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Changes in Thoughts and Actions as Requirements for a Sustainable Future: A Review of Recent Research on the Finnish Educational System and Sustainable Development

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Abstract

In numerous UN policy documents, a sustainable future through education is set in a key position; the UNESCO Global Action Programme on Education for Sustainable Development (UNESCO, 2018) is no exception. Therefore, it is of great importance to examine and report how different UN member countries work towards the implementation of sustainability at all levels of education. This article is a review of recently published research in Finland, with a focus on sustainability in the educational system. Specifically, the article deals with teacher education, combined with theoretical research around sustainability and systems thinking, to find a pathway forward. The main finding is that higher education in Finland cannot guarantee that student teachers are prepared enough to teach about sustainability. This issue is discussed and addressed in the last part of the article.

Keywords: sustainable development, teacher education, sustainability, Finland, educational system.

Introduction

The second decade of the twentieth century is coming to an end. According to Rosling (2018), the world is a much better place now than 20 years ago, at least in certain areas such as poverty and public health. The line between the east and west is no longer as apparent, nor is the line between north and south or rich and poor. Admittedly, there is still a difference between rich and poor but the proportions and the gap between them is less apparent now than 20 years ago. The largest proportion of the world population today lives in middle-income countries (Rosling et al., 2018). This indicates that the socio-economical part of sustainable development in the world is heading in the right direction. During the last 20 years, public health has improved; child mortality has decreased and the number of children with the possibility to go to school has risen. But there are still areas that need change. Even though poverty has declined, a part of the world population still struggles in their daily lives. More work needs to be done to eradicate poverty (ibid.).

In the latest report from the Intergovernmental Panel on Climate Change (IPCC, 2018), poverty, equity and climate change are discussed as well as the fact that the climate change we are now experiencing will probably exacerbate poverty in the world. Another recently published report on global health and sustainable development by The Lancet Commission (2018) points out that mental health problems have increased all over the world during the last 25 years. During the same period, consumerism has developed as the main focus of societies all over the world (Assadourian, 2013; Bauman, 2007). Although we increasingly consume more to feel well, the interrelation is obviously not that simple (Andersson & Eriksson, 2010). This is a paradox indicating that there must be something wrong in the system. The UNESCO statements below testify about the awareness of this paradox.

"We are faced with a paradox: Is education the problem or the solution in working toward a sustainable future? At current levels of unsustainable practice and over consumption it could be concluded that education is part of the problem. If education is the solution, then it requires a deeper critique and a broader vision for the future." (UNESCO, 2005, p. 59)

Sustainable development can be achieved but technological solutions, political regulations or financial instruments are not enough. Long-term sustainable development can be achieved only if individuals and societies change the way they think and act. Education is key to achieving this transformation (UNESCO, 2017).

These statements from UNESCO are quite clear, education is the key to sustainability. But education might also be a problem in working towards sustainability. That is why it is of great importance to further evaluate education, educational systems and education for sustainable development and deepen the discussions around the problems and possible solutions. As Fedosejeva, Boče, Romanova, Iliško, and Ivanova (2018) argue, there is a need for a holistic understanding of the sustainability phenomenon in order to develop new perspectives in education.

To obtain a view of the situation regarding education in Finland, this article presents a review and summary of recently published research in Finland, with a focus on the implementation of sustainability and climate change education throughout the whole educational system. In addition, research on Nordic student-teachers' knowledge of biodiversity, species identification and sustainability is reviewed to gain a broader picture of the situation. In this way, it is possible to monitor how the implementation of sustainability in the Finnish educational system is progressing.

Research on Different Educational Levels in Finland

The first research to be reviewed concerns two recent Finnish dissertations on the knowledge of ninth graders regarding climate change. The specific aim of the research was to gain a picture of what the pupils have learned during their basic school education system in Finland.

Degerman's (2016) dissertation implies that both Swedish ninth graders and Swedish-Finnish ninth graders possess misconceptions about climate change as a phenomenon, and show inadequate knowledge of the consequences of climate change. Degerman also found that the students have trouble differentiating between climate change and the depletion of the ozone layer. The students appear to learn how climate change affects

animals and plants, but knowledge on how climate change affects humans and health generally is not satisfying. In addition, knowledge on how climate change affects the students themselves was very low. Degerman states that the students do not understand the human role and dependence on nature.

