СОВРЕМЕНОТО ВОСПИТАНИЕ И ОБРАЗОВАНИЕ - СОСТОЈБИ, ПРЕДИЗВИЦИ И ПЕРСПЕКТИВИ

ШЕСТА МЕЃУНАРОДНА НАУЧНА КОНФЕРЕНЦИЈА – ЗБОРНИК НА ТРУДОВИ –

CONTEMPORARY EDUCATION - CONDITION, CHALLENGES AND PERSPECTIVES

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Содржина

ПРЕДГОВОР

Публикацијата под наслов *„Современото воспитание и образование – состојби, предизвици и перспективи"* е колекција на трудови кои беа презентирани на истоимената конференција одржана на 11 и 12 мај 2018 година во организација на Факултетот за образовни науки при Универзитетот „Гоце Делчев" Штип, а во соработка со Факултетот по педагогија при ЈЗУ „Неофит Рилски", Благоевград, Р Бугарија и со Педагошкиот факултет при Приморски Универзитет, Копер, Р Словенија.

Оваа конференција е продолжение на востановената практика на Факултетот и неговите заложби во развојот на научната мисла на полето на образованието како едно од најважните вложувања што општеството може да ги направи, и своевидна инвестиција во иднината на секој народ, во иднината на човештвото, воопшто.

Научно-стручниот карактер на конференцијата овозможи не само размена на искуства и анализа на состојбата во воспитанието и образованието на сите нивоа, туку и трасирање на патот за иднината на воспитно-образовниот систем во целост како еден од основните темели на развојот на заедницата, за што сведочат испишаните страници во монографијата.

Публикацијата е синергија на претходните настани кои пет години по ред ги организираше Факултетот за образовни науки, научно-стручната конференција и научно-стручната трибина и е продолжение на десетте изданија во последните пет години.

Публикацијата под наслов *„Современото воспитание и образование – состојби, предизвици и перспективи"* е продукт на размислувањата, искуствата, инцијативите и предлозите, теориски и емпириски сознанија презентирани на самата конференција.

Содржински текстовите во публикацијата од монографски карактер третираат прашања од различни аспекти на воспитанието и образованието, прашања кои се актуелни и значајни, на сите образовни нивоа, од предучилишно, основно и средно па се до високо-образовните институции. Всушност, монографијата изобилува со широка лепеза на научни погледи и размислувања за предизвиците, перспективите и состојбите во современото воспитание и образование денес, кај нас, и на глобално ниво. По својата суштина, зборникот е наменет за сите структури кои се активно вклучени во креирањето, имплементацијата и развојот на воспитно-образовниот процес.

Покрај монографскиот карактер, зборникот на трудови *Современото воспитание и образование - состојби, предизвици и перспективи* е прирачник кој ќе им послужи на сегашните и идни генерации учители и на сите директни и индиректни креатори на образовната политика. На страниците поместени меѓу корите на оваа колекција, низ

синергичен приод, можат да се најдат нови идеи за понатамошни истражувања и развој на воспитанието и образованието. Текстовите изобилуваат со богати и разновидни искуства кои се водилка за стекнување и развој на ново индивидуално искуство и инспирација за идни истражувања и собири.

Оваа публикација нè ја исцрпува целата проблематика која е предмет на интерес на конференцијата, со оглед на сложеноста на феноменот воспитание и образование како и комплексноста на воспитно-образовниот систем. Комплексната природа на проблемот како и неговата условеност од општественото опкружување, науката, техничко-технолошкиот развој, индивидуата, отвора нови полиња за дискусија, идеи за развивање, нови практики со една единствена цел, унапредување на воспитно-образовниот процес, заради зголемување на квалитетот на самиот процес и на знаењето како негов продукт.

Таа останува да сведочи за еден настан, една состојба, во одредено време како четиво за генерациите што идат.

Им благодариме на сите партиципиенти за учеството и придонесот на споделувањето на теоретските размислувања и практичните искуства на конференцијата.

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COMPUTER GAMES AND THE DEVELOPMENT OF MATHEMATICAL CONCEPTS

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Abstract. Computers and computer games are today actually our natural surroundings, part of our everyday lives. They preoccupy us with their dynamism, initiate activity and gradually introduce us into a new, for us unknown, virtual world. Starting from the golden rule of teaching "Tell me and I will forget, show me, and maybe I will remember, involve me and I will understand", in this paper we tried to answer several key questions: Since when these games date?, How can they be used in the direction of the realization of educational content, in order to achieve the process of teaching, i.e. achieving educational goals? How to use them to become a tool for learning and developing children of preschool, elementary, high school… age? When to start using them for achieving educational goals? Can they be a useful tool for the development of initial mathematical concepts?
Key words: games, visual tools, preschool children, preschool teacher, information literacy.

