

Slavoljub Hilcenko

Multiplication table in the second grade – from game to computer

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Slavoljub HILČENKO

College of Vocational Studies, Subotica, Serbia

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1. Multiplication table – and going around IT!

The troubles with the multiplication table, we all remember all too well, we have all experienced it on our „skin” either as students or as parents. It is not our intention to give the finished recipe to pupils' eternal problem ... but we wish to point to errors in the training process that can be easily avoided.

Schools in Serbia and into rote learning and few teachers know how to give to their students any useful advice on how to better facilitate this process of learning autonomously. They just simply say: „Next week, I'll be asking the multiplication table!” To help ... then come on the stage the (im)patient parents, grandmothers or grandfathers...

The problem with the traditional schools will not be solved overnight, but we can help our children. The lack of visualization – read motivation in the form of a pair of images in a textbook, will be of great assistance in learning monotone multiplication tables!

$$2 \cdot 4 = 8 \quad 4 \cdot 6 = 24 \quad 6 \cdot 9 = 54$$

In any case, the worst possible option of learning is the „cramming” it all by heart ... ($1 \cdot 1 = 2$, $1 \cdot 2 = 2$...) or rote learning. Unfortunately, the consequences of such inefficient learning, often permeate the whole life ...

For automated learning to take place we need more than 10,000 repetitions. Therefore, although it sounds depressing, you should not waste your time and hope, the child must begin to repeat everywhere and in every situation, free, game, shopping etc.

„But if could only learn less and faster ... are there any tricks or tools?”

First of all, it is essential that the child has no fear of the great multiplication tables full of data, because when you simplify it a bit, there's not much to learn by heart after all!

And in learning multiplication tables one should be systematic! Every day one should be focusing on one part of it.

Therefore, let us visualize the problem, let us draw large multiplication table on the wall. As the child progresses, s/he will have a task = to paint the part that

has been mastered. Thus, every day, the table will be getting smaller, and the motivation will grow!

On the first day, the child will be able to paint the part from the diagonal to the bottom or from the diagonal up, because these products are of repetitive nature (eg $5 \cdot 6 = 6 \cdot 5$).

A child will quickly see that s/he „already” knows how much is $x \cdot 1$, and painting that part of the table will be pleasant for him. After such a successful day s/he will enjoy a well deserved rest (with the obligatory revision!).

The next day is followed up with the multiplication with the number 10. Require of him to notice the appearance of the product, and then to paint that part of the table (revision!).

Then when it comes to the multiplication of the number 2, which actually represents the double addition of the self same number. When a child acquires this part of the table, s/he will happily paint it (revision!).

When multiplying the number 5 drive him to the conclusion that the number $x \cdot 5 =$ as if the same number is multiplied by $10/2$ (eg: $5 \cdot 9 = 45 = 10 \cdot 9 : 2 = 45$) (Here you should show patience!).

After this part, the remaining part of the table (unpainted part of the table) is no longer so great! (*revision!*).

2. Some useful tips and some practical playful tasks

„However, some numbers are known to make problems!”

In this case, consult the **game**, but above all try to find out which **learning style** is your child’s style, or combine several methods ... and let all approaches be **active!**

The term „active learning” is anything but new! I quote the famous Benjamin Franklin (a person from a banknote of 100\$), who expressed this more than 200 years, in the following way: „Tell me and I will forget, show me and I may remember, involve me and I’ll understand!”



Learning style indicates a particular way of thinking, processing and understanding information. We are witnessing a large number of different theories of

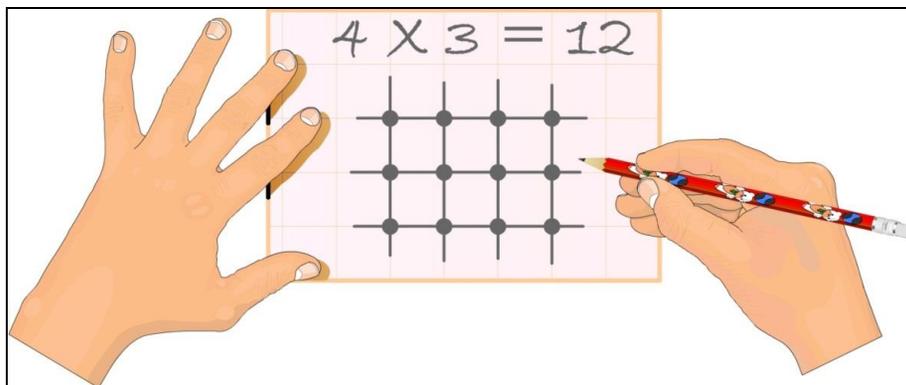
learning styles. There is no generally accepted classification of learning styles. According to the theory of Vak there are three styles of learning: 1) visual, 2) auditory, and 3) kinetic learning style. David Kolb [1975] first proposed the four learning styles: 1) activists, 2) thinkers, 3) theorists and 4) pragmatists. This model is based on a four-step learning process in which:

- a) immediate and concrete experiences provide the basis for,
- b) observation and reflection (thinking) that distils the,
- c) the abstract concepts of producing new implications for action that can be,
- d) actively tested by producing a new experience.

So, everyone has their own way of learning. We learn best when you learn with more senses involved, remember that we retain 90% of information when you can see, hear, say and then do it.

The game offers endless possibilities to master multiplication tables. Here are some examples:

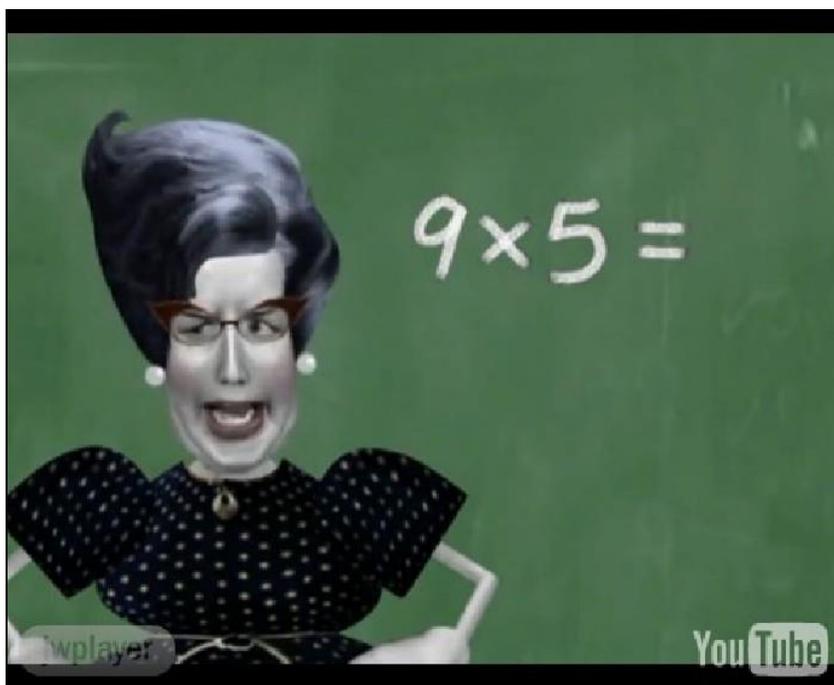
- a) „**Do not be a mad man**” board game, two numbers which you get by throwing two dice, to multiply ...
- b) **The Play with the previously prepared cards**, in which each player has 5–10 cards. Cards are alternately thrown on the table. Thus, for example. if you take a card that requires the result of the multiplication (7 and 8) – you have to quickly tell the product = 56, or if the card has the printed product of two numbers (eg 63), you must quickly say both factors, ie, 7 and 9. Anyone who makes a mistake loses all cards on the table;
- c) **The game of memory**, where the pairs of the multiplication table are on the desk (eg, 4•9 and 36). Players are asked to find as many pairs. The winner is the one who pairs up more multiplication tables;
- d) If your child has a sense for **writing poems**, loves poems, ask him to write a song or rhyming verses for troublesome multiplying numbers. For example. „3-hump camel drank 7 liters of, and walked 21km!” Certainly it can be a kind of process of associative memory (the simplest associative learning, Pavlov’s conditioned reflex experiment with dogs = over the more familiar concept we can remember what is otherwise harder to remember!);
- e) Also, very beneficial can be a **network of drawn lines with dots**. So, drawn on paper is a visualized network of a concept of multiplication. Take for example the drawn picture no. 1. The drawing represents 3 horizontal and 4 vertical lines drawn on the sheet. The intersection of these lines, are the points that the child should mark with dots, and then count them. So, $3 \cdot 4 = 12$.



