A Model: Animated Logical Mathematical Tasks For The Younger Elementary School Children

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Abstract: The aim of this article is to present a model of solving, not so much favorite, mathematical tasks for the younger elementary school children using the example of a logical task under the name: "How a kid got the better of king's wise men by weighing an elephant without a scale". It comprises divided sequences that are linked up into integral whole by pupils throughout the trial and error method. Thus, this method instigates pupils to think, simultaneously making this subject more attractive.
Key words:A model of an animated logical task, step by step, animation, the method of trial and error, e-learning.

I. Introduction: You Want A Job, Here's A Question?

The website Glassdoor.com dedicated to business advices, gathered at one place the most unusual questions employers ask candidates tending to present the unemployed that wish to get a job the challenges they may come across in a single conversation.

"How would you advertise ping-pong balls if that sport has become outmoded?" and "Explain quantum electro dynamic in two minutes" are some of the bizarre questions bosses ask, whilst not expecting the right answer but rather to see how a person manages in tough situations, say experts and reports Srbijanet.

"The essence is to show the sense for humor, interest for learning, team work and that you like intellectual challenge", says John Mackey, the founder of the site BusinessSuccessCoach.net and the author of the book "The Plan".

Top 10 weirdest questions:
1. What is the philosophy of martial arts? **-** Aflac
2. Assess on a scale form 1 to 10 how weird you are. **-** Capital One
3. How many basketballs can be stuffed in this room? **-** Google
4. If you could be a superhero, which one you would prefer to be? **-** AT&T
5. If you had at a tournament 5623 participators, how many matches it would require in order to get the winner? **-** Amazon
6. **How would you weigh the elephant's weight without using the scales?-** IBM
7. How many bottles of beer it is drunk in town per week? **-** The Nielsen Company
8. What is the square root of 2000? **-** UBS
9. A train goes 60miles per hour form San Antonio to Huston. The other train goes 80mph from Huston to San Antonio. Distance between two cities is 300miles. If a bird flies to San Antonio at 100mph turns around when it meets the train from Huston and then continues to fly between two trains, how long will it fly before the trains collide?
10. What would you do if have just inherited your uncle's pica restaurant? **-**Volkswagen [1].

Therefore here is a piece of advice. The best time to seriously start preparing for you future job is as early as in kindergarten ages and primary school, and mathematics...hereof the problem frequently start to occur!?

II. Why Is Mathematics The Notorious Bogey In School?

"The mathematical classes are quite traditional. The professors have to be motivated to teach children and not to do presentments. I think that our school system as it is obsolete and must be reconstructed seriously. We had not made our education in such a way to permanently enable pupils to be capable to do some things, rather this system is congested with facts and it is always important to know something"[2], says the professor BranislavPopovic the president of Mathematicians' Society of Serbia and associate professor at Mathematical Faculty in Kragujevac.

The mathematical classes have been a bogey for the most of the pupils, ever since. This stands for the pupils of primary school, as well. The problems emerge at the very moment when the abstraction overcomes the

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capabilities of a pupil to understand the problem anent to achieve abstract thinking after manipulative/concrete thinking. The problem occurs because the transition in units and methods of teaching is not justified with the pupils' development rate concerning the transition from visual/motoric towards abstract thinking. These problems manifest within contents such as measurements units, equations, fractions or textual problems. Let us recall just the last mentioned that were formidable problem and headache for pupils and parents, too. The problems of such type can be allayed by large, if dull textual tasks we translate to the language of multimedia and animation. Well known saying that a single picture tells more than a thousand words we expanded empirically throughout the praxis and work with multimedia/animation, and it goes: "a single animation worth more than a thousand pictures"[3].