КОМПЈУТЕРСКИТЕ ИГРИ И РАЗВОЈОТ НА МАТЕМАТИЧКИТЕ ПОИМИ

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Апстракт. Компјутерите, компјутерските игри, во денешно време се всушност нашето природното опкружување, дел се од нашето секојдневие. Пленат со својата динамичност, покренуваат на активност и постапно не воведуваат во нов за нас непознат виртуелен свет. Поаѓајки од златното правило на поучување „Кажи ми и ќе заборавам, покажи ми и можеби ќе запаметам, вклучи ме и ќе разберам", во трудот се обидовме да одговориме на неколку клучни прашања: Од кога датираат овие игри? Како можат да се искористат истите во насока на реализација на едукативни содржини, во насока на остварување на процесот на поучување т.е. постигнување на образовните цели? Како да се искористат за да станат алатка за учење и развој на децата од предучилишната, основношколската, средношколската... возраст? Кога да се започне со нивното користење за остварување на едукативни цели? Дали истите можат да бидат корисна алатка за развој на почетни математички поими?
Клучни зборови: игри, нагледни средства, деца од предучилишна возраст, воспитувач, информатичка писменост

1. Introduction

The preschool period is the period in which the most intense socio-emotional, physical, intellectual development of a child's personality takes place. It is a period that the child spends at home, with the family, and at a preschool institution. In that period the foundations for further holistic personal development, and the base for lifelong learning are produced. Early access to preschool education leaves its mark on the overall further education of each person, on its construction into a positive, creative and active person who will have in himself/herself the respect for oneself and for others. The key and main activity of a child, the activity through which a child learns is the child's play. Children play various games, constructive ones, logical, games with rules, didactical, social games... Through them they acquire new knowledge, acquire new skills, develop sociability, the way of thinking, they gain experience, and the play stimulates fantasy and creativity.

What is a special characteristic of the time we live in, is that it is the time of advanced technology and the application of multimedia systems? They provide interactive work, and presentation with the help of multiple media sources such as text, sound, image, movie, and animation. Preschool children are provided with multimedia systems most commonly represented through computer, tablet, and various electronic devices, which are accepted with pleasure regardless of age. Not infrequent are the moments when mothers gladly inform that "my child understands everything, it knows how to play a game on my phone, it helps me to find something on my notebook, he/she will be a top computer technician, this can be seen from a very early age, etc.".

Computers and computer games are actually our natural surroundings nowadays, part of our everyday lives. They preoccupy us with their dynamism, they initiate activity and gradually introduce us to a new, for us unknown, virtual world.

Starting from the golden rule of teaching "Tell me and I will forget, show me, and maybe I will remember, involve me and I will understand", we asked the following questions: Since when these games date? How can they be used in the direction of the realization of educational content, in order to achieve the process of teaching, i.e. achieve educational goals? How to use them to become a tool for learning and developing children of preschool, elementary, high school… age? When to start using them for achieving educational goals? Can they be a useful tool for the development of initial mathematical concepts?

2. Historical development of computer games

Computer games date back to a long time ago. The emergence of electronic devices - computers has been linked to 1958. The first computer game was made in 1961 in America, and was called Spacewar.

Since then, there has been a huge rise in the construction of computer games. What is characteristic is that each constructed computer game has its aims and rules. The goal is always the aspiration to victory, to conquer certain things etc. They can be played by an individual or by more players, who, in order to reach the goal, make a series of moves and develop strategies.

They are divided into several groups according to various criteria. Depending on the content, skills and theme, games can be divided into: arcade – they require quick reactions and reflexes; logical – it takes reasoning, memory, intelligence; simulations – more realistic behaviour during the game: strategic games, undertaking some strategic actions, planning etc.

According to the display of graphics, games can be 2D or 3D.

Computers, in particular software, can also be used in the teaching process, for its modernization, for intensifying the learning process.

