings (Jaquith & Hathaway, 2011). This provides the opportunity for art educators to consider how the qualities of play, passion, participation and pertinence can be acknowledged and embraced in school settings.

My role at WIG was to facilitate settings that provided time and space for the student teachers to make connections to their prior knowledge, give them feedback and support along the journey. By using this methodology in teacher education, students are more likely to use the same methods once they become in-service teachers. The aim of WIG is for the student teachers to develop self-efficacy (Bandura, 1997) and action competence (Mogensen and Schnack 2010). Teachers with increasing self-efficacy and action competence in connection to EfS have the potential to influence the choices their pupils make and the courses of action they pursue (Kozak,S. & Elliot, S., 2014).

WIG has concrete objectives for the participating children. Working with the theme *What is hidden in the nature that we have never seen or heard?*, the aim of the workshop and the exhibition with which it ends is to raise

awareness of the impact we all can have on our natural environment, today and in the future. WIG is based on the participants' active interaction with their surroundings in the Botanical Garden and discussions on how to build a fair and sustainable society. The workshop ends with an open exhibition showing the process of the artistic workshop and the art created by pupils using their senses and their aesthetic experiences.

Motivation: Artists and student teachers

Ever since I started to teach at IAA I have taught the course on pedagogy for elementary schools, including student teaching in school. All of the pre-service students in the IAA reported in interviews that they felt they were getting too little field experience and few possibilities to try out alternative approaches in education, fearing that once they became in-service teachers they would do the same routine year after year and fall into pre-formed ideas of the role of the teachers.

My research data showed that this issue needed to be addressed and in 2013 I approached the principal of the local school and asked if the school was willing to collaborate with us. We got a grant from the city and since then this event has taken place four times and we are planning to continue. All the student teachers in visual art education participate in planning and running WIG as an assignment in the pedagogical course.

The student teachers at IAA bring a great deal of knowledge with them when they enter teacher education programs. They are all professionally trained artists, designers or architects with BA, BFA, MA or MFA degrees. Therefore, once in the program, a great deal that is taught is based on their prior knowledge. WIG gives them the potential to connect educational theories to their previous experience.

Throughout the four years of WIG I have kept a journal to analyse the development and the potential of the project, creating settings for the student teachers to discover how they can experiment with theories of developing knowledge through art creation with the pupils.

Art as a source of knowledge

Many scholars have researched art as a source of knowledge including John Beder (1993), Noël Carroll (2002), Cynthia Freeland (1997), Graham Gordon (1995), Eileen John (2001), David Novitz (1998), Louis Arnaud Reid (1985), James O. Young (2001). Their approaches are different but all come to a similar conclusion:

> *The scope and limits of the knowledge which can be derived from the arts are examined in 'What can be learned from art?'... Before artists or scientists can represent anything, they must observe aspects of the world. If their representation has cognitive value, they are grounded in careful observation. Just as scientists conduct experiments and gather observations prior to constructing theories, so artists make a careful study of the objects they intend to represent* (Young, 2001, p.65-66).

All the WIG assignments organised by the pre-service art teachers were designed to address how we impact on the world around us, and how it impacts on us. The projects carried out by the student teachers focus on contemporary issues, the problems of our time and on projects to build the future. Some of the assignments are a narrative about how we feel about our community and our planet, how we act in it, and how we care for it. This is done in order to develop deeper forms of connection through creativity and imagination, providing settings for the pupils to find other forms of knowledge and ways of being in the world. An interesting issue for sustainability education is that of tacit knowledge, the type of human knowledge that is bound up in the activity and the effort that produced it. This kind of knowledge is value adding and resides within organisations (Horvath, 1999). Tacit knowledge includes judgment, experience, insights, rules of thumb, and intuition, and its retrieval depends upon motivation, attitudes, values, and the

social context. Professionals and other experts generally perform their practice primarily on the basis of tacit knowledge (Polanyi, 1967, Horvath, 1999). To what extent can tacit knowledge be knowledge about sustainability?

The Icelandic curriculum places strong emphasis on knowledge that is gained from lived experience, but it still appears as if the common educational discourse presumes that knowledge refers to facts and objective information. The Icelandic emphasis on knowledge production is in line with Amrit Tiwana's research on different forms of knowledge:

> *Knowledge is a fluid mix of framed experience, values, contextual information, expert insight and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms* (2002, p. 269).

Within WIG, the pre-service art teachers experience first hand how EfS connects visual art education to the complexity of the world beyond the classroom. A significant amount of learning time has been spent outdoors, over the course of one week in the settings of the Botanical Garden. The project deals with local elements in connection to the community. The project also reflects on UNESCO's pedagogical foci that encourage cooperation and sharing of knowledge, skills, perspectives, and questions, to help pupils prepare for the world of work as well as community participation and decision-making (UNESCO, 2011). However, in spite of these similarities there are many ways in which the arts' and the sciences' contribution to knowledge is different.

Pedagogical approach

The pedagogical approach at WIG aims at developing transdisciplinary learning and teaching using art as medium, to express the participants' ideas and thoughts. The pedagogical focus criteria are reached with a balance between direct instruction and project-oriented teaching methods. WIG illustrates how a deeper understanding of subject matter can actually be enhanced through art creation. This is the foundation for the transformative power of artistic actions that form the pre-service art teachers' identity, professional values and habitus.

When organising the activities at WIG a framework called *Connecting the Dots* developed by Stan Kozak and Susan Elliot (2014) was introduced. It is built on key learning strategies for environmental education, citizenship and sustainability. In the framework Kozak and Elliot reflect on how students can become engaged and active citizens involved in achieving environmental, social and economic sustainability. The pre-service teachers use the framework and design learning strategies for the pupils with a focus on involving them as engaged learners, learning within the context of their communities, and addressing relevant, local issues.

