

УНИВЕРЗИТЕТ „ГОЦЕ ДЕЛЧЕВ“ – ШТИП  
ФАКУЛТЕТ ЗА ОБРАЗОВНИ НАУКИ  
UNIVERSITY “GOCE DELCEV” SHIP  
FACULTY OF EDUCATIONAL SCIENCES



**ОБРАЗОВАНИЕТО ВО XXI ВЕК  
– СОСТОЈБИ И ПЕРСПЕКТИВИ –**

**МЕЃУНАРОДНА  
НАУЧНА КОНФЕРЕНЦИЈА  
– ЗБОРНИК НА ТРУДОВИ –**

**EDUCATION IN XXI CENTURY  
– CONDITIONS AND PERSPECTIVES –**

**INTERNATIONAL SCIENTIFIC  
CONFERENCE  
– PROCEEDING BOOK –**

Штип, 24 – 25 Септември, 2015  
Shtip, September, 24-25, 2015

fesconference@ugd.edu.mk

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## LADIES AND GENTLEMEN, DEAR GUESTS!

With great honor and pleasure I welcome You on behalf of all teachers, associates, employees and students of the Faculty of Educational Sciences at the University "Gotse Delchev" in Shtip and I wish You pleasant moments during this solemn event organized to mark 20 years of university education of teachers.

But in fact, the Faculty of Educational Sciences basis its twenty years of existence on 146 year continuous development of formal education of teachers and preschool teachers in the region. The achievements of the Pedagogical-Seminary school founded in 1869, the existence of which is linked to the name of the creator of the first primer and the first textbook for teachers - School Pedagogy - Josif Kovachev, and to the name of the great teacher Gotse Delchev, followed by the School for Teachers established in 1946, Higher Pedagogical School founded in 1959, and the Pedagogical Academy (1961) are woven into the tradition and development of our Faculty.

In 1995 the two-year formal education of teachers and preschool teachers developed into four-year university studies.

In 2007 the Pedagogical Faculty became part of the State University "Goce Delchev" in Shtip, said to be the fastest growing university in Macedonia.

Following the global trends in teacher education, modern trends in education policymaking in Europe and in the world, respecting the knowledge of the history of civilizations as an important intellectual resource for social development, as well as scientifically and experientially diagnosed educational challenges that have emerged as a result of deep changes of values in our society and globalization trends (scientific, educational, technological, and economic) the Faculty of Educational Sciences has designed study programs for I, II and III cycle of studies in accordance with the organizational - pedagogical quality standards in compliance with the principles of the Bologna Declaration and European credit-transfer system with a high level of recognition in the area of European Higher Education.

If 20 years ago our Faculty started to implement teaching with 5 PhDs and 3 masters as regular employees, today we can proudly say that our academic community is comprised of 20 PhDs and one master.

Today our students have the opportunity to educate themselves at the faculty which sees its future as a continuous development aimed at:

- Strengthening and expanding international partnerships
- Popularization of mobility of students and staff,
- Internationalization and improvement of scientific research work,
- Improvement of pedagogical approaches to teaching and links with practice, putting students at the center of the educational process.



**Ladies and Gentlemen,**

I take this opportunity to thank you for coming today to celebrate with us the teaching profession and our contribution to it.

We are quite aware that the road to success is long and winding and it is easier to travel with joint forces. That is why we wanted to mark this celebration by organizing a scientific conference dedicated to education in the 21st century. Let us share our knowledge, understanding and experiences regarding the situation and perspectives and suggest possible ways of modernization. 89 papers have been submitted and there are authors from 8 countries. This is really promising!

Once again, I wish you all a warm welcome and successful work.

Dean,  
Prof. d-r Sonja Petrovska  
24. 09. 2015., Stip

**ПОЧИТУВАНИ ...**

Со голема чест и задоволство, Ве поздравам во името на сите наставници, соработници, вработени и студенти на Факултетот за образовни науки при Универзитетот Гоце Делчев во Штип и Ви посакувам пријатни моменти во текот на оваа свечена манифестација организирана по повод 20 годишно факултетско образование на наставници и воспитувачи.

Факултетот за образовни науки своето постоење го темели на 146 годишниот континуиран развој на формалното образование на наставници и воспитувачи на овие простори. Во традицијата и развојот на нашиот факултет се вткаени достигнувањата на Педагошко-богословското училиште основано во 1869 год. Со чие постоење се врзува името на творецот на првиот буквар и првиот учебник за наставници – Школска педагогија – Јосиф Ковачев, и името на големиот учител Гоце Делчев, па Учителската школа основана во 1946 год, Вишата педагошка школа формирана во 1959 год, Педагошката академија (1961 год.).