"We are aware of the fact that most of children do like video games and some researchers take them for a powerful teaching/learning tool" [4]. According to Black this sentence is somewhat sustainable, with remark: "Design of commercial video games is not meant for learning, yet its basic intention is to make it as difficult as possible for the player to reach the goal or to comprehend causal relationships! For efficient learning transparency is required that these aforementioned games lack". For positive cases of suitable games he cites learning by virtual pupil or by direct manipulation of the animation process!"The efficiency of leaning by the means of direct manipulation of animation reflexes on the example of the functional relations. The pupils that have learned this way achieved better results than the pupils that acquired the same matter by photographs with accompanied texts, sequence of slides or films. Namely, the results of learning were conclusively the consequence of pupils' activities they demonstrated when animating the segments of animation and when they learned the internal relations. It was not the "superiority of the technology" that has the paramount significance [5].

III.   How Does A Model Of Animated Logical Task Function?

Our conceptual model of animated movie is planned as "a minced applicative form or animated story in pictures", that represents short animated sequences. If they are related left pupils get animated "solution" of the logical mathematical task.

In the very beginning of application pupils are faced with the textual form of the problem:


"A Chinese tsar set a question to his wise men, how one can measure an elephant without using a scale? However, they did not know the answer to this question! In whole of the kingdom only one little boy knew the answer". Do you know what the answer is?

The solution: Firstly we place the elephant in a boat and use a piece of chalk to mark on the boat brink how deep it has sunk. Then we load the empty boat with rocks until it sinks to the level of chalk drawn line. In the end, these rocks we measure using a scale and we get the exact weight (kg) of the elephant.

The solving of the task after the text has been read is a process in several successive steps:
1. In the first step these minced forms represent five mixed up vector images. When correctly sequenced throughout method of trial and error anent placing at right fields marked by numbers 1 to 5 they "unlock" (picture number 1).
2. The whole process is supervised by the hero of this story ("virtual pupil") who user's tries confirms (with-CORRECT) and mistakes (with-FALSE). Virtual pupil will be set in the upper right part of theapplication's window.

3. By activating "unlocked" images (on mouse click) using direct manipulation of animation the images become animated each in duration from 10sec to 20sec. Thus, the pupil is motivated to independently discover "the further step". This procedure of enquiring the solution of the task comprises elements of functional, associative and convergent/divergent thinking.
4. Following correct solution of the task the pupil is presented with the whole animated task (picture number 2).
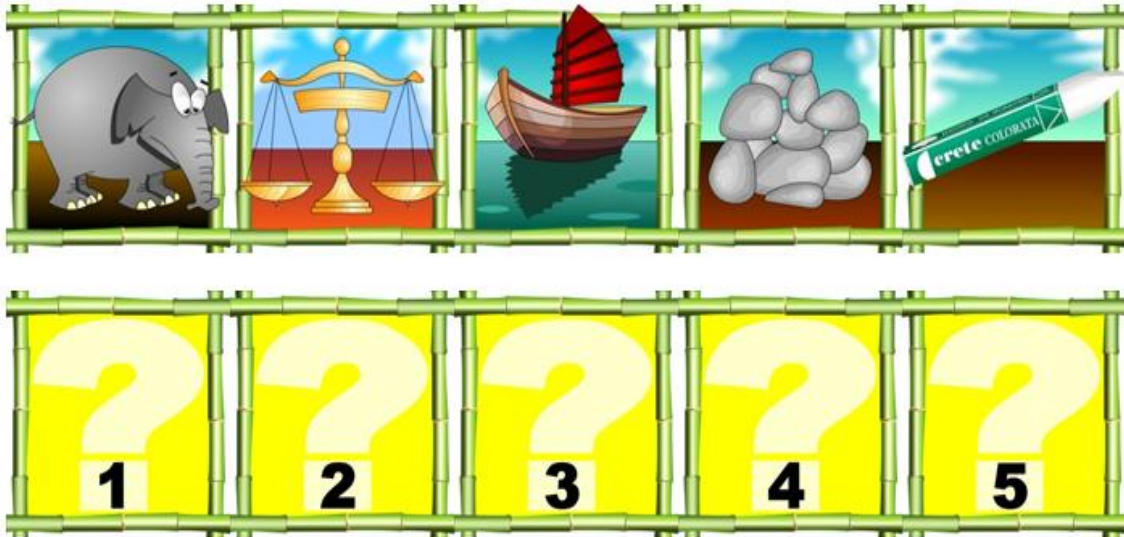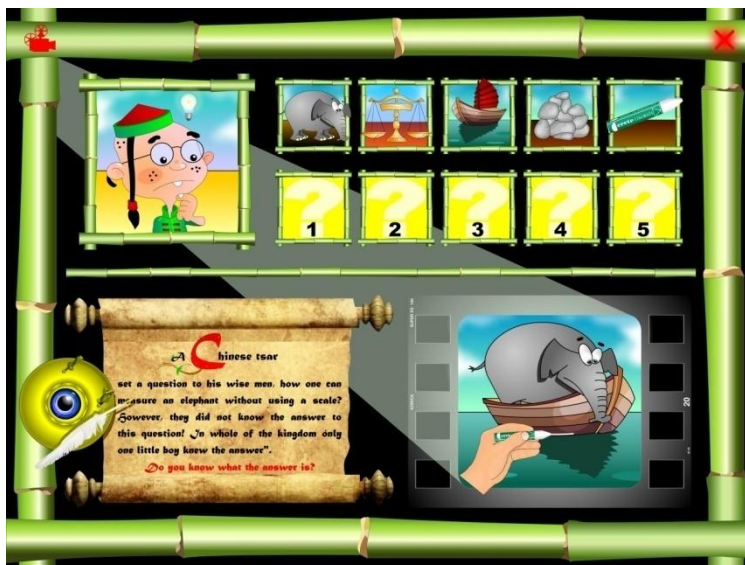