Discovering issues about sustainability through a creative approach that sparked their imagination gave the pupils the potential for self-discovery through participating in art making and through engaging in activities outdoors. The exhibition gave the visiting guests a chance to go through a process of self-discovery, transcending their own horizons, something which was empowering for the pupils as they discovered how their artistic actions could affect the visitors.

> *Works of art are means by which we enter, through imagination and the emotions they evoke, into other forms of relationship and participation than our own. ...To some degree we become artists ourselves as we undertake this integration, and, by bringing it to pass, our own experience is reoriented. Barriers are dissolved, limiting prejudices melt away...This insensible melting is far more efficacious than the change effected by*

> *reasoning, because it enters directly into attitude* (Dewey, 1934, p. 334).

The transdisciplinary learning approach employed links concepts and skills through a real-world context, one of Paulo Freire's (1970) emphases in his critical pedagogy. The student teachers' move education beyond just blending disciplines to an approach aimed at learning objectives that require pupils to both find answers to questions, and to form questions they themselves might have about the content. Transdisciplinary learning aims at stimulating students to solve real world problems and allows them to faithfully create and build their own ideas. Rather than supporting the idea that knowledge of the other is needed in order to engage with the other, they place more emphasis on the multiple and unique ways that individuals come into the world. Gert Biesta (2012) has come to a similar conclusion:

> *So just as competencies in themselves are not enough to capture what teaching is about, the idea of education as an evidence-based profession makes even less sense* (p.16).

The pedagogical approach at WIG stresses the importance of cultivating environmental values (Gralton et al., 2004), which is in line with the National Curriculum (2013) learning outcomes both in natural sciences and in visual art. When connecting the actions undertaken at the garden there is a strong link between education for the environment and EfS.

The actions are also in line with the framework for 21st Century Learning (P21, 2015) that highlights the vitality of transdisciplinary approaches that can promote depth of understanding as well as adaptability, which are important skills needed to succeed in our changing world. The framework was developed with input from teachers, education experts, and business leaders to define and illustrate the skills and knowledge students need to succeed in work, life and citizenship, as well as the support systems necessary for 21st century learning outcomes.

The pedagogical focus in WIG is of a participatory nature. It seeks to transform structures and practices that perpetuate undemocratic life in order to promote the development of a politically emancipatory and humanizing culture of participation, voice and social action. Scholars researching participatory pedagogy have identified three key elements for successful participatory pedagogy: 1) providing ample choice and flexibility in assignments and course activities; 2) navigating the balance between challenge and risk; and 3) creating contexts for critical reflection (Simmons, Barnard & Fennema, 2011).

Place-based learning

According to UNESCO students should understand how the earth's ecosystems set boundaries for mankind; they should understand their own ecological footprint and how the ecological footprint of societies and nations is linked to development; they should be able, in a critical way, to evaluate the value of information about environment and nature; they should be active and responsible citizens with regard to the environment and nature; they should be able to formulate a critical opinion on the environment, society, culture and economic system; they should have an understanding of the common responsibility of the human race on earth and her inhabitants (UNESCO, 2005).

In this respect, places can be very fruitful learning sites for students. In order to learn to understand themselves and their environment students need to get a sense of their own place (Greenwood, 2008). The WIG project has a place-based focus. Place-based learning is informed by cross-curricular links and contextualized by the diverse characteristics of the places that are studied. Place-based approaches and the tasks proposed are primarily intended to motivate the pupils through humanistic and scientific engagement with their surroundings (Gruenewald & Smith, 2008).

Sustainability: Learning steps

We do not really know how learners, be they children or adults, begin to understand the world in terms of sustainability concepts. Current discourse is, however, extremely fertile, offering a range of ideas and terms, increasingly involving everyday language. In WIG many new concepts were developed. What follows illustrates a few influential areas of discussion which have been used by scholars and increasingly by learners and so are entering common educational discourse.

Frequently, when issues of sustainability are discussed, questions of social behaviours and cultures are discussed in connection with environmental problems. Discussion also involves whether sustainability could be considered as an intersection of the economic, social and environmental sectors or whether social and economic systems are inherently limited by the environment (Huckle, 2005). The course I developed at the IAA was also framed by issues emerging after the turn of the century and then used frequently during the Decade of Education for Sustainable Development (DESD) from 2005 to 2014 and coordinated by UNESCO (2005). A massive website has enabled the development of a basic vocabulary across many countries.

In the early seventies two economists proposed the notion of *wicked problems*, defined as those characterized by high levels of complexity, ambiguity, controversy and uncertainty both with respect to what is going on and with respect to what needs to be done (Rittel & Webber, 1973). The term wicked problems is frequently used but still perhaps not well understood and thus requires extensive discussion (Singer & Macdonald, 2016). To use the term appropriately we need to understand many factors: that wicked problems are hard to define because of the actual nature of the problem; that there is no one solution to a given problem, because each one is unique (Macdonald & Jónsdóttir, 2014); that the solution to the problem differs depending on time and space; that it is neither right nor wrong; and sometimes the problem itself does not appear until the solution is found (Rittel & Webber, 1973; Thompson & Whyte, 2011).