Во 1995 година формалното двегодишно образование на наставници и воспитувачи прераснува во четиригодишно факултетско образование.

Во 2007 година Педагошкиот факултет стана дел на државниот Универзитет „Гоце Делчев“ во Штип, кој го носи епитетот најбрзорастечки Универзитет во Р Македонија.

Следејќи ги глобалните тенденции во образованието на наставници, современите тенденции во креирањето на образовните политики во Европа и во Светот, респектирајќи ги знаењата за историјата на цивилизациите како значаен интелектуален ресурс за општествениот развој, како и научно и искусствено дијагностицираните воспитни предизвици кои се појавија како резултат на длабоките вредносни промени во нашето општество и глобализациските тенденции (научни, образовни, техничко-технолошки, економски) ФОН дизајнираше студиски програми за I, II и III циклус на студии согласно организациско –

педагошки стандарди за квалитет, согласно принципите на Болоњската декларација и Европскиот кредит-трансфер систем, со високо ниво на препознатливост во Европскиот високообразовен простор.

Ако пред 20 години нашиот факултет започна да ја реализира наставата и вежбите со 5 доктори на науки и 3 магистри, како редовно вработени, денес со гордост можеме да кажеме дека оваа академска заедница ја сочинуваат 20 доктори на науки и 1 магистер.

Денес нашите студенти имаат можност да се образуваат на факултет кој својата иднина ја гледа како континуиран развој во насока на:

- зајакнување и проширување на меѓународните партнерства,
- омасовување на мобилноста на студентите и на вработените,
- интернационализација и подобрување на научно-истражувачката работа,
- унапредување на педагошките пристапи во наставата и врските со практиката, поставувајќи ги студентите во центарот на образовниот процес.

#### **Почитувани присутни,**

Ја користам оваа прилика, да ви се заблагодарам што дојдовте денес заеднички да го чествуваме учителското дело и нашиот придонес во него.

Ние сме сосема свесни дека патот до успехот е долг и кривулест но и дека полесно се патува со заеднички сили. Затоа ова наше празнување сакавме да го одбележиме со Научна конференција посветена на образованието во 21 век, да ги споделиме нашите знаења, разбирања и искуства во врска со состојбите и перспективите како и да предложиме можни начини за негово осовременување.

Уште еднаш, На сите Ви посакувам топло добредојде и успешна работа!

