Impact of virtual space games on younger elementary school children

Playing has always been a central activity in the life of every child. Younger children in elementary school may acquire certain skill through playing, develop abilities and adopt curriculums. The most famous pedagogues and psychologists wrote about the phenomenon of play, on its impact, function and significance in child development. They all agree that the play is a powerful tool for encouraging full development of personality, since it allows cognitive, emotional, social and physical development of the child, preparing it for the future. Research in the field of virtual space and its influence on the mentioned age group in our country is still in its infancy, but more attention is paid to it as the schools introduce computer technology.
Key words: play, virtual space, virtual reality, computer, virtual (computer) games

Theoretical approach to the research

In conditions of rapid technological developments education and schooling of children are under the influence of the increasing effects of modern technological achievements. When it comes to the negative sides of innovations the best indicators of how to take advantage of them and how to act preventively at them are the customers; and the professional community, through the research of problems, can give final judgment substantiated with the facts.

The way kids play developed and changed throughout history with the changes of societies and the forms of its designs. In primitive society the only aim of play was to prepare and introduce children to the world of adults, while with the development of the society and the creation of private property and the division of roles in the family, play became a tool for learning, and sometimes play itself was the purpose which was turning into a pure form of leisure and entertainment. “The word ‘play’ is used in the sense of fun, entertainment; in a figurative sense, e.g. ‘playing with fire’ meaning something unusual—‘a game of nature’, or accidental—‘a game of faith’.”
With the development of the computer technology and the advent of virtual space the playing still remains the primary mean that a child uses to learn, but now it is more playing in virtual space. Virtual space is the opposite of the real space. Several authors have attempted to define virtual space with more or less success. Considering all that it represents, it is not easy. Definitions mainly refer to a specific context that can be presented in a virtual reality. Each reality happens in one area, and from that we can conclude that the virtual reality happens in virtual space that is real and veritable to it. “The concept of virtual reality means the simulated world within which a computer user can have the feeling of “going in” either through special glasses that cover 180° of vision field and a special interface for the entire body, or through using some simple animated representation of three-dimensional world - like those used by architects” (Munici and Jeličić, 2008, p. 50).

As we can see from this definition, for the virtual space we need a mediator (an interface) that allows to each user a specific way of using that new space, which for him is verity and reality. Computers and computer games are the bearers of activity in the virtual space, or the most important mediator between the user and the virtual space. However, we can often
простора. Међутим, често ћемо чути да се корисник виртуелног простора одваја од реалности, али како говоримо о томе не смијемо заборавити да је виртуелни простор за многе пословне људе незаменили моност во обављању разних пословних задатака, па зашто онда не би виртуелни простор био реалност за учење, друштвено или у нашем случају игру?! “Позитивна страна виртуелних појавности могла би бити у томе што она омогућује да сада несуштено зарањање у апипикацији и деловању без последица, то се у њој види нешто иновативног у нове образовне технологије. Корисник може да се „кршће“ по виртуелном свetu, па чак и да „долерије“ иначе невидиво и неводирајиво” (Богојевић, 2002, стр. 429).

Дакле, је потребно да личност посједује могућност брзог припитомљавања јер се свијет брзо мијежи и он не може да чека она који нису у стању да прате тенденце. Свијет постаје једно „глобално село“ у којем је највећа моћ имати информацију у правом грешку туку да би се потребе могле задовољити брзо и ефикасно. Виртуелни простор је и створен да би информације могле бити брзе и ефикасније измјењиване, односно преношене. Истраживањем виртуелног простора друштву се омогућава идентификација могућих утицаја тог новог простора за игру на развој дјече младег основношколског узрasta чија личност треба бити оплескеног таквим компетенцијама које ће доприносити развоју друштва у њелими.

С обзиром да је наше вријеме „за-
D. Lozjaković: IMPACT OF VIRTUAL SPACE GAMES ON... OUR SCHOOL 2014 Banja Luka

Life, including the children’s play area, it is necessary to come as quickly as possible to some new discoveries in the field of virtualization play and illuminate the concerns that have been placed in front of the expert public. This is particularly important because of the rapid development of technology and virtualization of the society in all segments of life. “Virtual reality representation, using virtual appearance as a new medium, provides the construction of a model of reality whose possibility of combining is huge, whereby the probability to predict future events significantly improves” (Bogojević, 2003, p. 25). Knowledge of the virtual environment and its possibilities, both in positive and negative consequences for the younger children in elementary schools, will surely help parents and teachers in choosing the appropriate approach in fulfilling the needs of the younger children in elementary schools.