In recent years education for sustainability scholars have applied the wicked concept to a range of issues. A parallel discussion is being addressed more vigorously now as some scholars have reached the conclusion that it is no longer possible to be satisfied with a transformation of knowledge, a concept that we have been using in justifying new approaches. What is now needed is 'transgression' where we move beyond our current set of values and practices, and 'look back' and try to cross boundaries and move into areas that would question current structures and not set about transforming them (Lotz-Sisitka, Wals, Kronlid & McGarry, 2015). A further discourse would say that knowledge is plural, contested and inherently contingent (Colucci-Gray et al., 2013). What is important to emphasize is that we are moving within a new and complex field and the language of sustainability is constructed as we research it and learn more about it. This was and is a challenge for teachers and learners.

A case study from Reykjavík

The data for this study are drawn from my personal observation. I designed the project and have organised and developed it from its outset. This case study uses action research and records my observation through journal writings.

The case examines some of the most important, distinct and successful aspects of the four years of WIG. The specific focus of this paper is on the participatory pedagogy which the pre-service art teachers have used in their process of becoming reflective professionals of EfS. I also reflect on the claims of knowledge making through art, the successes and the difficulties experienced, and the teacher educator's effort to develop rational dialogue when reflecting on the practice of promoting critical reflection in connecting theory and praxis.

Using action research to approach investigation

has become increasingly important to me as an assistant professor and a programme director where I have responsibility for development. My findings have led to new understanding of operational significance for the practice at the teacher education department at IAA. This has advanced knowledge about EfS within teacher education. The investigation has the potential to help improve teaching and learning within the programme and to contribute to a redefinition of the teacher educator's role within the development of the programme, specifically in terms of values, processes and methods (Brockbank & McGill, 1998).

The research process followed a similar format for each year, beginning with taking notes throughout the whole process and interviewing some pre-service art teachers who have taken part in the project. It also includes analyses of student teachers' written responses and assessment meetings. During the WIG process, permission was sought, and in each case granted, to tape-record the semi-structured interviews conducted. According to Yin (1984), the strength of a case study is that it is based on multiple sources of evidence which allow the investigation to retain the holistic and meaningful characteristics of real-life events.

Results and discussion

Over a number of years, the pre-service art teachers have created very different approaches or themes with their groups of pupils. When the learning outcomes of WIG have been analysed, there are indicators that show a sense of belonging, increased community vitality, cultural knowledge, and awareness of new artisan skills. The projects raised the participating 5th grader's awareness of their environment and its care through a focus on eco-friendly behaviours, connection to raw natural materials, ecological knowledge and waste management.

Most of the WIG groups have created projects that require intellectual quality including higher order thinking skills, deep knowledge, deep understanding, and substantive conversation. All of them have developed experience-based learning for the pupils with a focus on being in a natural environment, learning by doing, and working on projects in which they have choices and a chance to make decisions.

By creating an open exhibition as part of the week of cultural celebration for children, the project as a whole directed the learning to an audience beyond the classroom. As an organiser, I also created a photo essay showing the children at work, which was exhibited in the Botanical Gardens café. The key learning strategies for the WIG can be explained in a mind-map based on the *connecting the dots* framework. The mind-map was created as part of the project assessment.

The assessment meetings at IAA with the student teachers lasted for approximately three hours. After each meeting the researcher wrote detailed descriptions from her notes for later analysis. The purpose of this was to draw out the major issues connected to instruction, themes, issues of implementation, changing attitudes etc. The findings ultimately enabled analysis connected to current available literature. The following section uses data from the four projects to examine the different ways of working with tacit knowledge that encouraged the pupils to become aware of issues related to sustainability within UNESCO's sustainability learning framework (2005).

Content of the learning through WIG in relation to the UNESCO's Learning pillars

When the activities are considered with regard to the learning pillars identified by UNESCO (2005), one can see that the projects touch on different examples. Learning to know; Learning to be; Learning to live together; Learning to do; Learning to transform oneself and society.

Learning to know

The student teachers have appreciated being able to access the resources and expertise of the Botanical Garden staff. The staff have shown them how the Botanical Garden comes alive in the spring. Some of the groups have created sound magnifiers so they can listen to the root system of the trees waking up from the frosty winter.

The student teachers have reflected on the importance on trying by using their own skin to reflect on the local environment. Some of the groups have developed projects with a focus on sensory experience. The pupils then focus on learning from the materials available, for example one year when a moss and fungus specialist was working in the Garden moss became the theme of one of the groups, such as reflecting on why moss is sometimes unwanted and sometimes desirable. Another group has worked with soil and different kinds of sand to create the perfect mud to build things from. Some of the student teachers have used storytelling in their approach as the materials and accessories that are presented in the garden have become part of the pupils' experience. Stories are a way to open and encourage dialogue with the material, and with each other (Gersie, 1992).

Learning to be

Most of the WIG projects have built on the principles and values that underline sustainable development. The overall objective of WIG is to contribute to the participants' personal development where mind and body, intelligence, sensitivity, aesthetic appreciation and spirituality are all challenged.

Some of the groups of 5th graders reflected on active citizenship, like the group that created their own *Small society*. The group had started to discuss different societies and some of them had seen a new report on artists that had lived in a Mongolian yurt in Iceland. Those artists had carried out creative projects and promoted of a different way of working and living. A student teacher stated:

> *We had a great conversation about the use of materials and the traditions that are inherent in this kind of adaptable architecture. The Mongolian Yurts are attracting interest from people in many parts of the world as an ecologically friendly and attractive living space that can be used for a variety of purposes (Student teacher 2015).*

The group of pupils had, by end of the week, created a set of community rules they found important, and an environment within the yurt where everyone in the group had something to say. They had brought old sheets and curtains to create the yurt itself, decorated it, and constructed decorations or ornaments that were inspired by indigenous cultures in order to drive away bad spirits. Many of the projects related to community have also helped the pupils to learn to live together.