The first teaching project for learning with a computer was made and developed in the USA, in 1959, known as Plateau 1, 2, 3, later Plateau 4 was developed, which involved simultaneously teaching through a network of 4096 student terminals. For its construction the knowledge of programmed teaching was very helpful.

The intensive use of computers as teaching tools and learning environment starts in the 90s of the last century. Their successful implementation is closely related to the knowledge that teachers, educators should possess. They should know not only to use the computer for preparing the lesson, but also to use it as a teaching tool during the realization of the teaching process, which, of course, requires their basic informatics and telecommunication knowledge.

Educational software are programs that are designed to independently shape some educational content that needs to be mastered. "Software in the field of education is an intellectual technology and is called educational software that includes programming languages and tools, a certain organization of teaching and learning, based on logic and pedagogy". (Nadrljanski, 2007).

They have certain characteristics such as flexibility, openness to the Internet, compatibility to other software and hardware. They are aesthetical, hyper textual, multimedia and interactive. They are designed for children - students for easier learning of the teaching contents. They also contain a lot of fun elements requiring a lot of interactivity.

The built-in software can play multiple roles: a lecturer, an examiner, an exercise device etc., which basically represents the implementation of various models of computer application in teaching, i.e. programmed instruction using a computer, computer teaching, computer-assisted learning, and computer assisted interactive learning. It would be good to involve more people in the process of constructing educational software: programmer, pedagogue, psychologist, teacher of the relevant subject.

The XXI century has marked the advancement in the development of computer programs for preschool children.

For the first time, educational software is applied in teaching in West Virginia, where the programme Dance, Dance revolution was installed for the realization of physical education goals; for the realization of goals in math education the educational software package Logical journey problem solving, Thinking things, is used …

The software Edu games developed by the Agency SILA, implies that through computer games in primary classes, children acquire new skills, develop sociability, adopt various ways of behaviour. "By playing games, children always learn", (Zahirovic, 2014), i.e. the knowledge gained through the game is the most fun form of learning. Knowledge gained through the game is more durable than knowledge acquired some other way. (Maravič, J., 2007).

How, in a fun way, the process of developing initial mathematical concepts through the use of computer games can be realized?

3. Development of initial math concepts

Mathematics - mathematical knowledge is an integral part of every individual's life. For new and advanced mathematics that enters all aspects of human life, whose pace of development and degree of application are constantly increasing, a person must be prepared since preschool. Namely, many mathematical concepts a child learns from the earliest age. From a very young age, a child can recognize certain concepts such as number of years, fingers, legs, but that concept does not have an explicit mathematical dimension.

That is why the essence of mathematical education is the expansion of the fund of concepts and ratio, as well as the empowerment for their expression with mathematical symbols.

Mathematics for children of preschool age does not mean that the child must learn definitions, formulas and mathematical procedures. On the contrary, it is necessary to create math for the child through everyday life situations, games, research, creative expressions, sports etc.; it can notice, test, experiment, differentiate, reveal, compare, collect information, distinguish important from unimportant, classify, sort, group, exchange experiences, verbalize, solve problems, develop, build logical mathematical knowledge

The child should be able to understand them, understand mathematical concepts, not reproduce and memorize them. In this sense, all activities for the development of initial math concepts are directed towards children's awareness of them through the application of specific subjects, and the adoption of abstract concepts application of inductive approach – which allows the child not only to determine conditions, but also to reveal certain causal relationships, perceive elements of the so-called mathematical causality respecting the principle of gradualness, i.e. going from concrete to abstract.

Preschool children are curious about the world around them. Everyday contact of the child with objects and occurrences from the immediate environment enables it to develop an auditory, visual and tactile analysis.

In this process of integral, holistic development the senses which enable the detection and differentiation of the sense of sensory information; perceptual abilities, focusing attention, and higher mental processes have a huge role.

Visual representations are necessary for the development and formation of mathematical concepts. Concepts such as: number, serialization, classification, measurement, etc.., can be developed by children if they have opportunities, enough visible material around them that they can touch, manipulate, and notice its characteristics.

So, the first and basic step in learning mathematics is the *manipulation of specific, concrete objects.* In the process of developing mathematical concepts, *practical, verbal and reflective child activity* has a major role.

Children usually build mathematical concepts by abstracting them from personal experiences. For this reason, they should be offered activities that allow them *to explain, think about what is explained, solve problems using information and data they come upon independently, explain how they independently come to solving the task.*

The child reveals forms of objects, quantitative and spatial relations, abstraction and constructing logical-mathematical structures. Therefore, it is necessary to provide appropriate experience. The process of development and formation of mathematical concepts is much simpler if we have rich experimental material.