Another Finnish dissertation (Hermans, 2016) shows that both ninth graders and geography teachers need to develop a better understanding of the background to climate change and the consequences it has for their own living environments. Both students and geography teachers believe that climate change does not concern them, since it only affects people in other parts of the world. Hermans (ibid) found that the geography teachers were motivated to teach their students about climate change, but their lack of subject knowledge and lack of time was a barrier to the teaching. Research on the Swedish educational system also indicates that the teachers' lack of expertise and knowledge are barriers for the implementation of education for sustainable development (Borg et al., 2014). Hermans (2016) also emphasizes that increased understanding does not automatically lead to more environmentally-friendly behaviour. Therefore, other components of action competence and transformational learning also need to be considered in teacher education, in-service teacher training and a school's education on climate change.

The above is an indication that Finnish basic school education has not succeeded in implementing education on climate change to the desired extent. In addition, the fact that a very small part of Finnish primary and secondary schools have developed programmes for sustainability (Pathan et al., 2012) can be of concern, particularly when sustainable development was actually included in Finnish basic education already in the year 2001. According to the decree on the national goals of education and the Basic Education Act: "Students are educated to take responsibility and work together and to promote tolerance and trust between human groups, peoples and cultures. The teaching should also support the development of pupils into active members of society, and they are given skills to function in a democratic and equal society and promote sustainable development" (Wolff et al., 2017, p. 5).

As mentioned earlier, research has been conducted in Sweden and Finland on how education for sustainable development has been implemented in the basic school system. The results show that the teachers lack of expertise and knowledge are obstacles for implementation (Borg et al., 2014; Uitto & Saloranta, 2017). According to Wolff et al. (2017), the problem in the Finnish education system is teacher education, which probably also is the situation in Sweden. Therefore, there is a need to do research on student teachers and their knowledge and understanding of sustainable development, sustainability and systems thinking.

Puk and Stibbards (2012) point at the importance of understanding key ecological concepts to develop an understanding of more complex relationships in natural systems and human systems. Systems thinking is a method of holistic thinking and analysis that promotes the understanding of a system's interrelated parts and how different systems work and affect larger systems (Lewis, Manseld, & Baudains, 2014; Sterling, 2003). Palmberg (2012) has summarized several studies that show that students must realize the importance of species identification and have an interest in nature and outdoor experiences to be able to achieve an understanding of environmental issues and a sustainable lifestyle.

Recent research about Nordic student teachers' views on the relationship between species identication, biodiversity and sustainable development (Palmberg et al., 2017; Palmberg, Berg, Jeronen, Kärkkäinen, Norrgård-Sillanpää, Persson, Vilkonis, & Yli-Panula, 2015; Palmberg, Jonsson, Jeronen, & Yli-Panula, 2016) implies that Nordic student teachers possess low levels of ecological knowledge and species identification. The importance of integrating systems thinking into education has been emphasized in order to promote an understanding of the complex nature of sustainability (Hofman-Bergholm, 2018; Palmberg et al., 2017; WWF, 2016; Lewis et al., 2014; Sterling, 2003). However, according to Palmberg et al. (2017), Nordic student teachers do not seem to develop any form of systems thinking during their teacher education. This leads to research around Finnish teacher education.

Hofman (2012) claims that teacher educators in Finland do not understand the connection between the four dimensions of sustainable development, that is they do not connect the political, economic, social, and ecological dimensions to their teaching. One can even discern a tendency towards a negative attitude regarding sustainable development from the Finnish teacher educators. An alarmingly large proportion of teacher educators believe that sustainable development does not affect them or their teaching. Pathan et al. (2012) conducted a survey showing that higher education in Finland cannot guarantee that student teachers are prepared to teach about sustainability. The need for enthusiastic key persons is still obvious if sustainability is to be promoted in higher education in Finland (ibid.).

This leads to the question: What is the problem with Finnish teacher education, a field which is known for its high-performance standards? There are certainly issues that need to be raised if the cause of the problem stems from student teachers not learning how to teach about sustainability during their studies, or failing to develop systems thinking and action competence. Such concerns also apply if the teacher educators themselves do not have the knowledge or interest to teach their students about sustainability.

Why an Exceptionally Good Education Does not Implement Sustainability Successfully

A recently published article, "High Performance Education Fails in Sustainability? A Reflection on Finnish Primary Teacher Education" (Wolff et al., 2017), discusses teacher training in the Nordic countries and especially in Finland. The article identifies five reasons why an exceptionally good education, according to the results of PISA (The Programme for International Student Assessment of OECD), does not successfully integrate sustainability into the education.