Research of the virtual space for educational practice is very important because the computers have already experienced the full affirmation of schools, or they are applied daily in practical purposes. Of course, it should be noted that the younger children in elementary schools come in schools in growing numbers with the experience gained in the field of computer technology, so the school work would be more effective if it were known what impact this new space, which occupies the attention of the young, have on the development of the interests and capabilities of the younger children in elementary schools.
The methodological approach to the research

The complexity of the virtual space and yet his lack of research require to the researcher to use a specific methodology, but it also provides the possibility of more creative approach to the study of the identified problem.

The problem and the subject of the research

The requirements of modern times and technologically developed society change from year to year. These changes inevitably require of all constituents of society as a whole to engage quickly and appropriately to resolve the issues in the past, but also to act preventively so the future society would be more efficient and functional.

Educatokin as one of the basis for development of any society has a difficult task. It is a requirement that educational institutions should rapidly educate required personnel to use modern technological advances in order to improve the educational work and find more adequate methods and techniques that will enable the adoption of curriculums at easier and individually responsible manner. There are a number of factors that affect the life making it divers and rich. Diversity is a very important feature of life, so we can say that the diversity is a requirement for survival. If we turn
D. Ložnjaković: IMPACT OF VIRTUAL SPACE GAMES ON...

OUR SCHOOL 2014 Banja Luka

je разноврсност услов одимна живота. Окрењемо ли се око себе виждимо колико је само разновршен понашања потребно да се једна индивидуа при-
лагао потребама друштва, али и да из своје средине и природе која ју окру-
жује узме или прилагоди оно што јој је потребно да задовољи сопствене потребе. Разноврсност подстице миштање, креативност и стваралаштво, а то су уједно основни задаци васпитно-обра-
зовних установа у васпитању и образовању дјеце мањег основношколског узраста. Дјете које не машта „осуђе-
но” је на досаду и ограничен простор за сопствени развој.

Сложеност стварног свијета, „свијета живота”, захтева бржи предлазак дјеца на појмовно размишљање. Појмовно мишлење је у својој основи ра-
ционално што је супротно ономе што је дјечи потребно да развија своје когнитивне способности и да се разви-
вају у емоционалном и сваком другом погледу као продуктивне личност способна да граде, прилагажају и иновирају свијет у којем живе. Ираци-
онални свијет је тај који дјечи мањег основношколског узраста омогућава да на себи прихвате начина представе свијет оправдан и да развијају способно-
ности које пред њих ставља друштво. За маствање је потребан „слободан про-
стор”, простор у коме је све дозвољено.

Развојем технологије појавио се нови простор за игру у коме дјечи имају могућност да на један нови, по-
себан начин, граде свој свијет маши не без потребе задовољавања логиче-

around, we will see how many various behaviors are needed in order to one ad-
just to the needs of the society, but also to adapt to its environment and the nature that surrounds it what is necessary to meet its own needs. Diversity encourages imagination, creativity, and creation, and those are the basic tasks of educational institutions in the upbringing and education of the younger children in elementary schools. A child who does not daydream is “doomed” on boredom and limited space for personal development.

The complexity of the real world, “the world of life”, requires a faster tran-
sition of children to conceptual thinking. Conceptual thinking in its essence is ra-
cional which is opposite to what children need to develop their cognitive abilities and to develop the emotional and every other aspect as a productive person able to build, adapt and innovate the world in which they live. Irrational world is the one that allows the younger children of elementary school to present in itself acceptable manner the adult world and to develop skills posed by society. A “free space” is necessary for daydreaming, a space in which everything is permitted.

With the technology development a new game room where children have the opportunity to build, in a new and special way, their fantasy world without satisfying the logical structure of opinion has appeared. This new game room is a virtual space with the new opportunities and play context which replaces
the space in which dominated the playing activities of different roles. Virtual space, very quickly and for a relatively small price, offers an amazing number of facilities that through computer games or global network “Internet” encourage children to creativity, imagination and activation of their capacities, all for the purpose of personal development.