Learning to live together

Here the objective is to know oneself in the context of complicated social structures and to develop attitudes towards society and the environment. Other groups have reflected on differences and observations of how the lifestyle of people has changed. For example, in the neighbourhood of the Botanical Garden there are hot springs that people in Reykjavík used wash their clothes in. Some of the WIG groups have paid tribute to these washerwomen that had walked across the city, the group created sculptures that reflected the hard work the women had carried out. The children also did experiments with a range of fabrics that they got at the Red Cross, and then dyed them in different ways. One pupil had brought with him a cool-aid drink. After discussing colour pigments in the drink they decided to do experiments with colouring fabrics using both cool-aid and natural colours.

By creating a project like WIG, the student teachers can practice designing and teaching a good quality arts education and discover it as an essential component of holistic education, both formal and informal. Some of the projects have aimed at building capacity for community-based decision-making, resulting in community rules that include social tolerance, environmental stewardship, adaptable workforce and quality of life.

In WIG informal learning is a local ongoing phenomenon of learning via participation and is in contrast with the traditional view of teacher-centred learning that can be described as knowledge acquisition. The pre-service art teachers create an environment in which learning is able to flow and develop in whichever way and direction the pupils desire. Within that ideology the belief is that the pupils will end up learning more, not only about what they we need to know, but also about things that interest them. This kind of learning is transdisciplinary, aiming for the pupils to solve real world problems and allow them to faithfully create and build their own ideas.

Learning to do

Some of the groups focused on contributing to a concrete reality characterizing all our daily decisions and actions. Approaches to the theme *Fair community* have been very frequently aimed at building a sustainable and safe world for everyone. One of the groups chose to create a world they called *Togetherness* where the main focus was on playing together and experiencing new and unexpected things. They asked to be located outside the official Botanical Garden to have more freedom. One child wanted to experience how it would be to live underground. He and some of his friends spent a long time digging a hole in a hill they found. This provided a great learning curve for them as they learned to use different tools for digging and removing stones and different kind of soil.


Both artists said that the pupils that had spent the whole week outdoors (not going in to the greenhouse at all) and had been very happy.

> *Actually being in the environment experiencing its beauty, seeing the effects of their artistic activities had an impact on the pupils. Some of them were not sure if this was an artwork or not...but that really does not matter (*April 2016).

This pair places a strong focus on validating the process. They appeared excited by the prospect of choosing a project significant to themselves and allowing the pupils to have the liberty to design a course of action (Researcher notes 2016).

One of the groups called themselves the *Hawks* drawing the name from the bird that has great skill in noticing things around them. They worked like spies reflecting on the relationships they noticed with others participating in the project.

They created their own tools to report on their findings, and created metaphors mapping out different relationships to the garden that they had absorbed in the groups in working within WIG.

They noticed how some of the children liked to work small-scale while others liked to create bigger things. Some created something abstract while others were working with more concrete things. Some chose to work as a team while others worked in smaller groups within each large group.

Learning to transform oneself and society

Through this research I have learnt how to systematically use actions which influence the sustainability of society. All the fiver pillars of learning relate to all phases and areas of learning in the WIG project. The pillars support one another and are embedded as basic principles in the WIG project, resulting in collective learning for the student teachers as they learn to transform themselves and society. This includes that they have been able to integrate the values inherent in sustainable development into all aspects of their learning through the project. The cross-curricular themes applied in WIG that have been designed by the student teachers and the broad competences for integration in and across subject areas and learning domains have empowered both the pupils and the student teachers. This results in student teachers taking on responsibility for creating learning settings that aim for the pupils to envision a sustainable future.

The student teachers have reflected on the importance of the intermediate space that WIG provides for them and how it elicits their potential to develop their self-efficacy and action competence. Many of the participants have stated that their experience in WIG, together with their own tacit knowledge and experience, can be used to arrive at informed decisions for the good of themselves and others. They have also stated that the experience made it possible for them to focus on increased participatory virtues (Macdonald & Jónsdóttir, 2014) where individuals have the potential to be more creative and include

discussions on wellbeing in other spheres of life. That embraces encouraging freedom of expression and enriching the learner's creativity and imagination.

The student teachers' enthusiasm for their projects seems to arise from the pleasant discovery that they are able to connect educational theories to their own practice. One student teacher, for example, credited this project with making her more willing to experiment with different strategies. Indeed many of them felt empowered as professionals capable of connecting theory with practice, and able to use their judgement to adapt curriculum and educational strategies to the pupils' needs and to the context (Researcher journal, 2016).

Learning by doing and challenges

Many of the student art teachers have described their experience in the WIG as learning by doing. Many referred to their experience as 'hands on' and considered this week as having had one of the greatest impacts on their learning in the pedagogical course.

A number of pre-service teachers have used the term 'real life' experience to describe aspects of WIG, and how that impacted on the pupils learning. This included being outside in a natural place, responding to natural elements and often reflecting on real life situations.

They have also connected their experience to the importance of integrated learning. Many of the pre-service teachers and the in-service teachers from the local school have described the learning that takes place at the Botanical Garden as connecting aspects of the school curricula with what happens in classroom activities, and how that must have an impact on pupils learning.

After starting this project, that included exploring, investigating, creating and learning new skills through WIG, there was more variety in student teachers' theses. Some said that this experience would encourage them to recreate this project once they became in-service teachers. Some were still afraid it would be difficult to do this alone with a whole class.