(Picture number 1: The illustration of individual images if sequenced correctly they becomeshort animated sequences)
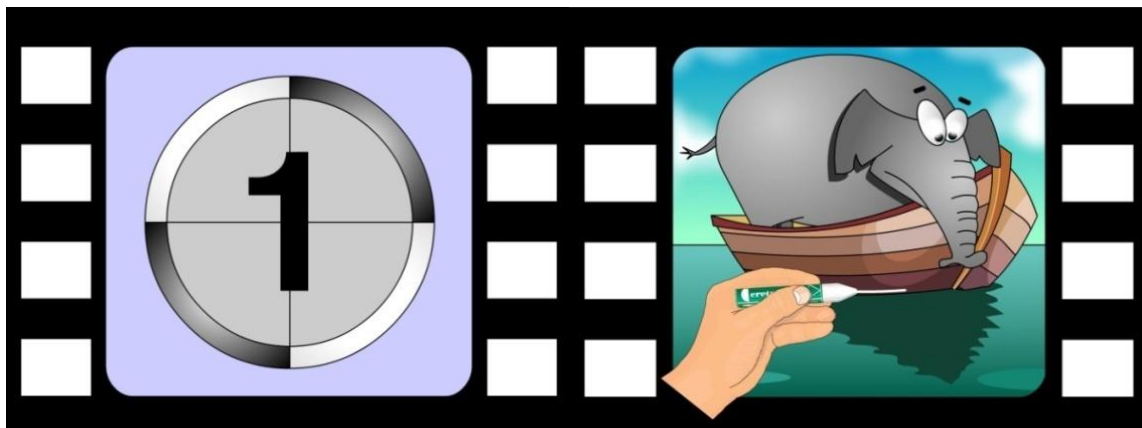
(Picture number 2: The illustration of animated logical mathematical task)

This presented model of solving a logical mathematical task by means of animated movie form we tend to make more accessible some not favorite mathematical classes to the children of "digital era", in order to make these teaching units more attractive and coherent. Certainly, this procedure of solving a problem make pupils activate thinking capacities so as to achieve the final goal, furthermore hereby pupils do this in a stimulating and "fresh" manner. The presented multimedia application "of a single screen" will be developed on AdobeFlash bedding (picture number 3).