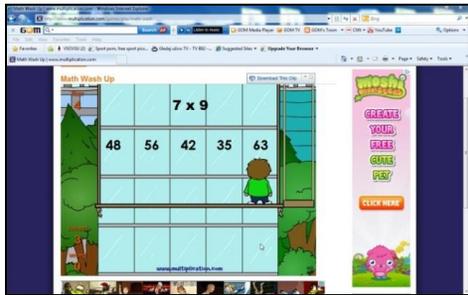
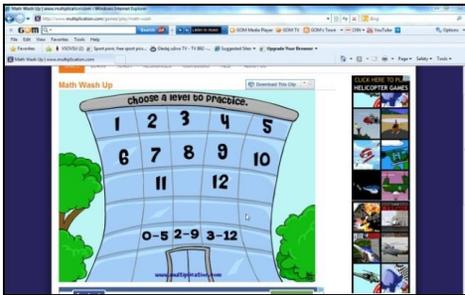
Pic. 1. Drawing a network of lines with dots

Of course, with these approaches we have not exhausted all the approaches to learning, we could also introduce a variety of exercises for those students who prefer to paint, cut ... and the like.

On the other hand, the Internet offers countless suggestions, exercises and solutions for this problem. One of them is an animated film (pic. 2) or an interactive game for learning/training, as well as those on page: http://www.multiplication.com/interactive_games.htm (pic. 3).



Pic. 2. Animation: Multiplication table



Pic. 3. Example 3 of interactive video games for learning/practicing multiplication tables online

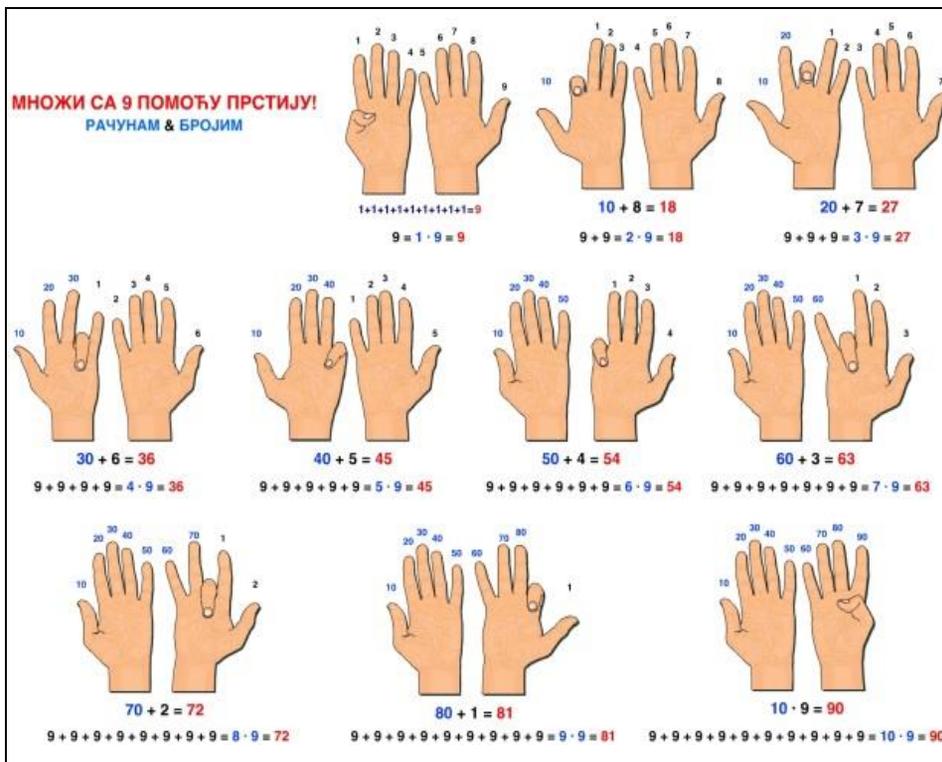
3. Multiplication table – a sample of an interactive application

To multiply the number 9 we will depict our interactive application that is actually a 3,000-year-old algebra (Vedic mathematics), which is due to its time-