It is the emergence of virtual space, which is imposing as a new play area for the younger children elementary school, and the opportunities it offers, as well as reflections on the development of creativity and creation, and comprehensive adoption of curriculums in certain areas, which have been selected as the basic problem we have studied in our research. We will put the younger children in elementary school in focus the light of new space for playing in virtual space.

Why children find this new world so interesting so that they can sit for hours in front of the monitor and repeat over and over again the same or similar action? Is it a sense of power that it can control everything or mix of colors and situations that are not possible in the real world, or something else?! The questions at which it would be very interesting to answer—directly and accurately! Are things which are elusive and free always more interesting and attractive? This new game space is infinite, unlimited and constantly offers something new which urges a child to the new way thinking and encourages its development.

The research topic is the virtual space...
and its impact on the younger children in elementary school, the impact of the change in the nature of the game and on the opportunities that the game gives in the virtual reality for dealing with the objective reality and creating perceptions about the world beyond the familiar environment, the environment in which the child is accustomed to.

The aim and the tasks of the research

The aim of the research is to determine the level of interest and awareness of the younger children in elementary school for playing in virtual space, identify possibilities which this space has for playing, raising the level of knowledge and developing creativity, and determine its positive and negative traits as a new space for playing from the perspective of parents and teachers.

This aim leads to the following tasks:
1) Determine the extent to which computer skills affect the improvement of knowledge of the Serbian language; 2) Determine the extent to which computer skills influence the improvement of knowledge in mathematics; 3) Determine the extent to which the younger children in elementary school, who use computers, resolve more successfully the tests of creativity; 4) Establish the teachers' opinions about the impact of virtual space to the younger children in elementary school; 5) Identify the parents'...
Технике и инструменты наслаждения

У исследовании смо применили техники тестирования и скалирования, а мјерени су извршени окалама процјенама за родитеље и учителе, тестовима знања српског језика и математике те тестом креативности за ученике.

У фокусу наших интересовања је одређивање нивоа познавања градених уметности језика и математике те успјешност рјешавања креативних задатака уз употребу рачунара те позитиван и негативан утицај тих рачунара на ученике млађег основношколског узраста. Тестирање смо провели на узорку од 240 ученика трећег разреда основних школа на подручју општина Брод и Дервента јединицама у два раза по истим критеријумима. Критеријуми су следили: образовни ниво родитеља, мјесто станованаса, успјех на полугоцидура и пол, а једина разлика између група била је употреба рачунара. У правилу, у ове сврхе се употребљавају тестови који најдиректнији њени служе за прикупљање информација о постигнутом васпитно-образовном нивоу

In this research, we applied the techniques of testing and scaling, and measurements were made by the evaluation scales for parents and teachers, tests of knowledge of the Serbian language, tests of mathematics, and test of the creativity for students.

The focus of our interest is to determine the level of knowledge of the Serbian language and mathematics, rate of success of solving the creative tasks using computers, and the positive and negative impact of these computers at the younger children in elementary school. Testing was done on a sample of 240 students from the third grade of elementary schools in the municipality of Brod and Derventa uniformed into two groups according to the same criteria. The criteria were: educational level of parents, place of residence, the success on the half semester and gender, and the only difference between the groups was the use of computers. Generally, the tests that most directly serve to gather information about the progress of the level of education or progress of students in any field
Резултати и дискусија

The results of the discussion

One of the tasks of our research was to determine whether a computer as a barer of the activity in the virtual space has an impact in raising the level of knowledge of the Serbian language. Students who used computers accomplished significantly better results in the tests of the Serbian language that those students who did not use it.
Табела 1

_Резултати теста из српског језика ученика трећег разреда_

Table 1

_Test results of the third grade students of the Serbian language_

<table>
<thead>
<tr>
<th>Групе у истраживању / Groups</th>
<th>Ученици који користе рачунар / The students who use computers</th>
<th>Ученици који не користе рачунар / The students who do not use computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Успех на тесту / The success of the test</td>
<td>66.66%</td>
<td>33.33%</td>
</tr>
<tr>
<td>Коefficient варијације / Coefficient of variation</td>
<td>26.87%</td>
<td>55.82%</td>
</tr>
<tr>
<td>t-омјер / t-ratio</td>
<td>t = 9.23</td>
<td></td>
</tr>
</tbody>
</table>

Процентално изражено, успјех ученика који користе рачунар је на нивоу од 66.66% успешно ријешених задатака, док су ученици који не користе рачунар биле мање успјешни и то на нивоу од 33.33% успешно ријешених задатака. Очигледно је да су радећи тест из српског језика успјешнији биле ученици који су имали искуство рада на рачунару тањо да на основу добијеног резултата израчунавања t-омјера (t = 9.23), може се закључити да постоји статистички значајан разлика у постигнућу на тестовима знања из српског језика између ученика који користе рачунар и оних који немају то искуство на нивоу значајности од 0,01 (t = 2.58) или са 99% сигурности.