> *I think we all wanted to get the children to be confident and have lots of self- esteem, and be able to be independent. We just used different ways to do it.*
>
> *I think the projects with the best outcome had experienced teachers with great self-esteem, and were willing to allow the pupils to do lot of experiments.*
>
> *The most independent pupils were active learners, they did everything themselves and did not rely on us too much.*

One of the teachers from the participating school stated:

> *I have been a classroom teacher for many years and been part of this teaching team [in the WIG]. It is an ideal setting in terms of keeping quality high, being part of the team, the kids all working in many small groups, they learn to work together in a new way, outside of the classroom, with new people that don't know their background. ... It is a fresh start* (April 2014).

When pairing the student teachers it is important to keep in mind that they do not always have the same values or ideas. One stated:

> *I know I will have to work with all kinds of people in the future but It's much easier to work with people who have similar values to you* (April 2016).

It can be very a important experience to learn to work with people that do not have the same ideas as you. After meeting with this pair and discussing the importance of giving everyone a position where they would feel valued, it was useful to explain that there are many stages of working together and the most important thing is to give them confidence to take responsibility on working out problems. This encourages them to act independently, but also ensures they would always be supported when necessary. This was an important learning event for both of them.

Another complained about her partner always wanting to take control:

> *It's hard to develop self-esteem when the people you are working with don't really*

have faith in you. It seems to me everything I suggest is wrong, not that I want her to be obedient, that's the last thing I want . . . I just want a dialogue (April 2014).

Lack of time was often a problem in the collaboration:

It would have been important if we could have sat down together after each day and asked ourselves what is missing, what do we need to be developed, etc. I know some of the groups did that and that was helpful for them. We were always in a rush to go to another class or we had other duties we had to work on (Student teacher, 2015).

Some of the student teachers have other duties at the IAA so their energy has been diverted away from the Botanical duties. I have had conversations with some of the student teachers and I have talked to my colleges and asked them to give them a break. Thankfully none of the student teachers are at risk in their practice in WIG. Next year we need to get off the mark sooner so this does not happen (Researcher journal 2015). [It has been agreed that next year no other classes will be required of the first year student teachers during this week.]

The first two years of the project, an assessment meeting was not included in the planning. But after analysing the data from the first two years, assessment meetings were then included. The in-service teachers and the student teachers have all considered the importance of these assessment visits. That visit gives space for supporting and deconstructing what the pupils had seen and experienced. Their experiences are very diverse:

In WIG we do have so much more space to experiment.

I think this was more like playing then schooling.

I sometimes get very tired in the classroom because I have to sit the whole day and use the indoor voice. It was nice that I did not have to think about that in the Garden.

I liked how I could decide what material I used and how I used it.

I didn't like it when it was cold, I always forgot to bring warm cloths.

Our group was the best group because we spent all the time outside. We did not go into the greenhouse.

The different engagement through diverse learning sequences has often brought up how important it is to work with values and virtues in connection to EfS.

Self-efficacy and action competence

The student teachers have developed strong self-efficacy (Bandura, 1997) and achieved action competence (Mogensen and Schnack 2010) in relation to EfS through WIG. Therefore they should be more likely to select tasks and activities in their classrooms that relate to sustainability in the future. That is because feeling competent means they will not avoid those issues. They need to believe in artistic sustainability actions in order to engage in them. It is a indicator of student action competence when they have developed the ability, motivation and desire to play an active role in finding solutions to problems and issues they feel are worth fighting for (Mogensen and Schnack 2010). Even though most research on human agency has been centred mainly around the development on individual self-efficacy, people do not live their lives autonomously. In many cases development is only achievable through collaborative efforts. In social cognitive theory the conception of human agency is extended to collective agency. Empowered pre-service art teachers with strong self-efficacy are willing to share the belief of their collective power to produce desired results, and this is a key ingredient of collective agency (Bandura, 1997).

The idea for WIG had been developing for several years. The IAA was able to connect with the community, children learnt new things, and the student teachers found it an interesting challenge. Before the project started the researcher was already aware of many issues and had ideas for several activities, based on the theoretical emphases connecting theory

and praxis in relation to place-based education. Prior to WIG, the IAA teacher education department had developed a strong relationship with the local neighbourhood. This included creating settings for the pre-service art teachers to teach in short art courses in their first term for the afterschool programme (started fall 2010). This has been a wonderful opportunity for the IAA pre-service art teachers to gain sometimes their first experience teaching in an environment they identify themselves with and feel good in. It is also very beneficial for the local children, all of whom know the big IAA building but have never entered an art academy before. They are generally curious about what happens there, and many parents have expressed how positive they are about this initiative.

> *It is really great for the kids to be able to walk here after school and get an ambitious course.*
>
> *It's great for the kids here in the neighbourhood to be able to walk here. It takes great stress off not having to attend art courses at the other side of town.*
>
> *My daughter has been taking your course for the past four years. It is frustrating that she is too old. I have really liked how she has been able to work with different artists that are in your teachers' programme.*
>
> *I have completely different view on the Art Academy now that my son has been with you for the last two years. Now I like that old meat-processing factory [the building was originally designed for this purpose] and I no longer think it is ugly. He gets a lot out of what he does with you. It is so seldom that kids have the opportunity to experiment with different media.*

This positive feedback we have received through our collaboration with the local community has given the project members of WIG a very important positive attitude and will for participation.

Developing professionalism

Sergiovanni (1992) believes that, in order to improve, schools must adopt the metaphor of the school as community rather than as organization. The central framework for the characteristics of a professional learning community are the five dimensions identified by Hord (2004) (a) supportive and shared leadership, (b) shared values and vision, (c) collective learning, (d) supportive conditions, and (e) shared practice.