The establishment of contact between what is provided for learning, set rules about this and previous personal experiences are very important for learning mathematics.

Everyday home activity such as: measuring while making cakes, pouring liquid from glass into another glass, making necklaces of different materials, perceiving the order of everyday events, arranging house, sorting toys, etc., can be used to encourage interest for mathematical thinking in children.

Problem situations often faced by children (alone or initiated by the educator, parent..), stimulate their curiosity, exploring spirit and influence to use research to apply learning through trial and error, developing their ability for reasoning and learning how to go further in problem solving.

In solving problem situations, they have the opportunity to see that there can be multiple solutions to the same problem and that one problem can be solved in different ways, still getting the same solution.

It is especially important to encourage verbalization, clear expression and explanation of the way in which they have come to the solution of the problem.

The formation of a positive attitude and positive emotional orientation toward mathematics is crucial in learning it by preschool children.

Developing a positive attitude towards mathematics and confidence in their own efficiency are the key components of children's learning and future achievements in this area.

The learning environment can support and encourage positive attitudes, it can promote assumptions for developing critical thinking, it can influence the strengthening of math abilities, enable the establishment of connections, correlations with previous and new knowledge in the world of mathematics. The development and promotion of such environment is the work of the whole community.

The learning environment can encourage, it can support the development of mathematical concepts if it is enriched with what is a trend, what is an integral part of the didactic quadrilateral, that is, with the use of computers, computer educational games in preschool institutions.

4. Application of educational computer games in preschool institutions

In the educational work with preschool children, having in mind one of the essential principles, the principle of visibility, a multitude of visible tools are applied.

The basic principles that we are guided by in their choice is the selection of such prominent means that will stimulate children's activity and enable the reflection of new ideas.

Their role is of particular importance due to the fact that they enable: encouraging motivational processes, acting on the emotional sphere, better understanding and understanding of mathematical knowledge, their descriptors, systematization and integration of knowledge as a whole, performance of complex operations, visual simplification of problems, better understanding and understanding of the content, and the essence of individual facts; facilitating the establishment of a dialogue between children and educators, and the performance of numerous practical manipulative activities. Among the multiplicity of the tools that are used is computer technology, above all computer games for preschool children. "If the computer game has a previous pedagogical objective in terms of developing a skill, ability, useful habit or new findings, it, like any other game with such characteristics is a didactic game.

Hence, with controlled use, the computer can be effectively used as a didactic tool.

Taking into consideration this fact, the modern educator is expected to in his work, among other things, use the computer as a didactic game tool." (Bajić i Lukić, 2014).

Numerous are educational computer games that can be used in preschool institution in working with preschool children. We can identify them as individual or group activities that have a cognitive, social, and emotional dimension related to the achievement of the educational goals.

They are designed to teach players to learn some new information, help them to develop new skills, expand their views, help them to understand certain historical events, civilizations, and know certain cultures.

They can be divided into several categories: mathematical games, linguistic art, games with animals and nature, games with words, logical games, memory games, games for faster typing on the keyboard, geographic games, games that will help the child to cope with everyday life and at the same time improve his/her behaviour in the environment.

Educational computer games which will be applied in preschool institutions must be in accordance with the predicted program, to be adapted to children's age, to move toward the achievement of the set goals, to be constructed to attract children's attention, to encourage active participation and learning, to encourage the interaction, to motivate.

Their implementation also means teachers' qualifications, computer literacy, because the teacher is the person who must prepare everything: the environment, the plan for its application, the timetable, the forms of work etc.

Despite a huge number of complaints concerning educational games suggesting they encourage and promote violence, lead to social isolation, cause obesity, obstruct cognitive development etc., their establishment on the list of addictions by the World health organization, however, if they are properly used (selected and targeted –set clear, concise goal, time-rested according to child's age), they can lead to numerous positive effects: improvement of the reflexive memory, simplification of the process of acquiring knowledge, their explanation, systematization and their durability, development of sense of initiative, approach, logic, advanced intellectual development, speech development, motivation, creativity, cooperation and communication, new discoveries etc.

We also asked the question when to start the use of computer educational games with pre-school children.