These identified issues might also be obstacles for the implementation of sustainability in education or education for sustainable development in other countries as well. To promote quality education and learning for sustainable development at all levels, universities need to overcome these obstacles and become forerunners in the sustainability process (Wolff et al., 2017).

These are five identified issues/obstacles (Wolff et al., 2017): (1) sustainability is in conflict with overall trends in society and politics, (2) teacher education takes place at universities, (3) teacher education is based on separate academic disciplines, (4) sustain-

ability is intricate because it is strongly connected to ecological literacy, and it is (5) value dependent.

Is the paradox with education to be found and solved within these issues? How do we overcome these obstacles so that universities can be forerunners in the sustainability process? These issues will be the focus of the discussion during the following sections of this article. The sections have been divided, based on the identified obstacles mentioned above. After that, one section will be dedicated to a discussion on possible ways to progress forward.

Trends in Society and Politics

According to Wolff et al. (2017), consumerism and mass consumption have grown considerably during the last century. The reasons behind consumerism lie within economies and policies promoting a growing demand for goods during the last decades. This is achieved by policymakers, business leaders and media experts, among others, who have succeeded in shaping values and norms to convince the public that a lifestyle expressed through consumption is the only way to be happy. Today consumerism is a part of human identity (Hamilton, 2010; Wolff et al., 2017). This is the case in large parts of the world. Salīte et al. (2016), for example, mention the rapid transition of Latvia into a market economy during the past 25 years as a step towards unsustainability. Education has also become a consumer good and education in Finland is seen as a tool for the economic success of the country. The competitive attitude, largely based on PISA comparisons, has made education in Finland market oriented (Wolff et al., 2017).

The common way to talk about prosperity is to identify prosperity with consumption and wealth (Andersson & Eriksson, 2010). This means that politics, economics and the competition between countries are big issues in the sustainability discourse (Becker et al., 2015). According to Becker et al., there is an issue in current political and public discussions whenever the preservation of the natural basis of life does not receive enough attention. They (ibid.) declare that today's sustainability discussions place far too much focus on the material claims of current and future generations instead of the natural basis of life. The politics of growth must take a step back in favour of a natural basis of life. Studies across countries show that increases in income per capita and happiness levels are not correlated to any great extent (Eriksson & Andersson, 2010) and as *The Lancet Commission on Global Health and Sustainable Development* points out in a new report: the mental health of the world population is getting worse and worse. To enable a sustainable future, it would be crucial that politicians and the whole of society consider the thought about a prosperity without growth as Jackson (2009) suggested.

While education is a very important way to affect people, a much stronger force is represented by economics. Consumption, production, marketing and economics are among the factors affecting development the most. However, the one factor that can largely control or influence the various areas is politics, since it is in the political arena where decisions affecting society and the environment are made. Thus, it is here where change should take place, and the change requires engaged and informed citizens. A deliberative democracy with engaged citizens participating in societal decision-making is an interesting theory that should be developed and tested in practice. This would be an opportunity to transform today's market economic policies and the values forming them (Speth, 2008).

Teacher Education Takes Place at Universities

In Finland and the other Nordic countries, teacher education takes place at universities. As such, the student teachers become well prepared for their future careers and obtain a high-quality education. The problem in Finland, however, is that the universities are autonomous and can decide for themselves where to focus within the education. This means that the leaders of universities will play a major role if education for sustainable development is to be implemented within teacher education in Finland (Wolff et al., 2017; Hofman-Bergholm, 2018).

According to Wolff et al. (2017), Finnish universities have adopted the same values as the business sector. These business ideologies have changed the rhetoric around education, which is now seen as a sales product. This market-oriented agenda stands in conflict with the idea of educating future teachers about sustainability. A lack of time for deeper discussions that are needed to grasp the content of sustainability is also a problem at the teacher-student level. Even though the Finnish teacher education is research based, it is not focused on development or adjustment and it has no critical shade that would be necessary in discussions about unsustainability (ibid.).

The fact that teacher education takes place at universities is not a bad thing in itself. The education is highly respected and in Finland the teachers are very well educated. Moreover, teacher education in Finland is popular and only the best students are chosen to become teachers. The problem lies with the universities' lack of a critical attitude towards the social discourse surrounding sustainability.