Currently, education relies on direct leadership and little time is left for leaders to focus on issues of substance that can make real changes in the ways we are teaching and learning (Sergiovanni, 1992). In WIG the emphasis was on a participatory pedagogical approach that allowed the participants to focus on different phenomenon over a long time. Working with participatory virtues has been found useful in comprehending sustainability and its wickedness and those aspects of human values which complicate and sometimes confound the process of realizing sustainable values (Macdonald & Jónsdóttir, 2014).

When working on school improvement, it is therefore crucial to understand that schools are communities and that everyone must become involved in the leadership of such schools. All the workshop projects have highlighted the importance of working together as a community.

Being involved means internalizing shared goals, being committed to professionalism and professional virtue and behaving in a collegial

manner (Sergiovanni, 1992). When spending time in the beautiful Botanical Garden, the participating 5th graders were walking, listening, meditating, making, marking, exploring, accepting, questioning, and writing as a group. They also got time for private creation in the group sessions that later became part of the whole enterprise.

Transdisciplinary teaching is democratic in nature. The most important fundamentals for transdisciplinary teaching are a high degree of openness and curiosity from all stakeholders with an open mind, willing to adapt, quickly and unconventionally, to new and unexpected circumstances. The aim is to generate learning environments in the WIG where power relationships are mutually constructed and negotiated between those involved in the learning process, through which relationships evolve during the relational pedagogical approach to co-creating knowledge. Therefore, the concept of participation becomes essential to the pedagogical process and its intention to transform the way we pursue social and ecological justice in line with the ActSHEN project principles and goals[1]. When going through my journal writings on the workshop, this is something the student teachers discussed as the biggest learning curve at the Botanical Garden.

The journey towards professionalism

The project in the Botanical Garden was designed around supportive and shared leadership. It was a venue for the student teachers to try to share responsibilities with the pupils.

> *It was a challenge in the first days to give the control partly up to the kids because the issues that we believed they would value was not always the same issues they valued as important* (Student teachers, April 2014).

Working as a large group when designing the overall objectives and learning outcomes provided shared values and visions for the project. In that process the student teachers built on theories studied in the IAA pedagogical programme. The project at the Botanical Garden also required connection to the curriculum at the local school. That required a transdisciplinary approach some of the student teachers found hard. In the research notes is stated:

> *I am mindful of the challenges of asking the student teachers to implement a complex transdisciplinary project on as tight a time schedule as the week in the WIG. As I am unsure of what we can reasonably expect from the student teachers, I cannot anticipate all their concerns or be sure I am guiding them in the right direction. I feel that I am not entirely in control of this project and am concerned that the uncertainty may increase the anxiety of the student teachers* (Researcher journal, 2013).

Those worries were unnecessary, since the student teachers showed more ability as they were given more confidence.

> *I have learned to trust the process. The more freedom I give to the student teachers the better they will deliver. It is still important that they make clear connections between theory and practice* (Researcher journal, 2014).

When working in pairs, or in groups of three, this gave them both needed support and also required shared leadership where they had to respect each other's perspectives and ideas.

> *Student teacher X has shown great flexibility in adjusting her ideas for the project to her partners approach. She is checking pupils' interest and trying to make sure they fit to the ideas of EfS. It is interesting to how they are bringing out the best in each other* (Researcher journal, 2016).

When sharing their experience from the fieldwork, the student teachers developed

[1] ActSHEN is Action for Sustainability in Higher Education in the Nordic region. In 2013 a group of scholars several of whom knew each other from earlier Nordic cooperation developed a projects, frameworks and lessons which give students more influence i.e. more voice and more choice http://blogs.helsinki.fi/action-for-sustainability/.

collective learning. One of the student teachers stated, when discussing what she learned from the project:

> *My sense that I lack control is compounded by the fact that this is a collaborative project.*

Another student teacher stated:

> *I have enormous respect for each of you and the unique qualities you brought to WIG. In my heart the uniqueness of each of you will always be respected. You were all committed to fostering a safe environment for the pupils where they could create the meaning of their experiences.*

Working in collaboration with WIG, the flora and fauna specialist, and working with the in-service teachers from the local school, generated a supportive condition. Mounting an exhibition at the garden and then later at the local school allowed for shared practice where the local community gave valuable feedback and at the same time the connection to the community also provided validation and stronger connection. The exhibition later created added value, as the value of the project was evident when it was awarded the 'encouragement award' by the Education Office in Reykjavik in 2015. The acknowledgement gave real life connections as the project was no longer just a school assignment, but it had become an important initiative in the pupils' lives.

For the student teachers is has been empowering to get direct feedback from the pupils and analyse it later in an assessment meeting together as a group. It has allowed them to share what went well and what needed improvement, forming a collective efficacy that leads to action competence. This project gives them the chance to reflect on their own actions as professionals.

Can the participating pupils learn from art?

In many schools the focus is on children learning for testing but not for real comprehension (Nelson, 2013; Solorzano, 2008). This also involves the danger of dismissing tacit knowing. Progressive teaching methodologies based on the theories such as those advocated by Dewey (1934) and Paulo Freire (1994) are difficult to endorse because of the time and energy needed to prepare students for standardized tests. Many such important educational theorists have in some way or another referred to tacit knowledge in their concepts. It has been interesting to see how the educators in the local schools have been willing to participate in activities that are aimed to help the pupils expand knowledge they already know through the artistic activities.

This understanding of the importance of fostering tacit knowing through art is important because it has a very positive impact on the in-service teachers that take part in the project with their pupils. The concept of tacit knowing is important to our understanding of how students learn and how we can rethink teaching strategies.

