

APPLYING THE PRINCIPLE OF SUSTAINABILITY OF EDUCATION TO THE CURRICULA OF THE ELEMENTARY STAGES OF EDUCATION IN ESTONIA

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Abstract

Sustainable education is a multi-level process, which bears humanistic values in today's and tomorrow's society and which is achieved through a long-term development process, where acquiring practical skills is in compliance with the theoretical self-concept and the concept of the whole surrounding environment. This principle is the basis for the objectives and competences formulated in curricula of pre-school education and primary education. The stronger is the connection between the two stages of education, the more sustainable is transition from kindergarten to school. However, in practical education we often experience something else. Therefore, the following questions need to be answered: To what extent does today's education take into account regularities of children's development? How is the sustainability of the objectives of the curricula of pre-school and primary education guaranteed? The aim is to give a survey on school readiness of children at school entry in different counties of Estonia and the children's achievements at the end of the first stage of their studies.

Methods. The research data have been collected in the framework of the ETF grant "Efficiency of pre-school education and its sustainable development in basic schools in four counties (Saare, Järva, Võru and East-Viru County)"; in 2005 data were collected in pre-school child care institutions, and in 2006-2008 in grades 1-3. This is a longitudinal study, which analyses the development of the same children from their last year at kindergarten up to the end of the third year at school. Children's coping was assessed by their teacher in five point scale in nine different target fields.

The research results showed that according to their teachers, children were well prepared for school in respect to different subjects, but there were several shortcomings in social skills, in their positive self-concept, and in the formation of abilities to learn.

Key words: *sustainable development of a child, curriculum, educational opportunities.*

Introduction

The fundamental issues of the present article are as follows: a) how pre-school and primary school teachers assess the achievement of educational objectives prior to school entry and in practical schooling and educational process during the first three years at school, and b) how sustainable the development of children at the first stages of education is. The studies conducted in Estonia show that in practical educational situations, the principle of sustainability is often disregarded. Therefore the following questions need to be answered: *To what extent does today's*

education take into account regularities of children's development? How is the sustainability of the objectives of curricula of pre-school and primary education guaranteed? The aim is to give an overview of school readiness of children at school entry in different counties of Estonia and their achievements at the end of the first stage of their studies.

The Conceptual Bases of Education in Estonia

A key factor of the sustainability of the society is sustainable education as a multi-level phenomenon, which starts at pre-school age and continues through life-long learning on different levels of education and in different forms of study. The principle of sustainability contains humanistic values, which emphasise the personality of a child and his/her developmental potential, concurrently providing for its consistency. Hence the need to go deep into the processes, during which education is acquired, or the implications formed by common everyday experience in the educational institutions, which provide children with experience which is the basis of their coping (Kuurme, 2008). Thus, the sustainable education links being a human with the welfare of the natural and cultural environment, expanding the dimensions of education from individual-centred self-realisation to the perception of the existential relation with everything existing in a more global way (Kuurme, 2008; *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability, 2005*; the research and development and innovation strategy of Estonia "Knowledge-based Estonia 2007-2013", 2007). This principle has briefly been formulated also in the *Republic of Estonia Education Act* (2006), which sets goals to raise people who respect and observe laws, and to create possibilities for lifelong learning for each individual. Achieving these goals presupposes providing favourable conditions for the development of individuals, family, Estonian nation, and national minorities, in order to guarantee the development of economics, politics, cultural life, and nature conservation of the society of Estonia in the global context. The former includes the tendency of the education in Estonia to obtain knowledge about more open and broader world and to participate in it.

According to J. Naisbitt, the global level of education can be characterised by ten trends: information society, high-tech world, global economy, strategic planning, transition from centralisation to decentralisation, transition from institutional help to self-help, moving towards participatory democracy, networking, plurality of choices, demographic processes (Niinistö, 2000). But according to Giddens, the dimensions of the globalisation are as follows: neo-capitalist global economy, international labour distribution, nation state, military order of the world (Leinster, 2003: 113). Ecological sustainable development is gaining importance. This means that in new circumstances, approaches to knowledge and to acquiring them have to change; these needs for changes have been formulated by V.-R. Ruus (2008) as an educational policy vision: The state of human development in Estonia is considerably worse than it was in the mid-1990s; the innovation system of Estonia has lagged behind the development needs; the creation of collective knowledge is insufficient; only approximately 1/3 of the companies are capable of changing (the need to change is not realised); the qualification, work culture and ethics of employees are low; cooperation between companies and with the state, and the joint use of resources are insufficient; the foreign markets oriented competitive ability of Estonia is relatively low; there is an increasing need for workers of the third level of education and post-secondary education, which means innovation and globalisation for a competitive economy.