Декан,

Проф. д-р Соња Петровска

24. 09. 2015. година Штип

## TABLE OF CONTENTS

1. СО КВАЛИТЕТНИ ПРОМЕНИ ДО ПОКВАЛИТЕТНО УЧИЛИШТЕ <b>Блаже КИТАНОВ</b> .....	5
2. LANGUAGE CULTURE – A SEGMENT OF LANGUAGE EDUCATION <b>Violeta NIKOLOVSKA</b> .....	9
3. RESEARCH TRENDS IN EDUCATION IN MULTICULTURAL ENVIRONMENTS IN THE REPUBLIC OF MACEDONIA <b>Elizabeta TOMEVSKA-ILIEVSKA, Emilija SIMONOVSKA JANACKOVSKA, Sadudin SADIKI</b> .....	15
4. USING AUTOMATIC TEXT CATEGORIZATION TECHNOLOGIES IN THE MODERN EDUCATIONAL PROCESS <b>Anna GLAZKOVA</b> .....	23
5. THE ROLE OF BUSINESS SCHOOL IN THE POST-GRADUATE EDUCATIONAL SYSTEM <b>Nikita RAVOCHKIN</b> .....	27
6. FORMATION OF ETHICAL RULES (CODE) IN PRESCHOOLERS THROUGH THE BULGARIAN CHILDREN'S FOLKLORE GAMES <b>Julia DONCHEVA</b> .....	32
7. FORMATION OF HUMAN POTENTIAL: INSTITUTIONAL MECHANISMS AND POLICIES <b>Stanka RINKOVA</b> .....	36
8. THEORETICAL FORMULATION AND SCIENTIFIC JUSTIFICATION OF THE PROBLEM OF TRAINING TEACHERS IN TECHNICS, TECHNOLOGY AND ENTREPRENEURSHIP <b>Tsvetana KOSTADINOVA ANTIPESHEVA</b> .....	41
9. INTERACTIVITY IN TEACHING STUDENTS MODERATORS <b>Kosta KOSTOV, Silvia KYUCHUKOVA, Hristina MILCHEVA</b> .....	45
10. EVALUATION OF STUDENTS' LEARNING UNDER THE PRISM OF EXPECTED OUTCOMES <b>Teuta SHABANI, Suzana NIKODINOVSKA BANCOTOVSKA</b> .....	49
11. COMMUNICATION IN THE TEACHING PROCESS. INTERACTIVE NATURE OF COMMUNICATION <b>Valentina VASILEVA</b> .....	57
12. PHYSICAL ACTIVITY OF 3-4 YEARS OLD CHILDREN IN KINDERGARTEN <b>Filip SHABANSKI</b> .....	60
13. MACEDONIAN LANGUAGE IN SECONDARY EDUCATION <b>Liljana MAKARIJOVSKA, Zhaklina GJORGIJOSKA</b> .....	64
14. STUDENTS' ATTITUDES TOWARDS TEACHING GRAMMAR IN THE FOREIGN LANGUAGE CLASSROOM <b>Vesna KOCEVA, Marija TODOROVA</b> .....	69
15. FOREIGN LANGUAGE CLASSROOM ANXIETY <b>Marija TODOROVA, Vesna KOCEVA</b> .....	75
16. TEACHERS AS A FACTOR FOR THE DEVELOPMENT OF KEY COMPETENCE CULTURAL EXPRESSION AMONG STUDENTS <b>Svetlana PANDILOSKA GRNCHAROVSKA, Fadbi OSMANI, Gordana STANKOVSKA</b> .....	82
17. INTRODUCTION OF THE DUAL SYSTEM IN THE BULGARIAN VOCATIONAL EDUCATION – REALITY AND CHALLENGES <b>Svetlana NIKOLAEVA</b> .....	86

18.	THE VALUES OF EDUCATIVE FUNCTION IN RELATION PARENT-SCHOOL <b>Ardita CEKA, Rabije MURATI</b> .....	89
19.	ELECTRONIC VERSUS TRADITIONAL TEST FOR MATHEMATICS IN PRIMARY SCHOOLS <b>Katerina PANEVA</b> .....	93
20.	THE SIGNIFICANCE OF LOCALLY DEVELOPED EDUCATIONAL SOFTWARE IN THE PROCESS OF SCHOOLS' COMPUTERIZATION <b>Olga SAMARDJIKJ JANKOVA</b> .....	99
21.	THE ACTIVITY OF MUSICAL GAMES FOR CHILDREN <b>Mujeser ILJAZI</b> .....	105
22.	THE PATIENT IN THE PROCESS OF LEARNING IN HIGHER MEDICAL SCHOOL <b>Silvia KYUCHUKOVA</b> .....	110
23.	INFORMATION AND COMMUNICATION TECHNOLOGIES IN TEACHING MUSIC EDUCATION <b>Lence NASEV</b> .....	113
24.	LEISURE TIME AND SPORT ACTIVITIES OF STUDENTS FROM THE FACULTY FOR PRESCHOOL AND PRIMARY SCHOOL EDUCATION AT SOFIA UNIVERSITY "ST. KLIMENT OHRIDSKI" – BULGARIA <b>Georgi IGNATOV</b> .....	116
25.	PLACE OF LIVING AS A FACTOR IN ORGANIZING STUDENTS' LEISURE TIME <b>Despina SIVEVSKA, Biljana POPESKA</b> .....	122
26.	METHODICAL APPROACH TO LEARNING ABOUT THE HOLOCAUST BY THE MODEL OF YAD VASHEM SCHOOL <b>Zhivorad MILENKOVIC</b> .....	129
27.	A HERMENEUTIC READING OF A POETIC LITERARY WORK DURING IMPLEMENTATION OF A LESSON <b>Milena RISTOVA-MIHAJLOVSKA</b> .....	136
28.	SOME GUIDELINES FOR INTELLECTUAL PREPARATION DURING PHYSICAL CONTACT BETWEEN THE INSTRUMENT AND THE PIANIST <b>Angele MIHAJLOVSKI</b> .....	142
29.	IMPLICATION OF EFFECTIVE SCHOOL MANAGEMENT FOR THE CONTINUING PROFESSIONAL DEVELOPMENT OF TEACHERS <b>Kristinka OVESNI, Emina HEBIB, Vera RADOVIĆ</b> .....	148
30.	THEORIES, SOCIAL EXPERIENCES AND PRACTICE IN INTERCULTURAL PEDAGODY <b>Alina SZCZUREK-BORUTA</b> .....	157
31.	TEACHERS' ASSESSMENTS OF CERTAIN CURRICULAR DETERMINANTS IN PRIMARY SCHOOL <b>Milan MATIJEVIĆ, Siniša OPIĆ, Goran LAPAT</b> .....	162
32.	THE SOCIO-POLITICAL IMPACT OF THE NEW SCIENTIFIC AND EDUCATIONAL TRENDS IN ARCHAEOLOGY, HISTORY AND RELATED FIELDS <b>Ljuben TEVDOVSKI</b> .....	172
33.	THE PRACTICE OF TAEKWONDO AS A PREDICTOR OF MOTOR ABILITIES <b>Ivan PRSKALO, Anamaria RADIĆ</b> .....	178
34.	THE RELATION MOTIVE - TEACHING CONTENT IN STIMULATING COGNITIVE ABILITIES THROUGH ARTISTIC ACTIVITIES AT PRESCHOOL AGE <b>Maja RAUNIK KIRKOV</b> .....	182
35.	CONTEMPORARY ADULT LITERACY MODELS <b>Elena RIZOVA, Zoran VELKOVSKI</b> .....	188