Да би остварили увид у хомогеност између група ученика, израчунали су коефицијент варијације који за групу ученика који користе рачунар износи 26.87%, а за ученике који га не користе коефицијент варијације је 56.82%. Из добијених резултата види се да је група ученика који користе ра-

In percentage terms, the students who use a computer had a success of 66.66% of successfully solved problems, while students who do not use computers were less successful and they had 33.33% of successfully solved problems. It is obvious that in doing the test of the Serbian language the students who have had experience with working on computers were more successful. So, upon the basis of the final results of calculating the t-ratio (t = 9.23), we can conclude that there is a statistically significant difference in achievements on the tests of Serbian language among the students who use computers and those who do not have that experience at the level of the significance of 0.01 (t = 2.58) or with 99% of certainty.

To gain the insight into the homogeneity between the groups of students, we calculated the coefficient of variation for a group of students who use computers which was 26.87%, and for the students who do not use computers it was 56.82%.
From the results it can be seen that a group of students who use computers is a lot more homogeneous and that their answers are more balanced from peers who are not computer users. On the basis of the fact that the groups before the testing were uniformed we can confidently conclude that the group homogeneity in giving their answers was influenced by the experience of the virtual space. According to the results achieved, we could say that these two groups have done different tests because they are uniformed under the same criteria. However, this is not our case. Both groups were tested with the test of the same weight and the same measurement characteristics.

As well as in the previous case, where we have shown the results which students achieved on the test of Serbian language, now, we have processed the test results of the third-grade on the mathematics test in exactly the same way, and also have applied the same statistical methods.

Таблица 2  
*Резултати теста из математике ученика третьего разряда*  
*Table 2*  
*Test results of the third-grade on the mathematics test*

<table>
<thead>
<tr>
<th>Groups / Групе у истраживању</th>
<th>Ученици који користе рачунар / The students who use computers</th>
<th>Ученици који не користе рачунар / The students who do not use computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>The success of the test / Успјех на тесту</td>
<td>54,50%</td>
<td>31,58%</td>
</tr>
<tr>
<td>Coefficient of variation / Коефицијент варијације</td>
<td>28,24%</td>
<td>58,15%</td>
</tr>
<tr>
<td>t-ratio / t-омјер</td>
<td>$t = 7.34$</td>
<td></td>
</tr>
</tbody>
</table>
Израчунавали смо врху од рец. резултати, па на основу добитог резултата може се закључити да постоји статистички значајна разлика у постигнућу на тестовања знања из математике између ученика који користе рагучар и оних који немају оно искуство на нивоу значајности од 0,01 ($t = \geq 2,58$) или са 99% сигурности.

Ученици који користе рагучар постигли су значајно боље резултате на тесту из математике од ученика који га не користе и то у односу од 54,50% према 31,58%.

Коелфицијент варијације за групу ученика који користе рагучар износи 28,24%, а коелфицијент варијације за ученике који немају искуство употребе рагучара износи 58,18%. Из добијених резултата види се да су ученици који имају искуство на рагучару хомогенији уједначенији у својим одговорима него што су то ученици који не користе рагучар. С обзиром да су групе прије тестирања уједначене, можемо са великом сигурношћу редићи да је на хомогеност групе и њихових одговора утицано искуство из виртуелог простора, односно коришћење рагучара.

У склопу нашег истраживања било нам је важно добити неке показатеље о утицају виртуелог простора на развој креативности и стваралаштва ученика мањег основнишколског узраста. Наме, друштво будућности намење потребу убрзаног школовања, велику покретливост и способност

We calculated the value of the t-ratio ($t = 7.34$), and on the basis of the obtained results it can be concluded that there is a statistically significant difference in the achievements on the tests of mathematics among the students who use computers and those who do not have that experience at the level of the significance of 0.01 ($t = \geq 2.58$) or with 99% of certainty.