In today's world, where the economic crises has become global and which faces an increasing threat that resources will be wasted to improve the current situation, the sustainable education and the lifestyle that spares human and natural resources is becoming ever more important. The objectives and strategies of education and the future society of Estonia have been reflected in several important documents relating these to the globally accepted developmental trends. Although Estonia does not have any educational strategy at the moment accepted at the national level, the new educational paradigm is represented by the document „*Õpi-Eesti*” (2005), the central principle of which is the transition from passive acquisition to orienting in the knowledge and using them, to teaching learning and to creating knowledge in the process of study. This means a general change in the meaning of education, where along with the traditional learning

methods children have a chance to create a complete image of the world and to acquire ready-to-use skills. The education has to be an effective relationship with the real life that is measurable on several levels and which bears significant information and has holistic character. Thus, the functions of education should be the formation of an adequate self-concept and world image by an individual; development the subjectivity of self-education; ethical valuation of relationships between the self and the world; orienting in the world and within the complicated self, and acquiring competence to cope in personal as well as in work life – the recurring principle here is socialising the individual (Türnpuu, 1994; Foshay, 2000: 78). The above is also stated by the *Development plan for the Comprehensive Education System in Estonia* (2007) as a principle that the future of Estonia, the coping and the complacency of members of the society are highly dependent on the educational level of each individual. By the present moment, documents have been drawn up for carrying out systematic changes in the education system of Estonia, which support the principles described above, such as “The Strategy of *Teacher Training in Estonia for 2009-2013*” (2008), “*Pre-school Child Care Institution Act*” (2008). In cooperation with the specialists in the respective fields, the strategic documents supporting the development of the educational system have been included in the development plans and strategies of the related fields, such as national strategy on sustainable development “*Sustainable Estonia 21*” (2005), “*Strategy to Guarantee the Rights of the Child*” (2007), “*Estonian Human Development Report 2007*” (2008), document by UNESCO “Education for All”, the *Lisbon Strategy*, the European Union’s programme “*Education and Training 2010*”, “*European strategy for child and adolescent health and development*” (WHO 2005). This process is difficult due to the vast information burst in the present information society, which in a democratic society means that there is a plurality of opinions and truths, which causes doubts in the truth, values and reality bringing along disagreements and inside splitting (Ruus, 2000: 69), which in its turn presupposes more cooperation, negotiations, discussions, initiative, agreements, and individual responsibility, thus making it difficult to create a whole. Integration within the European Union creates possibilities for *openness and flexibility* in exchanging direct information and experience between teachers and students, between students, and between officials (“*Development plan for the Comprehensive Education System in Estonia*” (2007)). The whole process of changes in comprehensive schools is supported by the national curricula.

The Bases of the Curricula of Estonia

The changing world calls for updating the curricula. A curriculum as a discourse implicitly embodies social developments and explicitly is the bearer of the educational philosophy formed by the influence of these developments (Kuusk, 2004: 8). The reference system of the up-to-date curriculum is the global level of education discussed above.

One of the key issues in drawing up a curriculum is the problem, around which it is to be formed; whether 1) around subjects based on scientific disciplines, 2) around important social problems, 3) around students’ interests and development (Kelly, 2006). Whereas in the definitions of a curriculum, theorists’ viewpoints are very different and there is no one simple definition, then different aspects have been proceeded from. The problem is even more complicated due to the fact that a curriculum exists on three levels: 1) a curriculum designed for students; 2) a curriculum delivered to students; 3) a curriculum acquired, experienced by students (Prideaux, 2003: 268). In the plurality of opinions expressed by curriculum theorists there is an old contradiction between theory and practice (Klein 1992: 191), although the most significant keywords in their approaches are similar: a curriculum as a means of creating discipline, as a plan of the content of teaching, as a programme of school life, as a learning plan, as learning experience and intended study results, as way of thinking derived from human experience (Connelly & Lantz 1991: 15; Kelly, 2006).

Drawing up a curriculum is a long-term process and it comprises many different aspects (Taba 1962; Läänemets 2004). Taking into account general educational trends, up-to-date curricula are characterised on the philosophical, political, and social levels (Kelly 2006, Ruus, 2003). Basing on the analysis of different curriculum theorists’ models of curricula, three main bases can be distinguished: *knowledge* (wisdom, culture), *society* (economics, work life, political life, technology,

etc) and *personal development needs, necessary competences for coping with life* (knowledge, skills, experience, proficiencies, attitudes, etc) (Taba, 1962: 2; Short, 2001; Ruus, 1997: 61), which serve as the basis of the value of a curriculum (McCutcheon, 2001). Drawing up a curriculum also has three important and greater stages: 1) setting the objectives and designing the programme, determining the learning needs, formulating the objectives, choosing and organising the content, planning teaching procedures, acquiring knowledge, and experiencing attitudes and values; 2) carrying out teaching; 3) results and assessment (Jarvis, 1998; Läänemets, 2004; Pinar, 2006). In practice there is no model that is based on one single principle and most of the designed curricula are of hybrid nature, including fragments from different types of curricula (Kuusk, 2004: 27).