36. COMPARATIVE ANALYSIS OF PROGRAMS FOR PRE-SCHOOL EDUCATORS IN EUROPE <b>Kiril BARBAREEV, Alma TASEVSKA</b> .....	196
37. INCLUSIVE EDUCATION - ROLE OF THE TEACHER AND BENEFITS <b>Sonja PETROVSKA</b> .....	203
38. THEORETICAL APPROACHES TO MODERN INTERPRETATION OF PEDAGOGY OF PHYSICAL EDUCATION AND SPORTS <b>Eleonora MILEVA</b> .....	210
39. POSTMODERN CONCEPTS OF FOUCAULT'S EDUCATION AND ITS RELATIONSHIP WITH DISCIPLINE <b>Kushtrim AHMETI</b> .....	215
40. ECOLOGY – A NECESSARY FACTOR IN TEACHING METHODS FOR NATURE AND SOCIETY STUDIES FOR FORMING A RESPONSIBLE PERSON <b>Oliver CACKOV, Tatjana GREGOVA</b> .....	219
41. THE ISSUE OF RESPECTING THE DEVELOPMENTAL POSSIBILITIES AND ACTIVITY-PLANNING IN EARLY CHILDHOOD DEVELOPMENT <b>Alma TASEVSKA, Kiril BARBAREEV</b> .....	223
42. INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES INTO PRESCHOOL EDUCATION <b>Tatyana V. NIKULINA</b> .....	228
43. WHAT SHOULD MODERN SCHOOL LEARN <b>Snezana KIROVA, Dragana KUZMANOVSKA, Biljana IVANOVA</b> .....	233
44. EDUCATIONAL FUNCTION OF THE SCHOOL IN CONTEMPORARY SOCIETY <b>Emilija PETROVA GORGEVA, Mitko KOCEV</b> .....	238
45. SOME METHODS IN TEACHING PHYSICAL AND HEALTH EDUCATION <b>Marjan MALCEV</b> .....	243
46. REVIEW OF ADOLESCENT LITERATURE THROUGH COMPARATIVE ANALYSIS OF THE NOVELS "THE BLUE PATH OF LOVE" BY METODI MANEV AND "VOICE OF LOVE" FROM GROZDANA OLUJIC <b>Jovanka DENKOVA</b> .....	247
47. INTERPRETATION OF A LYRIC POEM IN IV AND V GRADE <b>Blaze KITANOV, Irena KITANOVA</b> .....	253
48. TRAINING EFFICIENCY OF CYCLISTS SPECIALIZED IN ROAD CYCLING <b>Ivan KOLEV</b> .....	258
49. PHYSICAL EDUCATION AND DIAGNOSTIC PROCEDURES <b>Veselina IVANOVA, Galena TERZIEVA</b> .....	262
50. PROTECTION OF IMMOVABLE CULTURAL HERITAGE THROUGH EDUCATING STUDENTS OF PRIMARY AND SECONDARY EDUCATION <b>Trajce NACEV, Dragan VESELINOV</b> .....	265
51. FORMATION OF TOLERANCE IN ADOLESCENTS <b>Valentina VASILEVA</b> .....	271
52. NEW EDUCATIONAL POLICIES AND THEIR REFLECTIONS ON SOCIAL DEVELOPMENTS <b>Daniela KOCEVA, Snezana MIRASCIEVA</b> .....	275
53. PRESENCE OF ENTREPRENEURSHIP IN PRIMARY EDUCATION IN MACEDONIA <b>Lulzim MEHMETI</b> .....	280
54. CONSONANT /J/ IN COLLOQUIAL SPEECH AND ITS IMPACT ON WRITING <b>Blaga PANEVA</b> .....	284
55. METHODOLOGICAL STRUCTURE OF A LESSON FOR INTERPRETATION OF A FAIRY TALE <b>Irena KITANOVA</b> .....	289