When working in the garden through this collective project, the children have had to make good judgments about qualitative relationships, i.e. by making rules for invented communities. The pupils have also practiced respecting different perspectives because, unlike much of the curriculum in which correct answers and rules prevail, in the arts, it is judgment rather than rules that prevails (Eisner, 2002). In these projects the student teachers have discovered, when fostering a choice-based approach, that they can show the pupils how problems can have more than one solution, and that questions can have more than one answer. That is because the arts celebrate multiple perspectives. One of their biggest lessons in WIG is that there are many ways to see and interpret the world and small differences can make large effects (Eisner, 2002).

For some of the student teachers it was difficult to offer choice to the pupils:

> *When I first stressed that they should allow each child to choose a project with meaning to himself or herself, I sensed some level of silent incredulity: an "Oh, yeah. Sure." kind of attitude. At some point, one of the*

> *student teachers stated that she felt she was not teaching the kids anything. This was very important because it allowed me to discuss how we as teachers can be stuck in the setting that we were brought up in* (Researcher notes 2014).

Students can respond to works of art, and in the context of tacit knowledge one can learn from his or her reactions. Through the arts it becomes vivid that neither words in their literal form nor numbers exhaust what we can know. The limits of the language do not define the limits of potential cognition (Eisner, 2002). In the artistic activities the pupils have learnt that, in complex forms of problem solving, purposes are seldom fixed, but change with circumstance and opportunity. Learning in the arts requires the ability and a willingness to surrender to the unanticipated possibilities of the work as it unfolds (Eisner, 2002).

The projects that have focused on creating settings for the pupils to think through and within the natural raw material in the garden enabled them to have experiences they could not have from any other source. Through such experiences, they have the potential to discover the range and variety of what we are capable of feeling. All the projects allow the pupils to experience and to express what cannot be said. By inviting them to disclose what a work of art and art creation helps them feel, they must reach into their creative and imaginary capacities (Eisner, 2002). At the same time, since the main knowledge gained at WIG is a tacit knowledge, it can be often be hard to identify when the pupils have developed value judgment, or gained experience that gives them insights or intuition.

Conclusion

The experience at the WIG provides increased focus on connecting theory and practice for the student teachers at the IAA. The research findings indicate that they are able to identify the higher order thinking skills in activities such as more frequently asking critical questions, comparing different perspectives, creating meaning, drawing conclusions, and developing opinions and values.

The findings suggest the practices in WIG both enact conceptualization focusing on pupil learning and create empowering settings in teacher education, allowing student teachers to reach action competence. As they connect theories and practice they develop self-efficacy, and at the same time they create a powerful learning environment for the pupils, building their self-efficacy through vicarious experience.

> *The student teachers' work makes me optimistic about teaching and education. They have done so well with the projects they undertook in WIG! They have managed to reach out to students in unexpected ways in the first day of the project. All the children returned happy and excited about continuing tomorrow* (Researcher journal, April 2014).

This case gives a good example of how teacher educators can create settings for student teachers to develop self-efficacy and action competence. WIG is an example of the potential of art in EfS where the learning settings discussed earlier are characterised by play, passion, participation and pertinence.

References

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Bender, J. (1993). Art as a source of knowledge: Linking analytic aesthetics and epistemology. In Bender, J. & Blocker G. (Eds.). *Contemporary Philosophy of Art* (pp. 593-607). Englewood Cliffs, NJ: Prentice Hall.

Biesta, G. (2012). The future of teacher education: Evidence, competence or wisdom? *RoSE- Research on Steiner Education, 3*(1), 8-21.

Brockbank, A., & McGill, I. (1998). *Facilitating Reflective Learning in Higher Education*. Maidenhead: McGraw-Hill Education - Open University Press

Carroll, N. (2002). The wheel of virtue: Art, literature, and moral knowledge. *Journal of Aesthetics and Art Criticism, Winter,* 3-26.

Colucci-Gray, L., Das, S., Gray, D., Robson, D., & Spratt, J. (2013). Evidence-based practice and

teacher action-research: a reflection on the nature and direction of 'change'. *British Educational Research Journal, 39*(1), 126-147.

Gersie, A. (1992). *Earth tales: Storytelling in times of change*. London: Green Print.

Dewey, J. (1934). *Art as experience*. New York: Minton.

Douglas, K., & Jaquith, D. (2009). *Engaging learners through artmaking: Choice-based art education in the classroom.* New York, NY: Teachers College Press.

Eisner, E., (2002). *The Arts and the Creation of Mind*. Yale University Press.

Freeland, C. (1997) Art and moral knowledge. *Philosophical Topics, Spring,* 11-36.

Freire, P. (1994). *Pedagogy of hope*. New York: Continuum.

Freire, P. (1970). *Pedagogy of the oppressed*. New York: Continuum.

Gordon, G. (1995). Learning from art. *British Journal of Aesthetics, 35*, 26-37.

Gore, A. (2009). *Our choice: A plan to solve the climate crisis*. USA: Rodale.

Gralton, A., Sinclair, M., & Purnell, K. (2004). Changes in attitudes, beliefs and behaviour: A critical review of research into the impacts of environmental education initiatives. *Australian Journal of Environmental Education, 20*(2), 41-52.

Greenwood, D. A. (2008). A critical pedagogy of place: From gridlock to parallax. *Environmental Education Research, 14(*3), 336-348.

Gruenewald, D. A., & Smith, G. A. (Eds.). (2008). *Place-based education in the global age: Local diversity*. New York: Lawrence Erlbaum.

Gruenewald, D. A. (2003). The best of both worlds. A critical pedagogy of place. *Educational Researcher, 32*(A), 3-12.