In Estonia the development of the curriculum has been eclectic. The framework curriculum for pre-school education effective since year 1999 has been amended and at the moment, child care institutions proceed from the “*National Curriculum for Pre-school Child Care Institutions*” (2008) in their work. The national curriculum for basic schools and upper secondary schools has been in force since 2002 (*National Curriculum for Basic and Secondary Schools*, 2002) and it is obvious that changes are inevitable and necessary. Actually, the discussions for amending the curriculum started already 5 years ago, but as for many years there has not been any clear strategy for an educational policy, several versions of the curriculum have been prepared that have stayed on the discussion level. Thus, I can discuss only the principles of the effective curriculum.

Both the *National Curriculum for Pre-school Child Care Institutions* (2008) and the *National Curriculum for Basic and Secondary Schools* (2002) attach great value to the integrity of the development of an individual, to the formation of his/her responsibility for the course of life, as well as to learning how to study and cooperate, to manners and ethicality, lifelong learning, the development of civil society (Kala, 2009: 5-8; RÖK, 2002: 870-871). Hence, in case of Estonia we can talk about core curricula, which are based on vitality through competence studies.

Methodology of Research

The basis for assessing children’s learning skills and development at kindergarten and at the first stage at school was the questionnaire *Assessing Children’s Learning and Development*, compiled by researchers from the University of Helsinki J. Hytönen and L. Krokfors (Hytönen&Krokfors, 2002). This is a longitudinal study and all the data have been collected within four years (2005-2008), i.e. at four stages in four counties of Estonia: Järva, East-Viru, Võru, and Saare Counties, and it examines the same children from leaving kindergarten until the end of grade 3. The questionnaire proceeds from the material compiled by the Finnish researchers and has been adapted by Estonian educationists to meet the schooling and educational requirements prescribed by the *Framework Curriculum for Pre-School Education (1999)* (for the questionnaire used in kindergartens) and the *National Curriculum for Basic Schools and Secondary Schools (2002)* (for the questionnaire used in grades 1-3). The present article explains the level of achieving educational objectives, based on teachers’ assessments collected in the framework of the study.

Since the participation in the study was voluntary for schools and kindergartens, as well as for children, the number of children in the study decreased considerably over the years. Only the data about those children, who participated in the study from the beginning until the end are included in the present article. The final sample consisted of 288 children.

The sample consisted of children from every childcare institution in the counties participating in the study, six children from each pre-school group. The children were chosen by random sampling and their coping was assessed by their teacher in nine target areas: leaning to study, social skills, language and communication, mathematics, ethics and world view, science and the environment, health, physical and motor development, art and culture. Teachers assessed children in a five point scale (1= weak; 3= average; 5= excellent).

On the school level, class teachers assessed the coping of the children, who had participated in the kindergarten survey. Class teachers assessed children’s individual achievements in nine target areas: educational objectives, mother tongue, mathematics, ethics and worldview, music, art, handicraft, and physical education. Class teachers assessed children in a five-point scale (1= weak; 3= average; 5= excellent).

Processing the data, computer statistical programme SPSS was used. First, the descriptive statistics compares the averages of the studied target areas at kindergarten and in grades 1, 2, and 3, and next, the differences in the averages of achievements in these areas are analysed by counties. The differences in the achievements in the given target areas are also analysed about boys and girls. Finally, through statistical differences and manifested connections, the analysis focuses on learning capabilities and coping during the four periods of study.

While analysing the data, first the average results or characteristics of descriptive statistics were used. The relations between the averages of different target areas were studied by Pearson's correlation analysis. Statistically significant differences in averages were found by t-test and differences in frequency distributions with the χ^2 - test. The cluster analysis was used to group the children as weaker and stronger ones, based on the nine target areas. Clusters were formed for each stage of study and later these student groups were compared.

The relations between the averages of different target areas were studied by Pearson's correlation analysis, and statistically significant differences in averages were found by the t-test. The reliability for rating the children's learning was calculated by an Alpha-coefficient. The results showed a very high reliability for the teachers' rating (Alpha=0.95). All differences between groups are significant $p < 0.05$.

Results of Research

The results of the study are discussed below. First, the study conducted in kindergartens of the counties in 2005 is observed and the analysed results; next, the focus is on the results obtained in grades 1-3 in 2006-2008; then the relations between achieving the schooling and educational objectives at the pre-school stage and at the primary school stage are observed, and fourth, the results of boys and girls are compared.

Children's achievement rates of schooling and educational objectives at the pre-school stage and at primary school in different counties of Estonia.

In 2005 a study that focused on preparing children for school entry was conducted in four counties of Estonia (Järva, Saare, Võru, and East-Viru Counties), which also studied how children have acquired the different competencies stated in the framework curriculum for pre-school education. In 2006-2008 the same children were studied in grades 1-3 and their achievements were assessed based on the objectives of the *Curriculum for Basic Schools and Secondary Schools*. An overview of meeting the educational targets of the curricula for kindergarten leavers and pupils in the studied counties is set out below.