56. THE INFLUENCE AND THE EFFECTIVENESS OF FORMATIVE ASSESSMENT AND THE FEEDBACK IN STUDENTS' SUCCESS AND ACHIEVEMENTS <b>Valdeta ZENUNI-IDRIZI</b> .....	294
57. AESTHETIC EDUCATION OF EDUCATORS AS A FUTURE CHALLENGE <b>Valentina PAJAZITI, Vlora MARKU-TUQI</b> .....	299
58. SOCIAL AND COMMUNICATIONAL-INTERACTIVE COMPETENCES OF TEACHERS AND STUDENTS IN EDUCATION <b>Florina SHEHU</b> .....	302
59. INFLUENCE OF MEDICINES ON THE COGNITIVE SKILLS OF CHILDREN WITH CHRONIC DISEASES <b>Elena IVANOVA BUYUKLIEVA</b> .....	308
60. THE SPIRITUAL ASPECT OF HUMAN DEVELOPMENT AND THE EDUCATION IN XXI CENTURY <b>Eleonora PENCHEVA</b> .....	312
61. RESEARCH IN TEACHING PRACTICE <b>Snezana JOVANOVA-MITKOVSKA</b> .....	316
62. HOW ARE PEACE AND TOLERANCE REPRESENTED IN HISTORY TEXTBOOKS FOR PRIMARY AND SECONDARY EDUCATION <b>Todor CEPREGANOV, Sonja NIKOLOVA</b> .....	324
63. ETHICS AS TEACHING <b>Trajce STOJANOV</b> .....	330
64. RISK ASSESSMENT OF HYGIENIC AIR QUALITY UPON PRESCHOOL CHILDREN'S HEALTH IN KINDERGARTEN "VERA CIRIVIRI TRENA" IN SHTIP <b>Snezana STAVREVA VESELINOVSKA</b> .....	335
65. ABOUT SOME EDUCATIONAL GOALS IN TEACHING-SOCIO-CULTURAL PROBLEM OR A CHALLENGE MODERN EDUCATION <b>Snezana MIRASCHIEVA, Emilija Petrova GJORGJEVA, Daniela KOCEVA</b> ....	339
66. ESCAPE FROM THE WAR –TIME IN THE UNCERTAINTIES OF LIFE TO REFUGEE IN BULGARIA. FUNDAMENTAL RIGHTS OF PERSONS SEEKING INTERNATIONAL PROTEKTION IN TERMS OF THE BUREAUCRATIC SYSTEM IN BULGARIA <b>Pavlin PETROV</b> .....	344
67. HIGHER EDUCATION IN THE PERIOD OF TRANSITION <b>Verica JOSIMOVSKA</b> .....	353
68. RESEARCH OF THE CONFLICT ZONES IN THE SYSTEM OF INTERPERSONAL RELATIONSHIPS OF THE CHILD BY THE METHODOLOGY OF RENE GILLE <b>Julia DONCHEVA</b> .....	356
69. CLASSROOM SOCIAL CLIMATE <b>Despina SIVEVSKA</b> .....	360
70. COMPATIBILITY OF PRESCHOOL AND PRIMARY SCHOOLA IN R. MACEDONIA <b>Snezana JOVANOVA-MITKOVSKA, Biljana POPESKA</b> .....	366
71. THE IMPORTANCE OF THE CAREER CONSELING PROCESS <b>Tanja ATANASOSKA, Biljana CVETKOVA DIMOV, Ana GJORGJEVA</b> .....	376
72. ROLE OF MANAGEMENT IN IMPLEMENTING EDUCATION INCLUSIVE POLICIES <b>Sadete TERNAVA-OSMANI, Voglushe KURTESHI</b> .....	380
73. WHICH FACTORS ACCORDING TO THE PARENTS AFFECT THE EDUCATION OF CHILDREN <b>Voglushe KURTESHI</b> .....	385