Teacher Education Based on Separate Academic Disciplines

Universities have been shown to be conservative institutions with strong subject orientations, where interdisciplinary research is still seen as challenging (Wolff et al., 2017; Christie et al., 2013). The complexity and interdisciplinary nature of sustainability makes it very hard to implement in higher education teaching. Teacher education in Finland is based on separate academic disciplines and a traditional school curriculum. This is problematic regarding the importance of a holistic understanding of sustainability in order to develop new perspectives in education (Fedosejeva et al., 2018). The traditional curricula will need reorganization if sustainability is to be seen more as a process rather than a content. In Finland, it is quite common that sustainability issues have been passed to science teachers in biology and geography. Still, the last core curriculum for basic education stresses interdisciplinary teaching and learning to a much greater extent than earlier curricula (Wolff et al., 2017).

It is good that the core curriculum highlights and emphasizes sustainability issues, but that does not overcome the problem of a slow adjustment within teacher education. A strong and motivated leadership working towards implementing sustainability in the universities, and especially in teacher education, is needed to overcome these obstacles in a drive for sustainability.

Sustainability is Intricate

Sustainable development or sustainability is not just an environmental issue. It is a multifaceted interdisciplinary concept which affects our future by including cultural,

social, economic, political and ecological aspects in a complex interplay. These different aspects of sustainable development are interwoven and cannot contribute to the achievement of sustainable development alone. Tackling climate change and cutting emissions is a part of sustainability, as is poverty and equity. Alongside this, there are also other issues, such as economic interests and political interests, that make the topic of sustainability more complicated (McKeown & Hopkins, 2003; Winter & Firth, 2007; Savage, 2006).

Even though the gap between rich and poor is slowly fading (Rosling, 2018), an environmental knowledge gap still exists that makes sustainability less graspable. Ecological literacy is important to bridge this gap, as is a holistic way of thinking and systems thinking (Fedosejeva et al., 2018; Palmberg et al., 2017; Hofman, 2015; Puk & Stibbards, 2012). Here is one example of the intricate nature of sustainability and how systems thinking presents ecological, economic and social aspects as a whole: Emissions of carbon dioxide into the atmosphere result in temperature rises. Temperature rises affect the nature, biodiversity and species. This is seen as flooding and raised sea levels in some areas, and drought in other areas. In the areas affected by drought, the land will become useless, while the water in the oceans will become more acidic, affecting fishermen. As the water temperature rises, devastating storms and hurricanes will become more common. Another consequence of rising temperatures rarely considered concerns life-threatening diseases, such as malaria and dengue fever, which will become more prevalent. In the future, battles over water and cultivation fields will probably be more common, and a consequence of this will be a rise in poverty (Meyer, 2009; Speth, 2008).

As mentioned earlier, one of the main obstacles for implementing sustainability in teacher education is the fact that it is an intricate topic that needs an interdisciplinary approach as well as a developed form of systems thinking that is not possible in a conservative institution (Hofman-Bergholm, 2018). The institutions conducting teacher education need an organizational and substantive change to meet the need for the interdisciplinary work necessary to promote sustainability (ibid.). As Fedosejeva et al. (2018) state, the new generation growing up during the technology age is completely different from earlier generations and they have a completely different perception of the world. This highlights the need for a complete re-organization of the study environment in order to develop critical thinking and creativity among the youth of tomorrow. This will allow them to manage in a culture that is different and unknown to the one we know today (ibid.). The re-organization of teacher education is crucial to cater for this new study environment.

Value Dependent

One must develop an understanding of nature in order to value and care for it properly. It then becomes possible to evaluate how individual actions affect the nature and the whole social system (Grunewald, 2003). In the process of developing both sustainable development and action competence, reflection over personal values and critical thinking is important. The youth need to clarify their own values in the process in order to challenge the prevailing norms and political decisions leading to unsustainability. They need to develop critical thinking to question how society affects the process and, perhaps most importantly, to understand the cause of the current problems and provide a possible solution to these problems (Blewitt, 2008; Gruenewald, 2003).

Sustainability education requires opportunities for ethical deliberation and value discussions among the students in order to clarify different sets of values, ethics and morals. This will allow students to learn that there are a lot of different ways to approach problems, and that what seems right from one aspect might seem wrong from another. According to Palmberg et al. (2017), teacher education programmes should include such a form of systems thinking that is based on critical thinking, negotiation and action competence. Sustainability cannot be taught without involving systems thinking. Moreover, systems thinking needs to be incorporated within teacher education, because there is a necessity to develop an educational programme that provides individuals with knowledge on how different actions and choices affect the whole society (Hofman, 2015).