The research results show that according to teachers' assessments, the average results reflecting the achievement rates of pre-school educational objectives of 288 kindergarten leavers are rather even and high (averages range from $M=4.58$ to $M=3.77$).

Special attention should be paid to the achievements in health education in teachers' assessments, where the average of the general sample was $M=4.58$ and the corresponding results were very good in all the counties, but the best results were in East-Viru County ($M=4.62$). Good self-management skills, observing personal hygiene, and awareness of healthy nutrition were valued as the sub-skills of the target area. The field of physical and motor development also showed good results with reference to the averages of achievements (general sample: $M=4.42$), the best results were again in East-Viru County ($M=4.51$), and the averages of achievements in mathematics (general sample: $M=4.27$), the best county was Järva County ($M=4.38$).

Weaker results in the general sample of kindergartens ($n=288$) were obtained in the area of *ethics and worldview*; according to the teachers, the averages of achievements were rather low (general sample: $M=3.77$) compared to other target areas. Discussing what is right and what is wrong, comprehension of the meaning of one's activity with respect to the self and to others; fair behaviour, acceptance of cultural differences, and self-reliance were studied as sub-skills of the area. This area can be viewed as an essential component of schooling and educating process; skills, which call for close cooperation between school and home, teachers and parents, are important factors in the area.

The weakest results were obtained in East-Viru County ($x=3.68$). In the field of environment and natural sciences the averages of achievements were also weak (general sample: $M=3.86$), the weakest results were obtained in East-Viru County ($M=3.77$).

Analysing the results of the grades 1-3 is a pleasant surprise, because proceeding from the teachers' assessments, the averages of the fields are good as different grades are compared. It is commonly known that the transition from kindergarten to school is accompanied by less good study results by children, because this is the first so-called "period of crisis", where the growing child experiences substantial changes in the life order for the first time in his/ her life. Observing the target areas, which proceed from the schooling and educational objectives and the assessments provided for the three years at school, it is pleasant to see that very good results have been obtained in the field of *physical education* (general sample: grade 1 $M=4.13$; grade 2 $M=4.17$; grade 3 $M=4.23$). Readiness for physical activities, motor skills and orientation to healthy nutrition were regarded as sub-skills of the field. Throughout the three years, physical education has received the highest assessments as the most agreeable subject (averages of general sample ranging from $M=4.41$ to $M=4.49$). The results in the *art* field should also be accentuated within the entire sample. In grades 1 to 3, the best results in physical education have been obtained by the pupils in East-Viru County (results obtained from grades 1-3 range from $M=4.33$ to $M=4.27$) and Võru County (results obtained from grades 1-3 range from $M=4.23$ to $M=4.36$). The good results in music in East-Viru County Ida-Virumaa should be stressed (grade 1: $M=3.99$, grade 2: $M=4.28$, grade 3: $M=4.12$) along with those of art in Järva- and Saare Counties (results obtained from grades 1-3 range from $M=3.83$ to $M=4.16$) as assessed by teachers.

Comparing the fields, the weakest results in the first grade were obtained in music, in grades 2 and 3 in ethics and worldview, and in grade 3 in mathematics. Generally the averages of all the fields are a little lower in the results of grade 1. The weakest results in music are in Järva County (grade 1: $M=3.54$; grade 2: $M=3.73$; grade 3: $M=3.85$) and in Saare County (grade 1: $M=3.51$; grade 2: $M=3.49$; grade 3: $M=3.77$), and also in assessing the knowledge related to the mother tongue, and ethics and worldview. The teachers' assessments show rather even results in the averages of all the fields about pupils in Võru County, which indicates that the pupils' development has been rather balanced and without greater critical periods.

Analysing the agreeableness of subjects by pupils in the counties, we have to admit that at the first stage of study pupils like all the subjects rather much, because the averages of assessments are around four points.

Comparison of achieving the educational competences with respect to the results of kindergarten leavers and pupils at the first stage at school in the counties.

L. Vygotsky has stressed the important role of adults in forming/developing primary coping skills of children (Vygotsky, 2005). This is also manifested in the results of the present study. The achievement rates of educational objectives are compared below with respect to the results of kindergarten leavers and pupils at the first stage of school in the counties. We recognised that according to the teachers' assessments, all the results of kindergarten leavers and pupils at the first stage at school in the studied fields (in averages) were rather high in all the counties.