The results of psychological and pedagogical research show that this should be the period after the third year, i.e. the fourth and fifth year, when the children gradually become acquainted with the

possibilities of modern computers and gradually enter the virtual world of multimedia software. The introduction into this virtual world should be performed with the help and support from the educator and the parent, who will determine their application in accordance with the plan, the program for the performance of children's activities, in accordance with the general characteristics of the cognitive development and learning of children, in accordance with the children's age, their individual characteristics, in accordance with the nature of the educational area.

5. Educational computer games for the development of initial mathematical concepts

It is known that children learn best through interaction with other children that is established through various gaming and practical activities. Educational computer games offer this opportunity for the child to learn through game.

The application of computer technology in mathematics education enables educators to present and support the dialogue that will be established between them and the children.

Such support depends on how the computer software will be prepared. It is very important that it must be in accordance with the intended goals in this area - mathematics; it should be designed and in line with the requirements of children; adapted to their age; provide different approaches and an opportunity for interaction, anticipate the application of different strategies necessary for solving certain mathematical problems. There are ready-made software packages developed by experts and designed for children of preschool and early school age.

In the Early Learning and Development Program, the basic concepts that should be developed with preschool children are: serialization, classification, sets, spatial orientation, spatial dimensions, time dimensions, counting, number 1-5, money, geometric forms and shapes. Each of these basic concepts can be successfully developed using a computer game.

When choosing a computer mathematical game, the teacher is guided by the set of general and specific goals of mathematics education; the nature of mathematical concepts; peculiarities and characteristics of children, how a computer game is in function of developing a specific mathematical concept. There is also a visual offer, a competitive spirit that will develop in children, their tactile and practical activity, how much it leads to encouraging children's motivation, and interest in active participation.

We present several web pages that can be used to find computer games for developing initial mathematical concepts:

https://www.ixl.com/math/pre-k
https://www.ixl.com/math/kindergarten
https://www.ixl.com/math/grade-1
http://www.adaptedmind.com/gradelist.php?grade=1
https://www.education.com/game
http://www.abcya.com
http://www.abcya.com/kindergarten
http://nlvm.usu.edu
http://www.dobreigre.com/.
http://www.igrezadecu.rs/Edukativne-igrice/
http://www.primarygames.com/games.php

A variety of games can be found on each of these pages, games that are played on-line, such as games for serialization, counting, recognizing numbers, determining the spatial position of objects, comparing, determining the time dimension, determination of geometric shapes, money ... virtually all basic mathematical concepts.

Children learn through their own activity by means of perception engaged and certain mental operations and practical activities on the mental plan, especially in the process of solving problems, ascertaining the quantitative relationships between sets etc. The weak side of these games is that they are in English, but their visualization and logic lead children to skilfully manage the game play. The good side is that they can simultaneously adopt the English language. Besides the possibilities of developing initial mathematical concepts, these games also allow for developing physical skills in order to strengthen fine motor skills, specifically eye-hand coordination; development of social / emotional skills: self-control, promotion of perseverance and self-confidence, strengthening of cooperation, development of language skills.

The role of the educator in the implementation of computer educational mathematical games is enormous. He/she is the one, who in an interesting and practical way, will bring children into the world of

mathematics through a computer game, who will facilitate cooperative and individual work, support communication in multiple relationships, enable them to overcome the notion that mathematics is "something terrible" something that cannot be leartd or understood, and that it is a discipline that paves the way to new scientific knowledge and new activities in their future life.

And finally,

"If we want to enrich the mathematical experience, we will have to provide such tactical teaching tools with the help of which children can learn, they can establish interaction with others with educators and   to apply different methods to reach specific solutions. "

(Murray, 2001)

References

1.   Bajić, T., Lukić, M. (2014).Edukativne multimedijalne prezentacije za decu predškolskog uzrasta, Čačak: Tehnika i informatika u obrazovanju, Peta Konferencija TIO 2014 sa međunarodnim učešćem, Zbornik radova, 128-133

2.   Јованова-Митковска, С. (2018). Методика на развој на почетни математички поими, Штип: УГД

3.   Kamenov, E. (1997). Intelektualno vaspitanje kroz igru, Beograd: Zavod za udžbenike i nastavna sredstva.

4.   Kopas-Vukašinović, E. (2006). Uloga igre u razvoju dece predškolskog i mlađeg školskog uzrasta, Zbornik Instituta za pedagoška istraživanja, 1, 174-189