Students who use computers achieved significantly better results on the mathematics test than students who do not use it, 54.50% versus 31.58%.

The coefficient of variation for the group of students who use computers is 28.24% and coefficient of variation for the students who have no experience of using computers is 58.18%. From the results it can be seen that students who have experience with computers are homogenous and even in their answers than the students who do not use computers. Since the groups before the testing were uniformed, we can certainly say that the homogeneity of the groups and their responses were affected by the experience of the virtual space and the use of computers.

In our study it was important to get some indication about the impact of virtual space on the development of the creativity and creative work of the younger children in the elementary school. Namely, the future society imposes the need for accelerated education, high mobility and the ability to adapt to the frequent changes and accelerated technological develop-
The results show that $t$-ration is 5.40. According to the given result we can conclude that there is a statistically significant difference in the achievements among the tests of creativity between the students who use computers and those who do not, at the level of the importance of 0.01 ($t = 2.58$) or with 99% of certainty.
The students who use computers achieved way better results from those who do not use computers (57.85% versus 46.72%). The final results, from the both groups, on the creativity tests are something lower than those on Serbian language, but better than those on the mathematics test. We think that this result and the mutual relations among the final results of the tests indicate that experience of the virtual space has impact on the success, that is, that the computers help in developing creativity.

In order to have an insight in the homogeneity of the groups we calculated the coefficient of variation. For the students who use computers it is 34.23% and for those who do not it is 43.56%. Thus, we can see that the students who have experience with the computers were more homogenous and more even in their answers.

The creativity test was of the verbal type, so it was expected that the results were closer to the results of the Serbian language test than to those of the mathematics test. However, in order to be sure in which level computers help in developing creativity we should do some additional research in that field. This is the issue for a new research.

The teacher is one of the key factors of the educational process as well as the barer of the most activities in the schooling when it comes to the monitoring of the development of students, the level of adoption of the projected curriculums, the organization of the hour, the applied
D. Ložnjaković: IMPACT OF VIRTUAL SPACE GAMES ON...  OUR SCHOOL 2014 Banja Luka

methods and forms of work, the respect for the principles and rules in the classroom, and everything else that we should not bypass when it comes to a student and his needs. From above the need to find out the evaluations and the opinions about the impact of the computers as a new and increasingly present tool of game, learning and communication on the development and achievements of the younger students in elementary schools imposes in front of us.

The maximum number of points that could be obtained in response to the statement on the scale of assessments was 105, and the minimum were 21 points. 63 points were given to the teachers who at all statements had chosen the degree of agreement ‘not sure’. The median value is 59.00, while the arithmetic mean is somewhat higher and it is 59.45 points.

The total number of the teachers who had sixty or more points is 25 which is 49.01% from the total number of the surveyed. From this result it can be concluded that something less than a half of the surveyed teachers rather support the game, or the learning with smaller or poor impact of the virtual reality on the younger students in elementary schools. It is interesting that at the second statement “A teacher should use a computer in teaching”, 92.15% or 47 teachers gave positive attitude. However, at the tenth statement “Students who use computers adapt syllabus faster” 45.09% or 23 teachers answered positively, 31.37% or 16 teachers expressed themselves as
рило 45,09% учитеља или двадесет и таје, шеснаест испитаних или 31,37% изразило је неопредељеност, а дванасе- 
ств учитеља или 23,52% негативно се опредељено на постављену тврдњу. 
Шта је узрок овом контрадикторном одговору требало би посебно истра- 
жити: Можда узрок можемо наћи и у жељи и потреби да се пригне савремени 
tоком, али и у недовољној техничкој 
огрмљености школа. Понекад се не
зитивно, као и у свакој реформи, само 
декларативно опредељују они на које 
се реформа односити, а можда су узро-
ци и многог комплексије природе. Из 
добијених резултата, мада са малом 
пропорционалом разликом, можемо 
закључити да учитељи немају претежно 
позитиван став о утицају виртуел-
ног простора на дјеце млађег основ-
ношколског узраста.