First, based on teachers' assessments, the results in different fields are compared *at leaving kindergarten and at the end of grade 1*. Since there are differences concerning the indicators of the fields in the questionnaires used in kindergartens and schools, the results are compared in respect to 8 identical fields. The zero-hypothesis of Pearson's correlation analysis states that the correlations between the characteristics are not significant. Resulting from the analysis, we can disclaim the zero-hypothesis and say that there are strong positive correlations. The analysis allows us to claim at 95% significance level that good knowledge in the fields obtained by leaving kindergarten foster good results also at the end of the following year. Thus, we can say that correlations between the fields of the curriculum at leaving kindergarten and in grade 1 are significant. The results show that average strong correlation is manifested between language and communication ($r=0.625$ $p=0.000$, $p<0.05$), mathematics ($r=0.611$ $p=0.000$, $p<0.05$), and achieving general educational objectives ($r=0.589$ $p=0.000$, $p<0.05$) at kindergarten and in grade 1. Whereas the correlations between the

two stages are strong, it is important to study, whether there are statistically significant differences in the knowledge in the studied fields.

In order to determine the validity of the zero-hypothesis of the t-test, it was checked, whether there are statistically significant differences between the fields. It was discovered that in the results of kindergarten leavers and pupils of grade 1, there is a statistically significant difference in the achievement rates of educational objectives in almost all the fields (except for one). Hence, this allows us to claim at 95% significance level that comparing the achievement rates of educational objectives of kindergarten leavers and grade 1 pupils, there are statistically significant differences between seven fields, where the averages of grade 1 pupils fall behind the results of kindergarten leavers. The zero-hypothesis was valid only in case of one field and there were no significant differences in the results of grade 1 and kindergarten ($p=0.603$, $p<0.05$), both results were similarly low (kindergarten: $M=3.77$; grade 1: $M=3.75$).

Research results *at leaving kindergarten and at the end of grade 3*. The zero-hypothesis of Pearson's correlation analysis states that the correlations between the characteristics are not significant. Resulting from the analysis, we can disclaim the zero-hypothesis and claim that at 95% significance level there are strong positive correlations between the achievements in six target areas and weak correlations between the achievements in two target areas (health, and physical and motor development). The target areas with strong correlation are as follows: schooling and educational objectives ($r=0.621$ $p=0.000$, $p<0.05$), language ($r=0.569$ $p=0.000$, $p<0.05$) and mathematics ($r=0.516$ $p=0.000$, $p<0.05$). Thus, we can claim that the knowledge obtained at kindergarten serve as a basis for learning and support the acquisition of new knowledge on the further educational path. We can clearly point out that in everyday school practice, achieving the educational objectives of the two educational stages should enable and consider more cooperation. Since there are correlations between all the target areas, it is important to know, whether there are statistically significant differences between the fields.

The t-test was performed to find out the validity of zero-hypothesis (there are no statistically significant differences between the target areas) showed that the zero-hypotheses was not valid in case of acquiring knowledge in four target areas and it was valid in case of four fields (schooling and educational objectives: $p=0.061$, $p<0.05$; ethics and worldview: $p=0.843$, $p<0.05$; environment and nature: $p=0.845$, $p<0.05$; music: $p=0.197$, $p<0.05$). According to the results of the t-test, we can claim that at 95% significance level there are statistically significant differences between the results of kindergarten and grade 1 in the following target areas: language and communication ($p=0.000$, $p<0.05$), mathematics ($p=0.000$, $p<0.05$), physical and motor development ($p=0.000$, $p<0.05$), and health ($p=0.000$, $p<0.05$).

Comparison of achieving the educational competences with respect to the results of kindergarten leavers and pupils by boys and girls.

Analysing the research results it is important to focus also on the issue concerning the achieving of educational objectives of boys and girls. Their achievements are compared by target areas proceeding from the curriculum. Gender differences are known in physical and gender identification; the behavioural aspect is influenced by genetic predispositions revealed in the physical and social environment; these, in turn, have an effect on attention, thinking, etc. (Kenrick, 1994; Öhman & Mineka, 2001). Analysing the results of boys and girls in the transition from kindergarten to grade 1 (See Table 1) by Pearson's correlation analysis and the t-test, the statistical data are presented in one single table in order to facilitate comparing and approaching the data. Checking the zero-hypothesis of Pearson's correlation analysis, no significant correlation is found between the characteristics, thus we can disclaim the zero-hypothesis and claim at 95% significance level that there is correlation between the analysed characteristics in the results of both boys and girls (except for one pair of characteristics). There is average correlation in five target areas about both boys and girls. According to these results, we can claim that the skills acquired well at kindergarten also enhance success in learning in grade 1. The results for girls allow us to confirm the zero-hypothesis that the correlation ($r=0.142$) is not significant in case of applying fine motor skills and the knowledge of handicraft in grade 1.

Table 1. Correlations and statistical significance between kindergarten and grade 1 research results in the target areas of boys and girls in the four counties participating in the study.