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74. THE PHILOSOPHICAL PARADIGM OF SIGMUND FREUD <b>Slobodan MARKOVIC</b> .....	370
75. EDUCATIONAL NEEDS AND ACHIEVEMENTS OF ROMA CHILDREN AND OTHER CHILDREN FROM MARGINAL ETHNIC GROUP IN RM <b>Stevan ALEKSOVSKI</b> .....	377
76. COMMUNICATIVE-PEDAGOGICAL FEATURES OF COMMUNICATION IN THE EDUCATIONAL PROCESS-COMMUNICATIVE COMPETENCE <b>Biljana GRAMATKOVSKI, Jasminka KOCHOSKA</b> .....	387

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## RISK ASSESSMENT OF HYGIENIC AIR QUALITY UPON PRESCHOOL CHILDREN'S HEALTH IN KINDERGARTEN "VERA CIRIVIRI TRENA" IN SH TIP

Snezana STAVREVA-VESELINOVSKA <sup>1</sup>

### Abstract

*The paper will present the results of routine sanitary-hygienic controls of the air hygiene at the study halls and bedrooms of Branch 1 and Branch 4 in the kindergarten "Vera Ciriviri - Trena" in Shtip. The controls were carried out in the period from 2009 to 2014. Aero sediments were taken from premises at random in time after airing, when there is no movement. At the time of setting the plates for aero sediment the children were already asleep so the air dustiness is less and the sedimentation lasted two hours. In all samples the presence of microorganisms was proved as number of colonies, such as: pathogenic staphylococci and conditionally pathogenic staphylococci coagulase negative and the presence of germs. Results show that the greatest source of air pollution of the premises is the retention of impurities that are the source of bacteria, viruses, molds and mites in Sintelon carpets that do not really allow for proper and thorough hygiene of floors. Although the floors are regularly cleaned by mechanical and wet cleaning and regular and appropriate disinfection, it is still not enough to the requirements for clean and quality air in the premises where children and employees dwell.*

**Key words:** *aero sediment, air pollution, sanitary-hygienic controls, micro-organisms, children.*

### Introduction

Children face the excitement of a changing world, with many opportunities and challenges; but they also encounter formidable barriers to their health, development and well-being in the form of environmental threats. During recent decades, new knowledge has emerged about the special vulnerability of children to environmental risks in the places where they live, learn and grow. Children's and adolescents' exposure to chemical, physical, and biological risks at home, in school, in the playground, at work and elsewhere deserves our immediate attention and needs to be recognized as an important threat to their development and survival. Action to reduce the risks is required at global, regional and national levels.

Children around the world today confront environmental hazards that were neither known nor suspected a few decades ago. More than 80000 new synthetic chemical compounds have been developed over the past 50 years. Children are especially at risk of exposure to the 15000 of these chemicals produced in quantities of 4500 kg or more per year, and to the more than 2800 chemicals produced in quantities greater than 450000 kg per year. These high-production volume (HPV) chemicals are those most widely dispersed in air, water, food crops, communities, waste sites and homes (1). Worldwide many thousands of deaths occur as a result of poisoning, with the vast majority being among children and adolescents after accidental exposure. Many hundreds of HPV chemicals have been tested for their potential human toxicity, but fewer than 20% have been examined for their potential to cause developmental toxicity to fetuses, infants, and children (1, 2).

Until about ten years ago, chemical exposure was principally a problem for children in the developed countries. However, it is becoming a problem in developing countries as hazardous industries relocate there as a consequence of globalization and in an effort to escape ever stricter lab our and environmental laws in the developed countries. In addition to the hazards of new chemicals, children worldwide confront traditional environmental hazards, including poor water quality and sanitation, ambient and indoor air pollution, vector-borne diseases, unintentional injuries, inadequate housing, and effects of climate variability and change.