Hetland, L., Winner, E., Veenema, S., & Sheridan, K.M. (2013). *Studio thinking 2: The real benefits of visual arts education*; (2nd. ed.). New York: Teachers College Press

Hord, S.M. & Tobia, E.F. (2012). *Reclaiming our teaching profession: The power of educators learning in community*, New York: Teachers College Press.

Horvath, J.A. (1999). Tacit knowledge in the profession in Sternberg, R.J., & Horvarth, J.A. (Eds). *Tacit knowledge in professional practice.* London: Lawrence Erlbaum Associates, Publishers.

Ingold, T. (2007). Materials against materiality. *Archaeological Dialogues, 14*(1), pp1-16.

Jaquith, D. B. & Hathaway, N. H. (2012). *The learner-directed classroom: Developing creative thinking skills through art*. New York, NY: Teachers College Press.

John, E. (2001). Art and knowledge. In Gaut, B., & Lopes, D.M. (Eds.), *The Routledge companion to aesthetics*, London: Routledge.

Jónsdóttir, Á. (2013). Art and place-based education for the understanding of sustainability. *Education in the North*, *20*(Special Issue), 90-105

Kozak,S. & Elliot, S. (2014). *Connecting the dots: Key strategies that transform learning from environmental education to citizenship and sustainability.* Canada: LSF Retrieved from: http://lsf-lst.ca/media/LSF_Connecting_the_Dots_February2014.pdf

Lotz-Sisitka, H., Wals, A., Kronlid, D., & McGarry, D. (2015). Transformative, transgressive social learning: rethinking higher education pedagogy in times of systemic global dysfunction. *Science Direct, Current Opinion in Environmental Sustainability*, *16*, 73–80

Macdonald, A., & Jónsdóttir, Á. (2014). Participatory Virtues in art education for sustainability. In Jokela, T., & Coutts, G. (Eds). *Relate North, Engagement, Art and Representation.* Rovaniami: Lapland University Press.

Macdonald, A., & Pálsdóttir, A. (2013). Case-based studies: a critical pedagogy of place in international education in Iceland. *Education in the North, 20*(Special Issue), 55-72.

McKeown, R., & Hopkins, C., Rizzi, R. & Chrystalbridge, M. (2002). *The education for sustainable development toolkit*. Knoxville: University of Tennessee. Retrieved from http://www.esdtoolkit.org

Ministry of Education, Science and Culture. (2011). *The Icelandic national curriculum guide for preschool*. Reykjavík: Ministry of Education, Science and Culture.

Mogensen, F., & Schnack, K. (2010). The action competence approach and the 'new' discourses of education for sustainable development, competence and quality criteria. *Environmental Education Research, 16*(1), 59-74.

Nelson, H. (2013). *Testing more, teaching less: What America's obsession with student testing costs in money and lost instructional time.* New York: American Federation of Teachers.

Novitz, D. (1998). Aesthetics and epistemology. In Kelly. M. (Ed). *Encyclopaedia of aesthetics*, Oxford: Oxford University Press.

P21. (Partnership for 21st century learning) (2015). *Framework for 21st century learning.* Retrieved from: http://www.p21.org/our-work/p21-framework

Polanyi, M. (1967*). The tacit dimension*, New York: Anchor Books.

Reid, L. A. (1985). Art and knowledge. *British Journal of Aesthetics, 25*, 115-24.

Ritchart, R., Church, M., & Morrison, K. (2011). *Making thinking visible: How to promote engagement, understanding, and independence for all learners*. San Francisco: Jossey-Bass.

Rittel, H.W.J., & Webber, M.M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, *4*(2), 155–169.

Sergiovanni, T.J. (1992). *Moral leadership: Getting to the heart of school improvement.* San Francisco: Jossey-Bass.

Simmons, N., Barnard, M., & Fennema, W. (2011). Participatory pedagogy: A compass for transformative learning? In *Creative Teaching and Learning: Exploring, Shaping, Knowing.* Retrieved from: http://files.eric.ed.gov/fulltext/EJ1058772.pdf

Singer, S.R. & Macdonald, A. (2016). *Contextualizing learning: Changing and making place*. ActSHEN Project Group. Retrieved from http://blogs.helsinki. fi/action-for-sustainability/

Solorzano, R. (2008). High stakes testing: Issues, implications, and remedies for English language learners. *Review of Educational Research 78*(2), 260-329.

Stevenson, R.B. (2008). A critical pedagogy of place and the critical place(s) of pedagogy. *Environmental Education Research, 14(*3), 353-360

Tiwana, A. (2002). *The Knowledge Management Toolkit, (2nd Ed.)*, Upper Saddle River, NJ: Prentice Hall PTR.

Thompson, P. B. & Whyte, K. P. (2011). What happens to environmental philosophy in a wicked world? *Journal of Agricultural & Environmental Ethics*, *25*(4), 485–498.

UNESCO (2011). *Education for sustainable development, an expert review of processes and learning*. Retrieved from http://unesdoc.unesco.org/ images/0019/001914/191442e.pdf

UNESCO (2005). *United Nations decade of education for sustainable development.* Retrieved from: http://www.unesco.org/new/en/education/

Wakeman, H. (2015). *Power in place-based education: Why a critical pedagogy of place needs to be revived and how narratives or collective biographies support its practice.* University of Wyoming: Wyoming Scholars Repository. Retrieved from: http://repository.uwyo.edu/cgi/viewcontent.cgi?article=1008&context=plan_b

Yin, R.K. (1984). *Case study research, design and methods*. California: Sage.

Young, J. O. (2001). *Art and knowledge*. London: Routledge.