When people learn how their different actions affect systems, their values, ethics and morals become important factors in developing sustainability. Systems thinking starts to be raised by different stakeholders working for a sustainable future. For example, in the WWF "Living Planet Report 2016. Risk and resilience", systems thinking is mentioned as an important way to help us understand the underlying causes of unsustainable development. Scientists are working on developing a kind of "Earth system perspective" tool for humans to see and understand the complex relationships between human actions and global impacts affecting the natural state of the planet. This "Earth system perspective" could help us to understand how actions and local changes affect different systems (WWF, 2016).

Pedagogical Implications, Some Concrete Suggestions for Implementation

It has now passed several years since the UN Decade of Education for Sustainable Development (2005–2014). Still, the universities providing teacher education in Finland are in no rush to integrate sustainability within their teacher education. The foremost obstacles preventing this are the intricate nature of sustainability (Wolff et al., 2017), lack of time (Borg et al., 2014; Uitto & Saloranta, 2017), expertise (ibid.) and the issue of separate academic disciplines within teacher education (Wolff et al., 2017; Christie et al., 2013). These are the organizational problems that teacher education in Finland needs to overcome, albeit this is probably also the case in other countries' teacher education. The pedagogical implications are that the education for sustainable development has moved from the content of the education towards the importance of the process, i.e. that the education should be pupil centred to help them develop the student skills necessary to act in a changing society. This means that the subject content in the core curriculum should receive less attention and the teachers' pedagogical skills and pedagogical tools must be upgraded.

A complete reorganization of teacher education is crucial in order to overcome the obstacles preventing the implementation of sustainability in teacher education (Hofman-Bergholm, 2018). But as re-organizations are often slow in nature, one possible way to kick-start the change is to create a palette of obligatory courses for every student teacher in Finland. These courses could, for example, be: (1) *Concepts of sustainability*, (2) *ecological economics* dealing with consumerism, growth and justice; (3) *critical systems thinking* to develop action competence and (4) a course in basic ecology. This could be a pathway to developing the necessary skills and abilities within student teachers, which

would allow them to develop a comprehensive understanding of the complexity of social systems and how different systems interplay with nature. Nevertheless, a complete reorganization of the teacher education is necessary in order to address the sustainability issues in the long run. In a recent article, Hofman-Bergholm (2018) provides some suggestions on how such reorganization could be done in both countries where teacher education is governmentally regulated as well as in countries where it is autonomous.

In countries where teacher education institutions are not autonomous, the government could intervene and through regulations compel the organizational changes required. In countries where teacher education institutions are autonomous, the change is dependent on university leaders' interests in the issue (Hofman-Bergholm, 2018; Wolff et al., 2017). Here, the countries' Ministry of Education plays a major role because, at least in Finland, there are performance agreements between the Ministry of Education and the teacher education institutions, which means that the Ministry of Education has a chance to exert some pressure on the teacher education institution, if the will exists (Hofman-Bergholm, 2018). The Ministry of Education should also gather all the leaders of teacher education institutions in order to educate the leaders in sustainability issues, education for sustainable development and systems thinking. The goal is to kindle the leaders' interests to these issues in order to promote reorganization (ibid.).

Conclusion

Sustainable development, social justice, global warming and climate change are all linked in different ways. And within these different concepts we have economic values, politics, education and knowledge. The main link between these concepts might be their connection to nature and how the ecosystems we all need, and are dependent on, are affected by our actions and choices. If we could learn to understand the nature a little bit better and realise how our choices and actions affect the systems in our environment and society, would we then act differently? The Finnish educational system has failed to develop the students' understanding of the human role and dependence on nature (Degerman, 2016). Nevertheless, education plays a major role in developing the kind of systemic understanding and systems thinking required to comprehend the intricate connections in sustainable development.

Education is the main key to changing people's unsustainable lifestyles. Through education we need to teach a way of systems thinking that every member of society can understand. They can then realise how their choices affect the whole of their society or the entire planet. Nonetheless, the intricate nature of sustainability requires a lot of knowledge among teachers, as is systems thinking education. That is why teacher education becomes a crucial component for our sustainable future. All newly qualified teachers should be educated in sustainability and systems thinking. However, according to Wolff et al. (2017), that is not the situation now. Moreover, as this research implies, a complete reorganization of teacher education is crucial in the work towards sustainability. Here, governments and ministries of education are important actors to promote change. Likewise, the UN could also step in and exert more pressure on member countries to reorganize their teacher education.

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