(Picture number 3: The illustration of "a single" screen animated logical mathematical task)

IV.   Conclusion Or Mathematics Does Not Have To Be The Bogey?

After development of animated application comes the experimental verification of the hypothesis. The indicators this will seek are:

☙Whether pupils will be more motivated and

☙More successful in solving mathematical logical tasks by using animated e-content comparing to the pupils that will learn in classical textual way.

"Having said that, we rely on theoretical and empirical findings of other authors, which we have tested here in Serbia on some children. What we mean by that is: What do we know of the principals of delivering multimedia electronic content? Of the capacity of our senses?Of effectiveness of such an approach to learning and its comparative analysis to the traditional methods?and an extended Mayer[6] module of information input through manipulative and motoric learning" [7].

In the case of successful affirmation of the hypothesis we will tend to realize a sequence of animated logical mathematical tasks bases on the presented model purposed for the younger pupils of primary school classes in Serbia.

The part that refers to the implementation and appliance of this model and didactic means at direct praxis implies generating a suitable didactic-methodical guidebook for teachers that would be represent the integral part of this application.

References

[1].   Retrieved from http://www.021.rs/Info/Zanimljivosti/Bizarna-pitanja-na-razgovorima-za-posao.html on 15th Jan. 2014
[2].   Retrieved from www.nspm.rs/kulturna-politika/bauk-matematike/stampa.html on 25th Jan. 2014
[3].   S. Hilčenko, "Mathematics+Multimedia = The Direct Manipulation with Animation", ISKANJA naučno-stručna, revija za edukaciju, str. 118-129, Zavod Republike Slovenije za šolstvo, Sovenija 2010
[4].   Retrieved from www.edupoint.carnet.hr/casopis/57/clanci/1.html on 18thFeb. 2014
[5].   Retrieved from www.edupoint.carnet.hr/casopis/57/clanci/1.html Ph.D. John B. Black, Teachers College, Columbia University (2nd International Conference on e-learning ICEL 2007.) on 27thFeb. 2014
[6].   R. E Mayer, "The Cambridge Handbook of Multimedia Learning". New York: Cambridge University Press 2005
[7].   S. Hilčenko, "Education Software as an Engagement Material in Problem-Based Learning With Pupils From Year 1 to Year 4", Belgrade: Innovations in Teaching Practice, no. 3/08, p. 62-68, 2008
[8].   S. Hilčenko, "The Animated Movie as a Didactic Model in Learning Mathematical Concepts in Kindergarten (An Example Preview)", SirIKT 2011, Interlacing Education and Research with ICT, Kranjska Gora, Zbornik radova str. 353-358, Slovenia, 2011
[9].   S. Hilčenko, "A Model Of Programmed-Heuristic Animated Movie With Direct Manipulation Of The Content Intended For Learning On An Example Of A Logical Task In Elementary School Class Work", SirIKT 2013, Interlacing Education and Research with ICT, Kranjska Gora, Zbornik radova str. 774-781, Slovenia, from 15th to 17th Maj 2013(a)
[10].   S. Hilčenko, "Wie einen eiswürfel angeln? Ein heuristisch-programmierendes model animierten wissenschaftlichen e-aufgabe in der 4. klasse", Studia Scientifica, 2/2013, ročnik XII. p. 144-151, Facultatis Paedagogicae, Univeritas Catholica, Ružomberok, Slovakia 2013(b)
[11].   S. Hilčenko, "How to make s Needle to Float? Heuristic-Branched e-Model of an Animated Movie Utilized for Class Work", University of Rzeszow, The Institute of Technology, Department of Didactics of Technology and Computer Science, Education - Technology - Computer Science, Main Problems of Informatics and Information Education, Scientific Annual No/4/2013/Part 2, p. 139-146, Poland 2013(c)
[12].   S. Hilčenko, "Euro- animirani film, e-učenje u razrednoj nastavi Srbije", Časopis: Media, Culture and Public Relations (Mediji, kultura i odnosi sa javnošću), Hrvatsko komunikološko društvo, Vol.4 No.2 str. 197-200, Jurišićeva 5/I, Zagreb 2013(d)