Application of the systems educational model to sustainable education

Abstract

In the theories of sustainable development and sustainable teacher education certain principles are established and accepted. These principles include, for instance, a holistic understanding and systems thinking. The general systems model of educational thinking in early childhood education and preschool has been created by Härkönen (2003a) on the basis of several historically valued pedagogical theories. The main features of this model are a holistic view of the whole pedagogical phenomenon and the systems linkages between the parts and the whole of the mentioned phenomenon. It has earlier been pointed out how this model can be applied to early childhood work education (WESD) (Härkönen, 2004). In this presentation it will theoretically be proven how the general systems model of early childhood education and preschool thinking can be applied to sustainable teacher education and sustainable development.

The article is based on a power point presentation in the fifth international JTET conference in Debrecen, Hungary, May 30 - June 2, 2007. The former presentation and this article are a beginning of the entire process for creating an application of the said systems educational model to sustainable teacher education and sustainable development. The process will be continued for the next conference until which also this article will be created in a new and larger form.

Key words: early childhood education, preschool, sustainable teacher education, sustainable development, systems thinking in education
Holistic and systems thinking

Sustainable development means ecological, social, cultural and economic sustainability, all of which rest upon the knowledge, skills and values that support them. Agenda 21 (Chapter 36) points out the importance of education and training for sustainable development. According to it the countries and educational institutions should integrate environmental and developmental issues into the current training curricula and promote the exchange of their methodologies and evaluations. Educational and pedagogical theories, theoretical models and curriculums should have a connection to the goals of sustainable development of the society. (Härkönen, 2006: 103.)

In the theories of sustainable development and sustainable teacher education certain central principles are established and accepted. The principles include, for instance, a holistic understanding and systems thinking. (Härkönen & Jämsä, 2005.)

Snook (2005) has thought about holism. He says: “My definition of Holistic Learning involves looking at the whole system of learning processes within an organization rather than just concentrating on individual components or modes of delivery. This overall result can actually be greater than the sum of the individual parts, thanks to the efficiencies offered by a well-designed system.”

The holistic approach is contained in the focus on the openness and wholeness of the systems approach. The holistic approach is, though, older. Its roots are in the German gestalt psychology of the 2nd decade of the 20th century (Wolfgang Köhler and others). It is said that the Gestalts are cognitive patterns: 'The whole is more than the sum of its parts.' (Härkönen & Jämsä, 2005.)

Jan Smuts (1870–1950) was a South African. He was a statesman, soldier (general), naturalist and philosopher. According to him, holism (< Gr. holon 'entity') is the idea that the properties of a system cannot be determined or explained by the sum of its components alone. Holism and holistic are terms coined by Jan Smuts in his book 'Holism and Evolution' (1926). According to Smuts' definition of holism (cf. in particular the introducing Chapter 5 to holism, Smuts 1926: 85–117) there is the tendency in nature to form wholes, which are greater than the sum of their parts, through creative evolution. (Härkönen & Jämsä, 2005.)
The phenomena such as life, mind and conscience only arise in systems. This means these things cannot be explained by the study of nerves, cells or atoms. One theory of holism is based on the hypothesis that nature consists of a hierarchy of "wholes" (also called holons, a term created by Arthur Koestler). These wholes are quarks, protons, atoms, molecules, minerals, cells, tissues, organisms and populations. Holism also means that an object or a system can be recognised as a type, only with a few well-chosen characteristics. Hence, it is the basis of conceptual filtering and classification or typology. (Härkönen & Jämsä, 2006, 54-55.)

Rapoport (1968: 452-453) describes the development of the general systems theory and concludes that the definition of a system should also include other things beyond physical properties (e.g. the language). Chang-Gen (1990: 101) has established theoretical orientations in a way of true systems classification as the natural, social and thinking systems categories on the one hand and on the other, in classifying mathematical models – as the open and closed system and linear and non-linear system categories. Parson (1968: 458) states that methodologically a theoretical system should be set apart from an empirical system. A theoretical system is an entity consisting of suppositions, ideas and concepts that have a logical way of integration and an empirical referential framework. An empirical system is the wholeness of the phenomena of the conceivable world that can be analyzed and pictured by applying theoretical systems. A social system as a theoretical system is suitable for describing and analyzing social inter-action that in its turn is treated as a class of an empirical system. Action has sub-systems, and the cultural system is one of them. It includes the language, communication, beliefs and ideas. Gochman (1968: 489) writes about a concrete and abstract conceptual system. The concepts point to “…an individual’s set (standardized) of evaluative likings in regard to the specific aspects of the external world... The concept is a system of organization. --- One single concept never functions independent from others. A person’s system of concepts establishes itself in accordance with the person’s self.”
Applications of systems thinking

The systems definitions have drawn attention to the systems properties of human thinking, language and concepts. Such approach is needed in evaluating the sustainable education theoretical thinking models. A closer insight into the connections between the theoretical and the practical systems is also needed (Checkland, 1981).