		Correlation analysis						t-test							
		Boys Kindergarten and grade 1			Girls Kindergarten and grade 1			Boys Kindergarten and grade 1				Girls Kindergarten and grade 1			
		N	Correlation	Sig.	N	Correlation	Sig.	M	M	t-value	p	M	M	t-value	p
Pair 1	Learning skills Educational objectives	151	.484	.000	137	.588	.000	3.65	3.46	2.649	.009	4.25	4.12	2.269	.025
Pair 2	Language and communication Mother tongue	151	.557	.000	137	.606	.000	3.99	3.41	8.932	.000	4.48	4.06	7.223	.000
Pair 3	Mathematics Mathematics	150	.598	.000	136	.587	.000	4.09	3.66	7.282	.000	4.45	3.99	7.817	.000
Pair 4	Ethics and world view Ethics and world view	151	.466	.000	137	.349	.000	3.58	3.49	1.232	.220	3.97	4.01	-.594	.553
Pair 5	Environment and natural sciences Natural sciences	151	.430	.000	137	.342	.000	3.71	3.55	2.297	.023	4.03	3.97	.843	.401
Pair 6	Physical and motor development & Handicraft	147	.336	.000	131	.142	.107	4.25	3.60	9.392	.000	4.62	4.11	7.396	.000
Pair 7	Health Physical education	138	.298	.000	121	.252	.005	4.48	3.97	7.536	.000	4.64	4.31	4.723	.000
Pair 8	Art and culture Music	119	.386	.000	105	.361	.000	3.67	3.31	4.253	.000	4.30	4.12	2.628	.010

Table 1 shows the results of the data analysis conducted to find out the validity of the zero-hypothesis of the t-test. It was checked whether there are no statistically significant differences in the target areas in which the achievement of educational objectives of boys and girls was studied. Based on the data analysis we can claim that the zero-hypothesis was disclaimed in some target areas; seven in case of boys and six in case of girls. At 95% significance level we recognise statistically significant differences between the results of achieving educational objectives at kindergarten and at school in grade 1, in seven target areas for boys and in six ones for girls. In case of boys, the zero-hypothesis was confirmed for sub-skills for ethics and worldview, in case of girls it was confirmed for the above-mentioned target area plus that of environment and natural sciences.

It appears that the decline by the end of grade 1 in case of general learning skills as well as subject-based skills is significant among both boys and girls. Possible reasons might be different learning environment compared to that at kindergarten, which has less room for creativeness and individuality. Although at school in Estonia no point-based assessment takes place in first grades, teachers' conceptions of child development are nevertheless traditionally related rather to marks and less to their actual development and coping.

Previously, the achievement rates of educational objectives in transition from kindergarten to school were studied among both boys and girls, because it is an important and critical stage for children in respect to becoming more independent. It is essential to make interim reports of changes at leaving kindergarten and of grade 3. In this case, the statistical data (See Table 2) for boys and girls, obtained by Pearson's correlation analysis and the t-test, are also presented in one single table. Checking the zero-hypothesis of Pearson's correlation analysis, no significant correlation is found between the characteristics, thus we can disclaim the zero-hypothesis and claim at 95% significance level that there is strong correlation between the analysed characteristics of the results of both in all the target areas for boys and in the results of six target areas for girls. In case of girls, the zero-hypothesis was valid for two target areas, i.e. the correlation between fine motor skills and coping with handicraft, as well as between health and physical education, was not significant. The existing correlations are average. In case of these correlations, we can claim that the skills acquired well at kindergarten enhance success in learning also in grade 1 and the other way around – in case of girls, the knowledge obtained or not obtained at kindergarten does not have any effect on success in grade 1.

Table 2. Correlations and statistical significance between kindergarten and grade 3 research results of the target areas of boys and girls in the four counties participating in the study.

		Correlation analysis						t-test							
		Boys Kindergarten and grade 3			Girls Kindergarten and grade 3			Boys Kindergarten and grade 3				Girls Kindergarten and grade 3			
		N	Correlation	Sig.	N	Correlation	Sig.	M	M	t-value	p	M	M	t-value	p
Pair 1	Learning skills Educational objectives	127	.530	.000	116	.591	.000	3.65	3.52	1.965	.052	4.25	4.22	.511	.611
Pair 2	Language and communication Mother tongue	127	.489	.000	115	.539	.000	4.03	3.58	6.662	.000	4.49	4.21	4.467	.000
Pair 3	Mathematics Mathematics	128	.517	.000	116	.477	.000	4.14	3.65	7.357	.000	4.46	3.94	7.002	.000
Pair 4	Ethics and world view Ethics and world view	128	.438	.000	114	.363	.000	3.59	3.45	1.936	.055	4.01	4.14	-1.863	.065
Pair 5	Environment and natural sciences Natural sciences	128	.398	.000	116	.379	.000	3.73	3.66	1.027	.307	4.04	4.10	-.873	.385
Pair 6	Physical and motor development & Handicraft	130	.199	.023	113	.178	.060	4.24	3.63	8.089	.000	4.61	4.21	5.773	.000
Pair 7	Health Physical education	127	.258	.003	110	.204	.032	4.50	4.10	5.778	.000	4.66	4.38	4.345	.000
Pair 8	Art and culture Music	126	.276	.002	108	.403	.000	3.69	3.63	.934	.352	4.30	4.24	.905	.367