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### **Children's unique susceptibility**

Children are highly vulnerable to environmental hazards for several reasons (3, 4): Children have disproportionately heavy exposures to environmental toxicants. In relation to body weight, children drink more water, eat more food, and breathe more air than adults. Children in the first 6 months of life drink seven times as much water per kg of body weight and 1-5-year-old children eat 3-4 times more food per kg than the average adult. The air intake of a resting infant is proportionally twice that of an adult. As a result, children will have substantially heavier exposures than adults to any toxicants that are present in water, food, or air. Two additional characteristics of children further magnify their exposures: their hand-to-mouth behavior, and the fact that they live and play close to the ground.

Children's metabolic pathways, especially in the first months after birth, are immature. Children's ability to metabolize, detoxify, and excrete many toxicants is different from that of adults. In some cases, children may actually be better able than adults to deal with some toxicants, e.g. paracetamol. Commonly, however, they are less well able to deal with toxic chemicals and thus are more vulnerable to them. Children undergo rapid growth and development, and their developmental processes are easily disrupted. The organ systems of infants and children change very rapidly before birth, as well as in the first months and years of life. These developing systems are very delicate and are not able to repair adequately damage caused by environmental toxicants. Thus, if cells in an infant's brain are destroyed by chemicals such as lead, mercury, or solvents, or if false signals are sent to the developing reproductive organs by endocrine disruptors, there is a high risk that the resulting dysfunction will be permanent and irreversible. Because children generally have more future years of life than adults, they have more time to develop chronic diseases triggered by early exposures. Many diseases that are caused by toxicants in the environment require decades to develop. Many such diseases, including cancer and neurodegenerative diseases, are now thought to arise through a series of stages that require years or even decades from initiation to actual manifestation of disease. Carcinogenic and toxic exposures sustained early in life, including prenatal exposures, appear more likely to lead to disease than similar exposures encountered later.

### **Hygiene requirements and material basis for the establishment of kindergartens**

Preschool institutions or kindergartens represent non-family form of social care for children from birth until their starting school.

But, in order to provide and meet all the necessary factors that directly or indirectly affect the growth and development of children, it is necessary to monitor both the development of society and the criteria it sets. As a consequence of this there are problems arising in kindergartens that require systematic and timely solution.

Kindergartens really exist and have a defined and important place in educating and bringing up preschool children. Regardless of their administrative (legal) status, or whether they are state, municipal (local), independent or private institutions, or they are organized in a different way, they should meet some basic requirements in order to fulfil their purpose.

### ***Factors that determine micro climate in children's institutions***

Microclimate in kindergarten premises depends on the orientation of buildings towards the sides of the world, on the winds in the region, on the type and distance of green areas and water surfaces, on the arrangement of nearby buildings etc.

Microclimate in such institutions is the sum of all the changes of climate factors, adapted to have proper impact on children's bodies. It is closely and directly connected with changes in the air, quantities of carbon dioxide (CO<sub>2</sub>) in the air, dust, ionization, air temperature, humidity and movement of winds. Optimal conditions in kindergarten premises are improved with ventilation, purification, heating, lighting and good water supply.

It is known that there are a lot of impurities in the atmosphere, but their significance for the purity of the air in kindergarten premises is different, because some of them are formed by mixing, and others are changing during their mutual interaction indoors.

Microclimate conditions in kindergartens change along with constant and daily activities of children and adults, most often by breathing. This can be seen from the difference in the composition of atmospheric and exhaled air (where there are children in the premises, Table 1).

**Table 1: Composition of atmospheric and exhaled air (in percentage %)**

Components	Atmospheric air	Exhaled air	Difference (quantities)%
O <sub>2</sub>	20,94	18,40	- 2,54
CO <sub>2</sub>	0,03	2,30	+ 2,27
H	79,03	78,90	- 0,13
H <sub>2</sub> O	0,50	6,20	+ 5,57

The table shows that CO<sub>2</sub> (carbon dioxide) is the main air pollutant, because its volume is 70-80 times greater in the exhaled air than in the free atmospheric environment. Indeed, the exhaled volume of CO<sub>2</sub> is small and easily diluted in the air, but indoors its quantity rapidly increases, and so does the danger of pollution. For these reasons, the amount of 0.1% (which is a three times higher value of CO<sub>2</sub> than that found in the atmosphere) is taken as a tolerable concentration of CO<sub>2</sub>.