The field of systems theory has been developed in recent years to tackle a wide range of issues based on holistic concepts (Härkönen & Jämsä, 2006: 54).

The author has worked for long on shaping a new approach to the educational model and theory of early childhood education. Härkönen studied the educational ideas of several philosopher-pedagogues like Johann Heinrich Pestalozzi (1746-1827), Friedrich Froebel (1782-1852), Rudolf Steiner (1861-1925), John Dewey (1859-1952), Georg Kerschensteiner (1854-1932), Maria Montessori (1870-1952), Helen Parkhurst (1887-1959), Célestin Freinet (1896-1966), Vasili Suchomlinsky (1918-1970), Alexander Neill (1883-1973), Loris Malaguzzi (1920-1994), Paulo Freire (1921-1997) and others. Historically the study covers the period of time from the 18th century to our days. (Härkönen, 2003a: 30, 2003b.)

The philosophers-pedagogues have outlined the contents of their educational thinking in written form in numerous works. Researchers and educators have later given their evaluations of these ideas. By analyzing the texts of these pedagogues Härkönen first conceived a model for each idea and then generated a common model for all these ideas. There are three important features inside every model. The models have same categories, while the systems nature is inherent in every model and every model is a thinking model. After all these findings it became evident that a general educational model can be established. The name given by Härkönen (2003a: 31) to this model is the general systems model of educational thinking in early childhood and preschool education (Figure 1). This model does not represent the educational thinking of anyone single person but the concept view allows to call for anybody’s ideas or to create new ideas, philosophies and theories. The main features of this model are the holistic view on the whole pedagogical phenomenon and the systems linkages between the parts and the whole of the said phenomenon.
The author has already applied the general systems model of educational thinking to early childhood and preschool education while studying the interconnections of work education, environmental education and sustainable development in curricula (Härkönen, 2004: 26-42). The results of the analysis of the texts point out that the generally accepted values like global viability, caring for the nature and the environment as well the humans’ welfare and good life are the highest goals for sustainable development. Environmental education is the pivotal orientation area, the content area and the subject that all together are used to reach the goals. Work education is a method well suited for these principles. Work education allows to study the content of environmental education from the point of view of reaching the goals of sustainable development. Work education is an intermediary link between environmental education and sustainable development. While in small children’s education an activity is utterly important and necessary, the process should be looked at from the work education point of view. Seen from this point of view, work education supports sustainable development (WESD). Regarding the systems theory the results show that the systems theory based educational thinking model allows to specify the inter-relations between sustainable development, environmental education and work education as a system.

In the author’s mind it is easier to see the connections between environmental education and sustainable development, for instance, with work education and even with children’s play and games, with daily basic activities, with teaching and with outdoor education, than the connections between some other subjects of instruction and sustainable development. The principles and aims of sustainable development have usually and originally been stated as nature-based. And nature has been understood to mean environmental issues apart from the human being, while the human being has been approached as a biological system. But what do the thoughts, feelings, meanings, hopes, beliefs and health, other than environmental knowledge, or understanding, different activities, caring, educating and instructing a child mean in these processes?

As a member of a closely integrated teacher education department the author has noticed that every teacher conducts his or her own segment of teaching separate from other colleagues. There are teachers who are interested in sustainable development and its
applications, but there are many people who do not care about these things at all. There are not such general holistic views that everybody must follow.

In this presentation it will be theoretically analyzed, how the general systems model of educational thinking in early childhood and preschool education can be applied to sustainable teacher education and sustainable development, what problems may arise, and is it possible at all? What kind of problems can this model reveal in teacher education? The method here is built on theoretical reasoning and applying theoretical knowledge and principles.

General systems model for teacher education and sustainable development

It is understood here that the categories of Figure 1 are included in teacher education and describe the curriculum in its main parts. Further on certain categories are scrutinized in an exemplary way.

Views on world, that are strongly underlined in education, should promote an approach favourable for realization of the principles of sustainable development. The world is a system. Maintaining life and global viability should be treated as the highest goals. This approach is characteristic for an ideal world view. Scientific holism or systemism or integrativism represents a recommendable view of the world. (Uosukainen, 2002; Åhlberg, 1998; Äänismaa, 2002: 17-32).

Views on society. Sustainable development rests upon the vision of a democratic society. Taking into consideration the views of different people is related to the issue of multiple values. Approving of multiple values, tolerance, ethical ideals such as justice, freedom, emancipation democracy, non-violance and pluralism are the values at stake. A democratic and equality-based way of acting is also the goal of today’s educational curricula. The society is seen as a learning society. The field is rich in problems because an individual usually believes in the rightness, truthfulness and superiority of one’s own views. (Härkönen, 2006: 103, Kanpol, 1999: 27.)
Figure 1. General systems model of early childhood education and preschool thinking
According to a sustainable approach, the views on the human being and the child, people should take care of nature and the environment, of human welfare and good life. The human being has an inner striving for sustainable development. Loving one’s work and taking it close to one’s heart is an integral part of good life. Taking emotions into account and showing caring affection are significant conditions for good life (Åhlberg, 1998: 33-35). Learning processes should be seen as holistic (Snook, 2005), while thinking, concepts and languages as systems (Rapoport, Parsons, Chang Gen, Gochman). Åhlberg (1998: 89) speaks up for high quality learning, meaning the kind of learning that is fun, goes into depths, reaches out for something new, teaches responsibility and supports one’s own learning.