Table 2 shows the results of the data analysis conducted to find out the validity of the zero-hypothesis of the t-test. It was checked, whether there are statistically significant differences in the target areas in which the achievement rates of educational objectives of boys and girls were studied. Based on the data analysis, we can claim that the zero-hypothesis was disclaimed in case of four target areas (language and communication, mathematics, fine-motor development, health) and was confirmed also in case of four target areas (learning, ethics and world view, natural environment, culture) among both boys and girls. Thus, we can claim that skills, which are effectively practised already at kindergarten, such as mother tongue and mathematics, and which are easy to measure and assess, have significant differences by the end of grade 3. The skills, which are acquired by communicating and imitating and in everyday situations, etc, are not so easy to assess and they also merit less attention, although these are the skills, without which it is not easy to cope independently and which form the basis for the principles of community way of life, which is the basis for adopting the social paradigm of life.

Discussion

In the ideas about sustainable education such qualities of a personality like critical consciousness, ability to make good choices in the plurality of options, ethical sensitiveness, responsibility for larger units, ability to foresee consequences, etc (Kuurme, 2008) are of great importance. The educational objectives set in the curriculum can be realised in successful study process through the productive cooperation of teachers and pupils. Through practising and external confirmations, external values of the cooperation must become intrinsic. The present study focused on achieving educational objectives by children on pre-school level and at the first stage at school. Based on the research results we can claim that in general, the achievements by counties and in all the studied target areas were higher than average and all in all these could be regarded good. Achieving educational objectives on pre-school level, as assessed by teachers, were noteworthy in the fields of health education, physical and motor development, and mathematics. These are the fields, where children of 6–7 years of age are able to act, as it is suitable for their age, using different senses for perceiving and discovering the world. For most of the children at that age mathematics is interesting, because learning at kindergarten is organised through playing and it is more down-to-earth compared to school.

Kindergarten leavers had weaker results in achieving the educational objectives of ethics and worldview and of environment and natural science. Despite the lower results in the two target areas we can claim that, based on teacher assessments, the children in the four counties have very good achievement results in educational objectives and they are very well prepared for school entry.

The studying process is an act of communication, thus a child's development takes place in a communicative environment, where the teacher's task is to create a good environment for communication. Caldarella and Merelli (1997) claim that relationships with other children become very important at very early age already. Children of the same age play with each other, serve as confidants and provide support in case of stress. Children may act as mutual powerful factors of socializing, enhancing each other's social and emotional development. Children's consistent development and adaptation at school is directly related to the formation of social skills and positive self-esteem at pre-school age. In order to guarantee that, it is important to pay even more attention to detecting and considering children's individuality, as well as to early detecting problems hindering their development.

As assessed by teachers, the weakest averages in all the counties were received in achieving the educational objectives in ethics and worldview and in environment and natural sciences.

The research results in achieving the educational objectives at primary school were higher during all the three years, where all subjects with the exception of the native language have received very good assessments. During the three years the results are the best in achieving the objectives of physical development and those of the so called "creative subjects". The results at primary school in the counties were the lowest in the field of music in grades 1 and 2; in mother tongue in grade 1 and in ethics and worldview in grade 2. The latter is the field of the lowest results also in grade 3, where the results in mathematics have worsened as well.

It should be noted that in Estonia we have long-term traditions in pre-school and primary school

education, where the educational aspect and valuing the principles of child-centred pedagogy have always played an important role. Therefore, achieving educational objectives does not differ much by counties. Teaching the basic coping skills is accompanied by the simultaneous aspiration to teach cultural values through personal, social, and moral education, to broaden their horizon, to develop their critical thought and aesthetic sensitiveness. This idea is also correct, yet insufficient in respect to the process of schooling and education as a whole. It is important to create a safe and stimulating learning environment for each child, so that they could believe in themselves and discover their best talents (Talts et al, 2006).

The research results showed that both in the child care institutions and schools of Estonia, less attention is paid to establishing the ground for positive study experience or to forming necessary prerequisites for learning such as knowledge on ethics and world view, or to social skills. Being social requires a diversity of qualities such as self-reliance, well-balanced emotional life, skill of contemplating, and the ability to control and assess one's own behaviour, and to understand other people. This is not simply a link in the chain of another type of psychical development (e.g. emotional life or intellectual development), but it could be claimed that the social behaviour of a person reflects his or her self-image and worldview, his/her whole personality (Keltikangas-Järvinen, 1992: 3-4). Thus, the key objective for children should be to create a positive self-concept and readiness to learn, emphasising the need to observe their general development already at a pre-school institution and continuing it at school.

A human being is not a product created by external conditions. Roggendorf searches for the key factors that still need to be present in children to retain their positive vitality: possibility to communicate, flexible gender roles, active solving problems, ability to cope with conflict situations, judgement. For this a place is needed where to retreat, and a person, who responds to the existence of a child with support and understanding. Although up to date the task to turn the school towards humanity has appeared to be an unrealisable task in many respects, and it has been successful in rare cases only in a small number of countries, teachers as educators can always help particular children in specific cases, evoking their intentions for relations with the world, which has educative effect (Kuurme, 2008).

The study showed that by the end of the first stage at school the teacher assessments are rather similar by accent – children's social skills and qualities related to ethics and worldview are weaker, while subject-related skills are stronger. It is believed that social readiness to learn is not always sufficient, because in many homes not enough attention is paid to different aspects of social development. Thus, teachers at school need to focus more on developing children's motivation to study, behavioural norms, and development of self-expression skills. The present education policy emphasises reporting requirements, namely that the school and grade must be more responsible for the results of studies and for pupils' development. Pupils' competence is highly dependent on the quality of the school environment, therefore, it would be sensible to measure the quality of these environments.

As a result of the analysis of the stronger and weaker groups participating in the survey, it became evident that there were rather big group differences, which were especially obvious in case of boys, although in general achieving educational objectives was efficient. The obtained results give food for thought for both kindergarten and primary school teachers, these should encourage teachers to notice children's developmental potential and, by way of enhancing learning environment and relations, trying to see the most proximate developmental range next to the actual developmental level. In case a child, who on the basis of kindergarten results has been categorized as belonging to the weaker group, proves to be successful at school, it is most probably due to the primary school teacher, who is able to promote the child's motivation to study and will to cope. There are several reasons for cases, where a successful child at kindergarten is categorized as belonging to the weaker group at school, the most important of which is pre-teaching the school material that leads to insufficient interest in the knowledge provided at school. If the child is not engaged in learning activities, which are adequately demanding, they lose interest in the material they are already familiar with. It is widely known that from grade to grade, boys' interest in learning tends to decrease, whereas girls are continually successful in learning due to their greater sense of duty. In the Estonian pedagogy, more attention should be paid to the problem on how to consider boys' interests more in the teaching process.

Estonian teachers are often concerned about the completion of the extensive curriculum, therefore developing the social environment of the grade is regarded as wasting valuable learning time (Kuusk, 2004). And yet social problems are primary reasons for skipping lessons and dropping out of school. Children that differ from others in one way or another (different language environment, overweight, speech defects, etc.) face difficulties in merging into a social group. All children need friends and the approval and acceptance by other pupils. The teachers' task is to find possibilities to create a friendly class atmosphere and relations between the pupils, so that everyone could feel necessary. Pupils, who do not have any possibility to experience assimilation by others, seek attention by embarrassing, defiant and hostile behaviour.

Educational objectives are met by teacher's practical activities. Estonian teachers value skill-related objectives higher (language and communication, mathematics, environment and natural sciences). Although the child-centred approach as a teaching principle is accepted, teachers often have problems with considering simultaneously the developmental level of every single child and the expectations of his/her parents and the school.

The national curriculum for pre-school education in Estonia sets very high demands on children's intellectual, social and physical development and these are explained in detail in the curriculum. It is the task of kindergarten teachers to develop all these skills in children by school entry. The basic problem is using child-friendly teaching methods, which would help children in creating a positive self-concept and learning skills.

The study results give an overview of the essence of the national curriculum. Teachers' assessment of children's learning gives evidence of the considerably high level of education in Estonia. Teachers probably try to meet the expectations of parents, school and society. The threat that clouds the sustainable development of the society of Estonia lies in the fact that at very early age already the understanding that they have to be successful is cultivated in children. This forces teachers and parents to try to achieve fast and tangible results such as those of subject-related skills, and less attention is paid to ethical and social values. The integration of the curriculum is necessary in order to arrange connections between various knowledge and skills, to relate knowledge proceeding from pupils and their interests, to make it possible to understand large and complex systems and other associations, which exceed borders of single subjects, to organise and structure thinking by way of alternative options, to reach new knowledge and notional connections (Pring, 1976: 105).

From the point of view of the humane and sustainable development of the society, it is very important to pay attention to ethical and social values in a longer perspective. The ideology of sustainable education as a characteristic feature of the relationship would mean not so much focusing on the self, but on overcoming self-centeredness. Hopefully, the borders of people's "self" would expand to the extent that their responsibility would include also the fate of the natural environment, of other people and of the culture. Reality would not be what I face and where I realise myself, but rather what I function in the same rhythm with, as my personal wellbeing is dependent on the general welfare. Proceeding from the above, the child needs support from an understanding adult, who would help him/her in actual pedagogical situations, would help him/her develop into a person who values him/herself and other people.

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