Као што смо раније виђали истакнути, 
предмет нашег истраживања је виртуелни 
простор и његов утицај на дјецу 
млађег основношколског узраста. Дје-
ца млађег основношколског узраста су 
правно и формално везана за своје ро-
dицуле. Они о њима брину, у том узра-
сту одговорни су за њихове поступке,
помажу им да се развију у моралне и 
продуктивне личности, односно пома-
жу им да се душевно друштвено прихвати-
ве норме понашања. Пошто је виртуелни 
простор још недовољно истражен, а 
саједишта смо многим, како позитивних 
тако и негативних, страна које се ис-
половају у различитим аспектима дје-
чијег развоја, редитељи и њихови ста-
зови у нашем истраживању никако не 
би смјели бити забијујени.
neutral, and 23.52% or 12 teachers an-
swered negatively. Special investigation 
should be made about the reason of this 
contradictory answering. Perhaps the 
reasons could be found in desire and 
need to follow modern trends, but also 
in the insufficient technical equipment 
in schools. Sometimes the people who 
choose positive answers, only declarative-
lly, like in each reform, are those af-
ected by the reform and perhaps cau-
ses have much more complex nature.

From the results, although with a small 
percentage difference, we can conclude 
that teachers do not have predominantly 
positive attitude about the impact of the 
virtual space on the younger children in 
elementary schools.

As we mentioned before, the subject 
of our research is the virtual space and 
its impact on the younger children in el-
ementary schools. Those children are le-
nally and formally related to their par-
ents. Parents take care about them, at that 
age they are responsible for their acts, 
and they help them to mature in mor-
al and productive persons, respectively 
they help them to adapt socially accept-
able norms of behavior. Since the virtual 
space is not sufficiently investigated, and 
we are the witnesses of many, both po-
itive and negative, spheres that are man-
ifesting in different aspects of children 
evolution, parents and their opinions in 
our research should not be bypassed.
Table 4

Parents' attitudes about the effects of virtual space on students

<table>
<thead>
<tr>
<th>Групе у истраживању / Groups</th>
<th>Родитељи ученика који користе рачунар / Parents of students who use computers</th>
<th>Родитељи ученика који не користе рачунар / Parents of students who do not use computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Узорак / Groups in research</td>
<td>48</td>
<td>50</td>
</tr>
<tr>
<td>Претежно позитиван став / Mostly positive attitude</td>
<td>17 или 35,41 %</td>
<td>29 или 58 %</td>
</tr>
<tr>
<td>Неодлучан став / Hesitant attitude</td>
<td>5 или 10,41 %</td>
<td>2 или 4 %</td>
</tr>
<tr>
<td>Претежно негативан став / Mostly negative attitude</td>
<td>26 или 54,16 %</td>
<td>19 или 38 %</td>
</tr>
<tr>
<td>Коефицијент варијације / Coefficient of variation t-омjer / t-ratio</td>
<td>16,29 %</td>
<td>17,59 %</td>
</tr>
<tr>
<td>t-ratio</td>
<td>t = 2,08</td>
<td>t = 2,08</td>
</tr>
</tbody>
</table>

We have examined the parents' valuations and opinions with the five degrees scale of Likert type of the 21 statement. We divided parents into two groups according to one criteria. The first group was consisted of those parents whose children use computers, and the second group of those whose children do not use computers. From the results the t-ratio was calculated which is (t = 2,08). On the basis of the obtained results it can be concluded that there is a statistically significant difference in the valuations of those parents whose children had experience with computers and those who do not have that experience at the level of...
the significance of 0.05 ($t = 2.196$) or with 95% of certainty.

Besides the $t$-ratio we also calculated the coefficient of variation for both groups. Coefficient of variation for the parents whose children use computers is 16.29%, while for the other group of parents it is a bit higher and it is 17.59%. The results indicate that the parents whose children use computers are homogeneous in giving their valuations and opinions.

The maximum number of points was 105, and minimal 21. 63 points were given to those parents who at all statements had chosen the degree of agreement 'not sure'. There were in total 63 parents of the students of the experimental group who gave their opinions about the statements in the research. 35.41% or 17 parents had 64 or more points, 54.16% or 26 parents gave negative answers or had 63 points or less, and 10.41% or 5 parents expressed themselves as neutral.

There were in total 50 parents of the students who do not use computers who participated in the research. 58% or 29 parents had 64 or more points, 38% or 19 parents expressed themselves negatively, and 4% or 2 of them had neutral opinion.