A difficulty, to the author’s mind, may hide, for example, in the fact that a human being only learns bit by bit and the depth of learning is always unaccomplished. Though we have education and learning processes human beings have also destructive behaviour.

The views on knowledge mean that a human being constructs knowledge. The human being constructs the conceptual maps of the world, the models for thinking and acting. The attitude to knowledge should be holistic and there should be a striving towards acquiring the kind of knowledge that supports sustainable knowledge. Integrated knowledge is the issue of the day. As well as it is urgent to have knowledge emanating from natural sciences. All knowledge is still seen just as a beginning of the knowledge society.

In his views on education, Åhlberg (1998: 14-59) puts forward the theory of consolidating (harmonizing) education that builds on the consolidating interest for knowledge that is aimed at aspiring for wisdom that in its turn allows to understand the deeper inter-dependencies that furthermore promote the good life. Education includes in itself the function of self-education and the notion of taking responsibility for that. Åhlberg (1998: 60-89) is also a proponent for a continuous improvement of quality that calls for an incessant critical survey aimed at improving the quality of all activities.

The views on goals, views on subjects and views on methods: now only one example is taken into account, it is the subject of the language and the interaction in the Core Curriculum for Preschool Education in Finland, 2000: 11). Reunamo and Nurmilaakso (2006: 188-200) have studied, how the teachers see the role of language in
preschool and how the teachers’ views relate to sustainable development. The results show that the teachers see the language and the interaction as a cognitive activity, not as a part of routine in everyday preschool functioning. The teaching methods that are oriented towards the acquisition of knowledge create a consumer attitude and limit the discovery of the real world and the requirements for changes, thereby they do not further the education for sustainable development. (p. 198). In Finland preschool educators value highly the environmental objectives, but there seems to be a tendency that the educators who are enthusiastic about the new preschool curriculum are more interested in the language as an individual development and less interested in fostering sustainable development. There is also a danger that the language is in preschool regarded as an independent subject without connections to sustainable development. (p. 198). While concentrating on the development of children’s linguistic abilities, we neglect the connections between the language and a cultural evolution. The language is, however, the main tool as we create the new patterns of behaviour of the individuals, the groups and the society as a whole towards the environment (United Nations, 1996; Ojala, Karevaara & Reunamo, 2004; Reunamo & Nurmilaakso, 2006: 199).

The conclusions about the teachers’ attitudes and methods show that the subject field of language and interaction does not promote the education for sustainable development. In my mind the issue may be the same with other subjects, too. Perhaps, the environment and natural history bring ideas of sustainability into the teachers’ minds. But what is the situation, for instance, in mathematics, physical and motor development, where developmental things easily full a teacher’s mind, we do not know.

According to the systems model of educational thinking also other subjects of the curriculums, all the method supposed or possible, and also both the learning environments and materials and the interaction between teachers and children, can be analyzed and created. These issues belong inside every category.

This example leads to the issue of the basis of science. In teacher education, especially in early childhood teacher education, developmental and psychological theories are a more general than the ones related to environmental, societal, natural sciences or educational and pedagogical sciences. Theories can also influence the views
on the pedagogical process of early childhood education. The aims are part of the whole educational system.

If there is no knowledge about the connections between subjects, methods, goals and sustainable aims, the educational system is not holistic enough. In figure 1 the lines between the categories show the connections of the categories and their contents. These lines are not arrows, they are linkage lines which show all possible motions both to-and-fro, backward and forward and up-and-down.

Without knowing the sustainability aims a teacher can only plan separate parts that do not relate to any other structure of the system. Many problems begin to appear at that point.

Sustainability as the highest aim

How in reality could sustainability become the most important aim of teacher education? The more general principles of the teacher education curriculum are not tightly related to the goals of sustainable development, they are at best just a part of a bigger bundle. Not all teachers are even supposed to be familiar with them, let alone follow them. The subjects that are taught lead the teachers to use a widest spectrum of teaching practices. In relation to one’s own subject a teacher most often omits any talk of sustainable development. The studies made by students are usually quite far away from the principles of sustainable development. Not all students are even interested in the principles of sustainable development, they have no notion of their personal responsibility that might fall on their shoulders. Of course, some are responsible but some are not. What is the share of an individual? What are the limits of common responsibility that must be followed? And how will it all become realized?
References:


