

# **Integrativni pristup problemu sedentarnog načina života mladih u nastavi IKT i fizičkog vaspitanja**

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## **POVZETEK**

Fenomen fizičke aktivnosti i njen uticaj na različite aspekte života čoveka novija istraživanja sve više dovode u vezu sa kulturološkim i ekološkim uslovima. Uvažavanjem ekološkog modela obezbeđuju se sveobuhvatniji okviri za razumevanje uticaja fizičke aktivnosti na zdravlje i život ljudi, kao i mogućnosti intervencije. Rezultati novijih istraživanja ukazuju na veliki pad fizičke aktivnosti kod mladih ljudi između 18 i 24 godina. Cilj ovog rada usmeren je ka ispitivanju problema sveprisutnog sedentarnog (sedećeg) načina života kod studenata i ka iznalaženju mogućnosti za njegovo prevazilaženje u nastavi IKT i fizičkog vaspitanja. Na uzorku od 94 studenata Visoke škole u Vršcu utvrđeno je da slobodno vreme ovi mladi ljudi pretežno provode sedeći, a bitno manje baveći se različitim oblicima fizičke aktivnosti. Konstatovano je da više od polovine ispitanih studenata u slobodnom vremenu sedi četiri i više sati u sedećem položaju najviše surfujući internetom, dok manje gledaju TV i igraju kompjuterske igre. Fizičku aktivnost najveći broj ispitanih studenata upražnjava 1-2 puta nedeljno. Studenti smatraju da prostori u kojima se odvijaju fizičke aktivnosti delimično zadovoljavaju ekološke standarde. Rezultati ovog istraživanja pružaju osnovu za dalja interdisciplinarna istraživanja.

**KLJUČNE BESEDE:** fizička aktivnost, ekološki model, sedentarno ponašanje, ergonomija, studenti.

## **Integrative approach to the problem of sedentary life style of young people in ICT and physical education teaching**

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## **ABSTRACT**

The phenomenon of physical activity and its influence on various aspects of man's life have in the recent research been often associated with cultural and ecological conditions. Respect for the ecological model ensures increasingly more comprehensive framework for understanding of the influence physical activity has on health and life of people, as well as possibilities of intervention. Resent research results have pointed to a great decrease of physical activity of young people aging between 18 and 24. The aim of the paper is to examine the problem of omnipresent sitting way of life of students and to try to find possibilities for overcoming such a serious problem in the teaching of ICT and physical education. According to a research carried out on a sample of 94 Vrsac College students, it has been found that these young people spend their free time predominantly sitting, being significantly less engaged in any form of physical activity. It was established that more than half of the subjects

spend their free time sitting for or more hours a day in a sitting position mostly surfing on the Internet. This predominant free time activity is followed by watching TV and playing computer games. The greatest number of students is physically active once or twice a week. Students consider that the settings they have physical activity in partly satisfy ecological standards. The results of the current research offer possibilities for further interdisciplinary research

**KEYWORDS:** physical activity, ecological model, sedentary life style, ergonomics, students.

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## 1. INTRODUCTION

The phenomenon of physical activity and its influence on various aspects of man's life has recently been increasingly more related to cultural and ecological conditions (Kukolj, 2011; Rollo et al., 2016; Sallis et al., 2015). When analysing developmental changes it is necessary to always have in mind that contemporary life and development of man is a result of comprehensive changes within which interrelatedness of individual components contributes to a complex manifestation of a personality. In such a context, the basic concept of ecological model of physical activity is based on the fact that significant number of factors influences human behaviour and physical activity: intrapersonal (biological, psychological), interpersonal (social, cultural), organizational and environmental (quality of environment, life conditions, objects, furniture, etc.). Respect for ecological model ensures a comprehensive frame for understanding of influence of physical activity on health and life of young people, and opens up possibilities for more encompassing intervention in a variety of fields. Recent research has pointed out that there is a significant and broad interaction and conditionality between physical activity and environment (Spence & Lee, 2003). Development of knowledge on how environment influences physical activity is important for health promotion. Researchers have found that, when there is a greater availability of nature and high quality environment, there is also more intense physical activity which is more frequent and of higher quality (Calogiuri & Chroni, 2014). Humpel et al. (2002) have found that the attitudes of those practicing recreational physical activity, as well as of young people, depends on the availability and aesthetical qualities of the recreational objects. For example, the need to redesign towns and to plan and innovate pedestrian infrastructure has been more and more expressed, having in mind that mobility is the basis for profiling a town as a pedestrian one. Just like biking, walking is one of the "green" forms of transportation with a low level of negative influence on the environment, not spending energy and not creating noise. It can have multiple benefits, not only as form of transportation to work, school or shop, but also having social and health influence (Perić & Farkić, 2013). Davison & Lawson (2006) found that: availability of sidewalks, destinations or distances that can be covered by walking to a certain place, low intensity of traffic, existence of playgrounds and school objects, as well as availability of recreational requisites are important factors of environmental protection positively correlated with physical activity of children and young people.

Adaptation to movement, as a basic motor unit of mobility, is ingrained in human genes as a component of human life. However, in spite of this, a man has gradually found himself in a situation to, due to his modern way of life, be engaged in his everyday activities mostly in a sitting position (Ugarković, 2011; Sturza Milić, 2016). A man has brought his own body,

developed through evolution according to specific movements and motions, to the influences of factors threatening to destroy it. The changes occurring in human development impose demand for corrections and serious reflection. In today's world, body movement and exercise is an effort which is usually avoided by majority of people. The decrease of motor and functional competencies is only one of the reasons for action aiming at sustainability of human development (Sturza Milić & Nedimović, 2014). Movement is one of those crucial human abilities which significantly contributes to quality of life and development.

The benefits of a physically active lifestyle are well documented and it can lead to improvements of physiological and psychological health (Jeffrey, 2010). Physical activity is a key factor for improving and maintaining the capabilities of the human organism, as well as for decreasing the consequences of functional and degenerative illnesses, which are often called "lifestyle illnesses", while a change in lifestyle, which includes an increase in physical activity, can lead to the decrease in the number of illnesses or premature death (Bratic, 2014). Regular physical activity and a healthy diet are two important factors which contribute to the body's resistance to different diseases (Archer & Blair, 2011; Videmšek et al., 2003). Physical activity has a positive effect on the mental state of individuals, it prevents depression and anxiety, neutralizes the effects of stress while simultaneously developing self-respect and a positive view of oneself (Jürimäe & Jürimäe, 2001; Matejak & Planinsec, 2014). Unfortunately, exercise and physical activity have been losing out as primeval values. A lack of exercise does not merely result in biological problems, but also in (self-)alienation from society and an unfriendly attitude towards others (Skof, 2010). Although the beneficial effects of exercise and sports activities for the health of children and adolescents are well known and proven, there has been, especially in developed countries, a decline in physical activity along with rapid weight gain and obesity (The Health and Social Care Information Centre, 2012; Biddle, 2010; Biddle et al., 2004; Deforche et al., 2006; Pisot, 2012, 2014). In the EU countries 2/3 of the population at age of 15 and older are not sufficiently active and this especially true for the eastern region (WHO, 2002). In this context, according to the World Health organization, adults aging between 18 and 64 should do at least 150 minutes of moderate-intensity aerobic physical activity in a week, or do at least 75 minutes of vigorous aerobic physical activity through the week, or an equivalent combination of moderate – and vigorous intensity activity (WHO, 2010). Studies regarding the physical activity behaviour of university students found approximately 35% to 75% of students fail to obtain the recommended amount of physical activity. PA participation statistics indicate a significant decline of PA rates appears to be happening when young people transition from high school (adolescence) to university (Andrijašević et al., 2010; Gomez-Lopez et al., 2010; Rowland, 1999; Znidarec Cuckovic & Ohnjec, 2014). Studies dealing with physical activity of student population have found that between 35% and 75% of students is insufficiently physically active (Gomez-Lopez et al, 2010). Recent research results point to a significant fall of physical activity of adults aging between 18 and 24. It seems that the critical, i.e. a turning point in the decrease of physical activity is during the transition between secondary school and university. Only few percentage of secondary school students lead truly active life style. The study results illustrate that education on practicing sportive recreational activities in the free time along with promotion of an active and healthy lifestyle are insufficient for students in high school and at university whereas temptations are, unfortunately, countless and

alluring. Reasons for this decline in physical activity may be due to the pressure on university students to perform well academically and a decline participation in sports activity. Another plausible reason for the decline in due to the limited number of physical activity intervention tailored to meet the needs of young adults (Han et al., 2008). We need to create conditions for regular physical activity, in any form, with a note that certain population groups need special attention. Here we primarily refer to children and the young as well as the elderly. Of course, we shouldn't neglect students, who will soon become a part of the working active population (Abazovic et al., 2014; Andrijasevic et al., 2014; Cerar & Kondric, 2014; Pedisic, 2014; Sturza-Milic, 2013).

Through promotion of ecological model of physical activity of children in preschool institutions, young people in schools and university students, we are fighting back the fall of physical activity and increasing the chance for higher life quality in adulthood. The way young people and students spend their free time has influence not only on their health, but also on the sustainable development of each society. Unfortunately, the devastating data related to insufficiently physically active young individuals are even more emphasized in the case of student population.

Modern society relies on the increasing presence of technology diminishing time and energy necessary for dealing with everyday working and other activities and brings about more free time. The way in which an individual spends his/her free time illustrates his/her lifestyle. Free time activities, including physical activities, educational, cultural and artistic activities, as well as active participation in the community life, contribute to the development of physical, intellectual and emotional potentials of young people, but they have to be carefully and thoughtfully designed (Stebbins, 2005). Apart from those already mentioned activities, modern life style and technology development have introduced "through the back door" other forms of activities, which cannot apriori be classified under physical (on the contrary!), educational, cultural, art... Nowadays many economic branches in various countries, as well as many powerful industries are unfortunately existing designing free time of young people (Neljak & Milanović, 2007; Sugiyama et al., 2015). Spending a great number of hours in a sitting position while surfing on the Internet, playing video games on different devices, using a whole range of different applications, etc, must beyond dispute be characterized as a passive free time. Development of free time culture, active participation and action, in the flood of numerous offers and incentives of suspicious quality and influences is a key issue of upbringing influence which starts in a family, to be continued at school and higher education institutions (especially those educating future preschool teachers, teachers, pedagogues), as responsible institutions of upbringing and education (Prskalo et al, 2010). Therefore, in the context of modern life, there is a need to adjust education of future preschool teachers to new conditions and demands. The issue of education and professional development of preschool teacher in the changed civilization circumstances is one of the most important issues for the positive outcome of the work with preschool children within physical education (Rajtmajer, 2008; Sturza-Milić, 2016). It is important, among other things, to search for more versatile and efficient teaching methodology actions. In the spirit of the discussion on the ultimate necessity to raise physical activity of students – future preschool teachers, it is important to consider what are those course which could according to their contents and teaching methodology contribute to solving of the stated problem, as well as which are those teaching

courses which might be innovated in this sense (of course, along with the awareness that the innovations (i.e. changes) will not occur only to change something, but they will be in the first place harmonized with the possibilities of specific courses, interests of students, abilities of teachers, proscribed curricula, equipment existing in the educational institution, etc. We believe it would be purposeful for students to get familiar through various courses during their studies with the factors of risks existing due to being physically passive and leading a sedentary life stile, as well as with the possibilities of spending their free time in a healthy way through physical activity. In this context, solutions to many problems resulting from sedentary behaviour of young people can be searched for in greater interest for ergonomics and its reaches as a science, as well as practical activities. Knowledge on ergonomics and its influence can be presented to students through interdisciplinary contents of ICT courses and PA teaching methodology.

### 1.1. ERGONOMICS

The term *ergonomy* (Greek *ergon* – work, gr. *nomos* – law) comes into the limelight in parallel with the increased use of computers, not only for business purposes, but also in private lives. However, this multidisciplinary science, to put it simply, actually examines the relation between a man and his/her working setting, i.e. environment, and according to the definition of *International Ergonomics Association (IEA)* ergonomics is a scientific discipline dealing with understanding of interaction between people and other elements of the system, applying theory, principles, data and project methods aiming at optimisation of well-being of a man and comprehensive performances of the system (Pejčić, 2015: 1). *Ergonomisation* implies design of products, environment and jobs so that they become harmonized with the needs, abilities and limitations of people.



**Picture 1:** Ergonomics – visual illustration according to *International Ergonomics Association (IEA)*

Ergonomics promotes a holistic approach involving the issues of physical, cognitive, social, organizational, social, ecological and other relevant factors. The fields of application of

ergonomic principles are not mutually exclusive and they tend to be constantly changing; new ones occur, while old ones take over new perspectives.

Basic classification boils down to:

- physical ergonomics
- cognitive ergonomics
- organizational ergonomics.

Physical ergonomics deals with human anatomic, anthropometrical, physiological and biomechanical characteristics referring to physical activity. Cognitive ergonomics deals with mental processes, e.g. perception, memory, conclusion making influencing interaction between people and other elements of the system. Organizational ergonomics deals with optimization of socio-technical systems, including their organizational structures, politics and processes.

Originally, when ergonomics started to develop as a science, in the phase called *corrective* or *classical* ergonomics, the focus was on the research dealing with the relations man – machine, striving for the establishment of shortcomings or disharmony aiming at improvement of the existing systems. Through the acceptance of the principle of systematic, methodological approach, new fields of system / preventive / projective ergonomics have been developed.

Along with the more intense use of electronic devices, ergonomics has been primarily mentioned in the context of sitting in front of the screen of a *desktop* computer. It refers to proper body posture which should be ensured by a chair offering possibilities of regulation of height and angle of the back of the chair. The topic has become relevant when it was established that the choice of inappropriate chair can cause pain and stiffness in one's back, shoulders or arms. Apart from anatomically adjusted chairs, the designers have immediately offered anatomically adjusted peripheral devices. Keyboards and mice have taken unusual, but ergonomically adjusted forms.



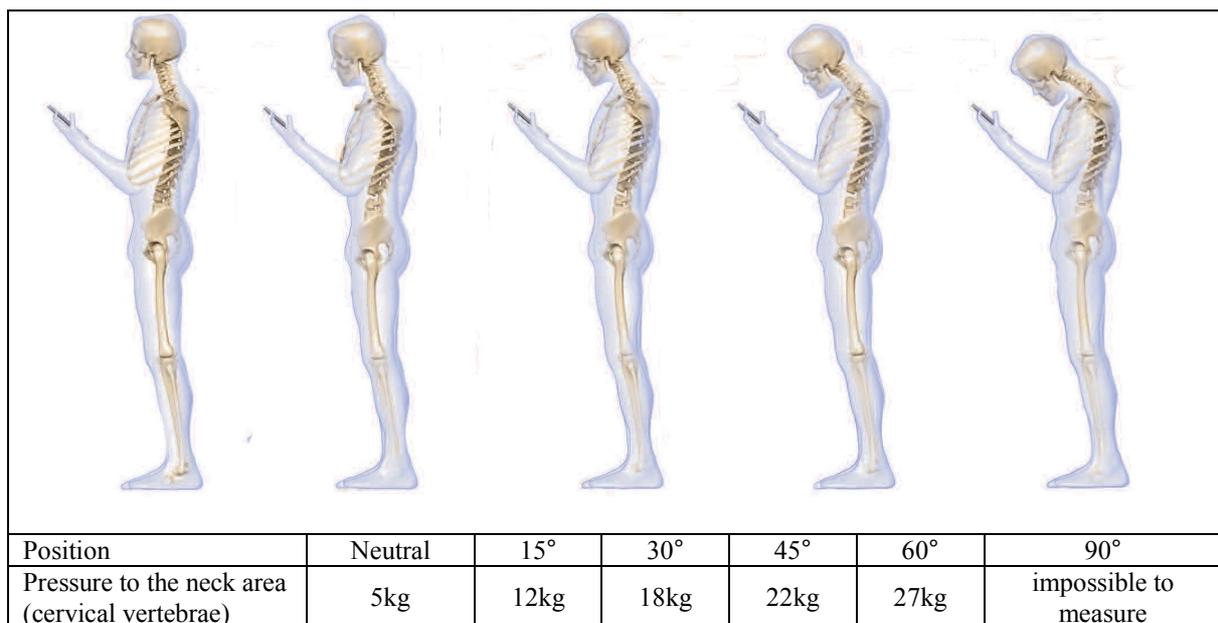
**Picture 2:** Ergonomically shaped keyboard and mouse

Further development of electronic devices has led to general miniaturisation, so that today laptop computers, as well as mobile phones are dominating devices equally used by both old and young people. Thanks to their dimensions and large capacity batteries of mobile devices, their great autonomy was reached; in other words, the user was not *bound to* a chair and desk any longer, or to the source of electric energy. Such a situation has opened up possibilities for *creative* use of other parts in the room and other pieces of furniture in order to enjoy in multimedia contents.



**Picture 3:** Creative use of space and furniture

It is also true today that the user can access the Internet through a wireless connection *anywhere* and *any time*, so that it is strictly forbidden to use mobile devices in driving, and it is not a rare case that there are warnings in the pedestrian zones, drawing users attention and warning to avoid using their phones, so that they would not endanger not only themselves but also other people. In view of using of mobile devices it is important to mention at this point that inadequate body position can also cause consequences in the form of pain in various body parts, especially in the neck.



**Picture 4:** Pressure to cervical vertebrae expressed in kilograms depending on head position

Position of one's arm and hand, as well as electromagnetic radiation the user is exposed to are further aspects to be considered in the context of overuse of mobile phones, i.e. electronic devices in general. Ergonomics offers solutions in practice in the form of products design, along with the comment that these are not ultimate solutions for overuse; as a consequence, the users are advised to have a rest after certain period of time of using electronic devices, as well as to be physically active in such a way to evenly activate all the body parts and muscles, preventing stress and their spasms, as well as deviations of the skeletal system.

## **2. RESEARCH METHODOLOGY**

Research aim was to examine what dominates the life of young people (college students): physical activity or sedentary lifestyle. The research conducted in February 2017 included more than 100 subjects, Preschool Teacher Training College students; the research sample consisted of 95 validly filled questionnaires. Due to the nature of the profession they opted for, the sample subjects were primarily females – 89, and only 5 subjects were males. In regard to their year of students, there were 34 of 1<sup>st</sup> year students, 45 of 2<sup>nd</sup> year students and 15 of 3<sup>rd</sup> year students.

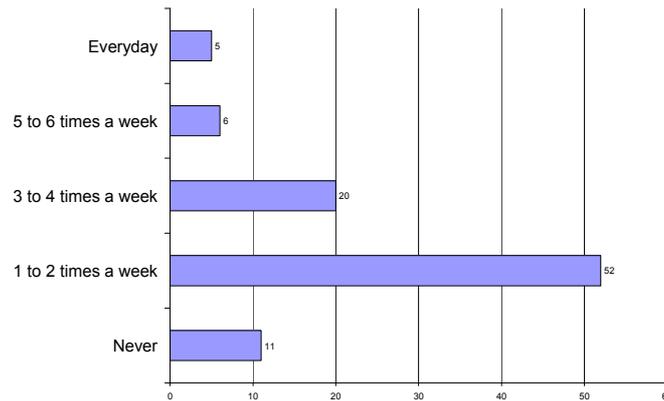
Poll technique was used according to a written questionnaire as an instrument, which was designed for the purpose of the research.

Apart from general address to subjects, the questionnaire consisted of two parts – one dedicated to examination of frequency and forms of physical activity and another part dedicated to examination of forms of dominant sedentary behaviour of students. The questionnaire was designed in such a way to comprise a number of open and close type questions referring to physical activity and sedentary life style predominating free time of the subjects, rather than to activities related to active transport or time spent in working or attending teaching. In the items dealing with physical activity, the questionnaire included a five level scale of frequency of physical activity: 1) everyday physical activity; 2) 5-6 times a week; 3) 3-4 times a week; 4) once or twice a week and 5) never. In order to positively reply to a question if they are engaged in any form of physical activity, the subjects had to be involved in it minimally 60 minutes, or more times during the day in the intervals not shorter than 20 minutes in continuity. The questionnaire also included 2 close and 2 open questions regarding the nature (form) of physical activity they are engaged in, as well as type and quality of space they are physically active in.

In the part of the questionnaire dedicated to the estimation of sedentary lifestyle, 4 close type question referred to the estimation of the following: 1) total free time spent sitting or lying; 2) estimation of the time spent watching TV; 3) surfing the Internet and 4) playing computer games. The last question referred to ranking of the stated offered contents (watching TV, surfing the Internet or playing video games) according to frequency (1 – most frequently, 2 – less frequently, 3 – least frequently), while students could also have stated and ranked the activities they are involved in sitting/lying position, and which are more specific (studying, reading a book, listening to music, etc). The results are processed according to descriptive statistical analysis and they are graphically shown below.

### 3. RESEARCH – RESULTS

The questionnaire consisted of a larger number of questions, and only the responses to those questions which according to the obtained results deserve our greatest attention will be shown here. One of the questions giving a clear picture on physical activity of the polled subjects, regardless of their gender is: *Estimate the frequency of your dealing with sport-recreational contents*. The responses are shown in the graph below:



**Graph 1:** The frequency of dealing with sport-recreational contents

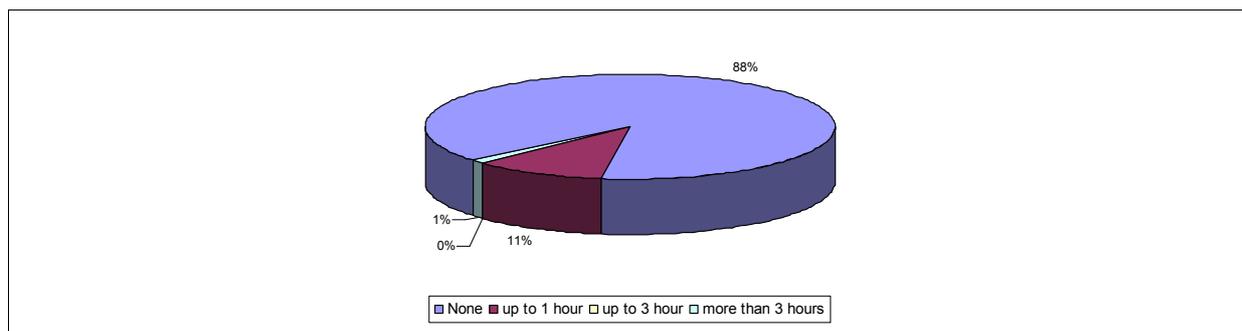
The greatest number of the polled students (more than 50%) deal with sport-recreational contents once or twice a week, and the number of those who are significantly more physically active is complementary to those who are completely passive (11); approximately 20% of subjects have moderate physical activity – 3 to 4 times a week. Female students often opt for jogging (34), walking or fast walking (17), fitness, exercises or cycling (8 responses for each activity), gym (6) and table tennis, skating, zumba dance, folk dance and volley ball (up to 4 responses), while, on the other hand, male students predominantly play basketball and football. In most cases only one answer is offered, rarely two activities are stated, and only in individual cases three types of sport-recreational contents are offered. Accordingly, the total number of the stated activities outnumbers the total number of subjects. In contrast to this, the following numerical data, in total, often do not match the number of subjects, since those who *never* deal with sport-recreational contents did not offer any answers regarding the form of physical activity. In regard to the ambient, i.e. the setting in which these physical activity occur, 32 responses refer to open space, 16 to close space, while 40 subjects responded that they are engaged in their physical activity both in open and close space. As for the question: *does the space you deal with your sport-recreational activity in satisfy ecological standards*, 16 students did not offer any answer, 61 of them responded positively and 11 of the subjects responded negatively, offering the reasons why. The ecological shortcomings of the space they are physical active in are as follows: garbage, pollution (of air due to traffic), bad air-conditioning, stuffiness...

What follows are the responses regarding the sedentary lifestyle of young people, i.e. the scope of activities dominating the free time of student population, i.e. the research sample, referring

mostly to sitting or lying in front of a TV, computer screen, or other electronic devices. Numerical data are given in combination of tables and graphs showing percentages.