It is interesting that both groups of parents had the same opinion about the fifteenth and the sixteenth statement which are: "Parents should limit the time spent on the computer to their children" and "Parents should warn their children about the harmful effects of the
excessive use of the virtual space – the Internet.” The result of the coefficient of variation indicates that the parents of the students who use computers are more homogeneous in their answers. As we seen it before, where we calculated the coefficient of variation for the students, the only thing that is different for the groups is the experience with the virtual space. This can be taken as a distinction when it comes to parents in wide context, having in mind a total greater experience of parents compared to children.

From the given results it can be concluded that the parents of the students of the experimental group, or the students who use computers, do not have positive opinion about the effect of the virtual space on the younger children in elementary schools, while the parents of the children who do not experience with computers are of a different opinion. They think that computers would help their children in developing of their abilities and achieving better results. Perhaps this result is just a mirror of a human nature, since we always stand out the thing which we do not have as the reason for our failure or lack of good success.

In order to conclude and to get the final analysis of the results of our problem we had to make an average between the valuations and the opinions of the teachers and the parents. During the calculation of the average the opinions of the teachers were compared to the opinions of the two groups of parents: The parents of students who had experience with
само на релацији учитеља-родитеља, 
всичко посебно родитељи ученика са искуством у коришћењу рачунара, а посебно родитељи ученика без тог искуства са учитељима. Израчунавали смо вриједности t-омјера за обе комбинације група родитеља са учитељима те добили да је t-омјер родитеља чија дјеца користе рачунар и учитеља (t = 0,80). Израчуната t-омјера показује да су разлике минималне те треба констатовати да разлика у проценама и ставовима између родитеља ученика који су сакупљали експерименталну групу и учитеља није статистички значајна.

Табела 5

Разлике у ставовима учитеља и родитеља дјеце која користе рачунар

Table 5

The differences in the attitudes of the teachers and the parents of the children who use computer

<table>
<thead>
<tr>
<th>Групе у истраживању / Groups</th>
<th>Ученици који користе рачунар / The students who use computers</th>
<th>Ученици који не користе рачунар / The students who do not use computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Узорак / Sample</td>
<td>48</td>
<td>51</td>
</tr>
<tr>
<td>Коefицијент варијације / Coefficient of variation t-омјер / t-ratio</td>
<td>16,29%</td>
<td>15,67%</td>
</tr>
<tr>
<td>t = 0,80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Исти закључак изводимо и израчунавањем коefицијената варијације. Коefицијент варијације родитеља чија дјеца користе рачунар износи 16,29%, вриједност коefицијената варијације родитеља ученика чија дјеца немају то искуство је 17,59%, а коefицијент варијације учитеља има вриједност 15,67%.

The same result is derived out of the calculating the coefficient of variation. The coefficient of variation of the parents whose children use computers is 16.29%, the value of the coefficient of variation of the parents whose children do not have the same experience is 17.59%, and the coefficient of variation of the teachers has the value of 15.67%
Table 6

The differences in the attitudes of the teachers and the parents of the children who do not use computers

<table>
<thead>
<tr>
<th>Групе у истраживању / Groups</th>
<th>Родитељи ученика који не користе рачунар / The Учитељи / parents of the students who do not use computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Узорак / Sample</td>
<td>50</td>
</tr>
<tr>
<td>Коefцијент варијације / Coefficient of variation</td>
<td>16,29%</td>
</tr>
<tr>
<td>t-омјер / t-ratio</td>
<td>2,90</td>
</tr>
</tbody>
</table>

With the testing of the arithmetical mean of the parents of the students who do not have experience with computers and the teachers we have got the different value of the t-ratio (t= 2.90). According to that it can be concluded that there is a statistically significant difference in valuations and attitudes between the teachers and the parents of the students who do not have experience with computers at the level of significance of 0.01 (t = ≥ 2.58) or 99% of certainty. If we look back at the analysis of the previous task we would see that it is not a coincidence that the difference in valuations and attitudes between the teachers and the parents of the students who do not use computers is statistically important. In fact, as we could see in the cases when we were comparing the valuations and attitudes of the parents, and having in mind that the teachers plead negatively about the impact of the virtual space on the younger children in elementary
schools, we can conclude that the opinions of the parents and the teachers partly differ.

Литература


References