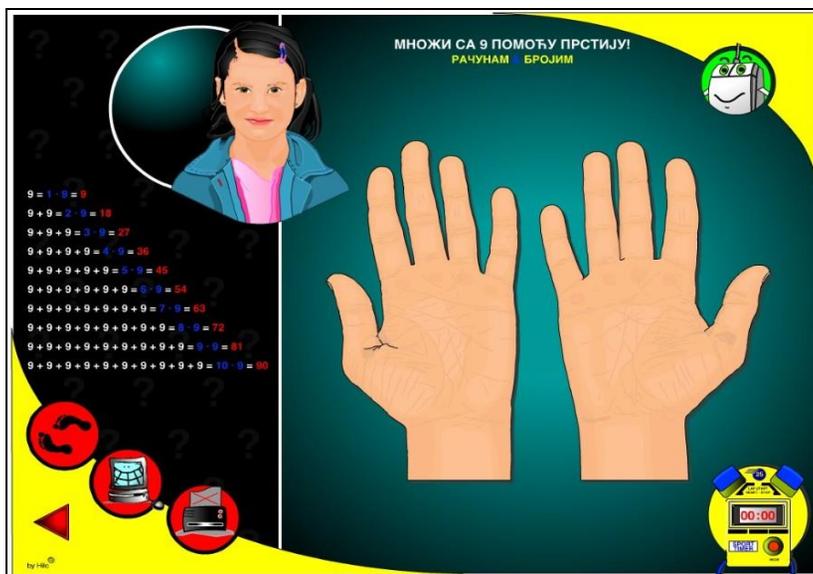
less simplicity used to this day, and is a practical and manipulative multiplication table on a hand, wrapped in a modern virtual environment (pic. 4).

The solution is the work of instructional designers in the application, Macromedia Flash. The procedure of multiplying the number 9, is shown on one screen. By clicking on the selected column under the girl's character (a number multiplied by 9), will prompt in the middle of the screen an animated sequence in which the hands are bending a finger on his hands, showing all the combinations of multiplication. Pictures no. 5 and 6 show the multiplication of numbers: $3 \cdot 9 = 27$ and $6 \cdot 9 = 54$.

Thus, with the multiplication of numbers 3 and 9, we bend middle finger of our left hand, while the remaining fingers of both hands stand for numbers from 1 ... 7 ($20 + 7 = 27$). Therefore, the student covers the entire exercise, watching the animated multiplication, then trains them and remembers them eventually. The whole procedure is time-limited, and after practicing, the student can print the list of all combinations of fingers.



Exercises can be done individually, in pairs or frontally with the whole class at once.



Pic. 4. Interactive applications, Multiplication table – multiplying the number 9



Pic. 5 and 6. Showing the multiplication of numbers $3 \cdot 9 = 27$ and $6 \cdot 9 = 54$

Conclusion

Do not wait for anything, go with the exercises... $6 \cdot 8?$

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Abstract

The problem of learning the multiplication tables among the students of the second grade, is not a minor problem. With regard to that, designed are the various practical, imaginative, humorous, professional and scientific methods in order to ease the „suffering“. We are not going to engage in deeper analysis of particular approaches or methods presented here in the adoption of practical and useful knowledge. The aim is to introduce an „old procedure – wrapped in new clothes“ = the one that is animated using computer applications. What all training procedures should have in common is that they must provide a comfortable „learning environment“, gamesome procedure and immediate practical-manipulative activity in the adoption of such a „dry content for learning“.

Key words: „the old in new clothes“; Computer + animation; instructional design; plays; practical-manipulative training activity.

Uczenie tabliczki mnożenia w drugiej klasie szkoły podstawowej z wykorzystaniem gier komputerowych

Streszczenie

W odpowiedzi na problematyczność nauki tabliczki mnożenia uczniów drugiej klasy szkoły podstawowej zaprojektowane i wykonane zostały różne profesjonalne i amatorskie, pomysłowe, praktyczne oraz dowcipne narzędzia mające zmniejszyć ich „cierpienie” w jej zapamiętywaniu. W artykule nie angażowano się w dogłębną analizę poszczególnych rozwiązań i metod ułatwiających zapamiętywanie tabliczki mnożenia. Przedstawiono jedynie tradycyjne metody nauczania „opakowane” w nowe środki. Wspólną cechą wszystkich metod jest to, że muszą one zapewniać komfortowe warunki nauki.

Słowa kluczowe: animacja komputerowa, projektowanie, praktyczne działania edukacyjne, manipulacyjne działania edukacyjne.