**TABLE 1.** The results directly related to *sedentary way of life of young people*.

<b>Please, estimate how much time daily you spend:</b>					
<b>sitting or lying</b>	<b>up to 2 hours</b>	<b>up to 4 hours</b>	<b>up to 5 hours</b>	<b>more than 5 hours</b>	<b>Total</b>
	25	31	20	18	94
<p>Legend: up to 2 hours (blue), up to 4 hours (maroon), up to 5 hours (yellow), more than 5 hours (cyan)</p>					
<b>watching TV, films or shows</b>	<b>None</b>	<b>up to 1 hour</b>	<b>up to 3 hours</b>	<b>more than 3 hours</b>	<b>Total</b>
	10	38	33	13	94
<p>Legend: None (cyan), up to 1 hour (maroon), up to 3 hours (yellow), more than 3 hours (blue)</p>					
<b>sitting or lying using the Internet</b>	<b>None</b>	<b>up to 1 hour</b>	<b>up to 3 hours</b>	<b>more than 3 hours</b>	<b>Total</b>
	0	23	40	31	94
<p>Legend: None (cyan), up to 1 hour (maroon), up to 3 hours (yellow), more than 3 hours (blue)</p>					
<b>playing computer games</b>	<b>None</b>	<b>up to 1 hour</b>	<b>up to 3 hours</b>	<b>more than 3 hours</b>	<b>Total</b>
	83	10	0	1	94



It is possible to make following statements according to the outlined results:

- One fourth of the subjects spend up to 2 hours sitting or lying, while majority of students, i.e. 70% of the subjects spend 4 and more hours sitting or lying.
- 75% of the subjects spend from 1 to 3 hours a day watching TV or films
- Less than one fourth of the subjects spend up to 1 hour sitting or lying surfing the Internet (it is worth mentioning here that there are none who do not use the Internet); the rest of the subjects spend significantly more time in this activity (up to 3 hours - 43%, and one third of the subjects more than 3 hours).
- The student population included in the research spend little time playing video games, i.e. only 12%; this finding deserves further comment in the text to follow.

Finally, male and female students were asked to rank the offered activities they are involved in according to frequency. The following activities were offered:

- Watching TV.
- Surfing on the Internet.
- Playing computer games.
- and possibility to offer some other activity they do sitting.

Surfing on the Internet is the most frequent (75) first response, while almost the same number of the subjects chose watching TV as the second predominant activity (73); finally, playing computer games was their third choice (25), which is in accordance with previously made statement that the participants in the research rarely dedicate their free time to this activity.

#### 4. CONCLUSION

Research findings have confirmed the statement (Dopsaj, 2014) that the urban way of life has produced the effect of inversely proportional mechanism according to which the conformity of life, as a heritage of modern civilization, has conditioned the occurrence of sedentary lifestyle in young people (college students), i.e. a style of life lacking the appropriate necessary amount of physical activity. It was found according to the research that the number of subjects who are engaged in some form of physical activity on daily basis is alarmingly low (6%), while the largest number of the polled students, about 50%, is engaged in physical activity only once or twice a week, which is insufficient for preservation of health, according to the World Health Organization (WHO, 2012) and corresponds with the results of similar studies (Andrijašević et al, 2014; Sturza Milić, 2013; Sturza Milić & Nedimović, 2014; Zajec & Cemič, 2010; Žnidarec Čučković & Ohnjec, 2014). Students mostly express the opinion that they space in which they

have various forms of physical activity satisfies ecological standards, but there are also standpoints that a problem of pollution of environment is present (garbage, polluted air, etc). These results are also in accordance with the studies associating the phenomenon of physical activity and its influence on various aspects on man's life with environmental conditions (Rollo et al., 2016; Sallis et al., 2015). Research results have shown that students are insufficiently physically active and that they spend significant number of hours sitting and being engaged in activities mostly including: surfing the Internet and watching TV, which is also evident in the research conducted by Bratić (2014) and Dopsaj (2014). Having in mind that ergonomics as interdisciplinary science promotes holistic approach to considerations of the examined problems, through careful observation and planning of adequate contents within education of future preschool teachers, it is possible to avoid or prevent negative trends, postpone or mitigate possible degenerating changes, thus contributing to the improvement of life quality of young people who, as it was found by the research, spend most of their free time in a sitting position. Changes in one's behaviour are conditioned by changes in the value system of an individual, assuming changes of personal motivation, education, being well informed, etc. Investment in one's own health should be one of the ultimate aims of young people, while promotion of healthy lifestyle, assuming everyday physical activity in healthy environment should become a significant task of education at all institutional levels. Research results offer guidelines and impose obligation to turn to interdisciplinary approach to solving of omnipresent problem of sedentary life style of young people.

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