Dust also worsens the microclimate in the premises. Industrial and street dust is also created in kindergartens, as well as organic dust. In addition to solid dust, there are significant amounts of live microorganisms (so-called "live" dust) in the premises, which can also greatly worsen the microclimate in kindergartens. They are commonly transmitted among children through coughing and talking, and they can be entering the body through solid dust. It should be emphasized that microorganisms do not multiply in the air, but they can stay alive in it for weeks and months.

The determination of bacteriological air pollution is very difficult. Mostly the total number of microorganisms in 1m<sup>3</sup> is determined and the number of streptococci and staphylococci because they most often attack the upper respiratory tract and the skin surface and are most easily transmitted in the air.

Four air sediment samples were taken for the bacteriological examination of the air.

**Table 2: Results of bacteriological examination of air samples taken as aero sediment**

<b>Nursery -1</b>	<b>Enterobacter species and Stapylococcus epidermidis – 200 colonies</b>
<b>Dining-room</b>	<b>Stapylococcus aureus coagulaza neg. 200 colonies</b>
<b>Older group</b>	<b>Stapylococcus aureus coagulaza neg. 50 colonies</b>
<b>Hallway preschool</b>	<b>Stapylococcus aureus coagulaza neg. and bacillus subtilis – 100 colonies</b>

According to literature, if there is any number of Enterobacteriaceae present in the air, it speaks for faecal contamination and very poor sanitary conditions in the particular room. The finding of sporogeneous bacteria indicates a strong presence of dust in the air. Such findings are indicators of direct or indirect danger to people's health, especially the most vulnerable population - children who stay in such an environment. We believe that the largest contributor to such air pollution of the premises is the presence of Sintelon carpet on the floor that cannot be completely cleaned despite mechanical and wet cleaning of the floors. Compulsory disinfection of floors which will reduce air pollution is therefore necessary.

According to the program objectives of preventive medicine in the function of protecting the health of children and staff, the Department of Hygiene of the Public Health Institution - Centre for Public Health Stip during the year 2013 re-performed a routine air hygiene control in the following premises: 9 playrooms and bedrooms of Branch-1 and Branch-4 in the Kindergarten "Vera Ciriviri - Trena" and were taken 5 air sediment samples were taken for bacteriological examination of the air that the children and the staff breathe in this centre.

**Table 3: Results of the bacteriological examination of air samples taken as aero sediment**

<b>((Playroom - bedroom) older group Branch 1</b>	<b>Stapylococcuscoagulaza negative – Bacillus subtilis 200 colonies</b>
<b>Playroom – middle group Branch 1</b>	<b>Stapylococcus aureus 100 colonies</b>
<b>Bedroom – middle group Branch 1</b>	<b>Stapylococcuscoagulaza negative – Bacillus subtilis 200 colonies</b>
<b>(Playroom - bedroom) younger group Branch 4</b>	<b>Stapylococcus aureus – 80 – kolnii</b>
<b>Nursery – 1 Branch 4</b>	<b>Stapylococcuscoagulaza negative – Bacillus subtilis 100 colonies</b>

Air sediments were taken from the premises at random during airing the same when there is no movement. Namely, at the point of setting up the plates for air sediment, the children were already asleep and "air dustiness" was less and sedimentation lasted two hours. However, in all the samples the presence of microorganisms was provides a number of colonies as follows:

Pathogenic staphylococci (*Staphylococcus aureus*) and conditionally pathogenic coagulase negative (*Stapylococcusaur. Coagulaza negative*) and bacilli (*Bacillus subtilis*).

The presence of these microorganisms in the inhaled air in the vulnerable population - children aged 1-6 years can cause problems ranging from irritation of the nose and throat (coughing and sneezing) to respiratory infections. There can be a feeling of dryness in the eyes and a need to rub them followed by redness - conjunctivitis. With the dust that falls on tables and toys and the remaining inventory, or with touching and certainly often putting hands in their mouths and licking or sucking toys by children in the nursery and the younger group, these microorganisms are introduced into the digestive system. Therefore health problems (from mild to severe forms of enterocolitis followed by abdominal pain, vomiting and diarrhoea, especially if the food is contaminated) can occur. Outbreaks of frequent allergies and infections of the skin, especially if the skin is hurt, are possible.

### **Conclusion**

The largest contributor to air pollution in the premises is the retention of contaminants - the source of bacteria, viruses, moulds and mites in Sintelon carpets that do not allow proper and thorough hygiene of floors despite mechanical and wet cleaning and regular and proper disinfection.

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