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## Who has better functional-logical capacity: Generation “X”, “Y” or “Z”?

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Edukacja - Technika - Informatyka nr 2(16), 169-175

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2016

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## SLAVOLJUB HILČENKO

### Who has better functional-logical capacity: Generation “X”, “Y” or “Z”?

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#### Abstract

Functional-logical thoughtful capacities pertain among the essential work competencies when referring to hiring of young people today. Members of this so-called Generation „Z”, born in Serbia, most often characterize individual and non-institutional self-education of information technology, which is „bored” in the traditional school. Researches and results in PISA tests, years back, confirm, that doesn’t have enough developed functional-logical thoughtful capacities, as well as their peers in the countries with a more modern educational-teaching technology. The aim of the paper is to compare the results of the functional-logical testing of members of three generation „X”, „Y” and „Z”. The sample was represented by random respondents matched by their age; gender; educational level or school success. „What had a significant influence on the test results, years (life experience), gender, level of education or school success?” The achieved results are on the side of older and middle generation, which is likely attributable to qualifications, years (life experience) and gender. However, by all criteria, women have shown better results than men. In contrast to that, the weakest results indicate the necessity of school reform, which would implement the content and methods of MENSE – „Nikola Tesla Centre” from the earliest educational age. Modern education must be market-oriented, knowledge-based society that encourages professional, creative and functional-logical mental potential of children. The paradox is that the domestic intelligence is in use in EU countries, but not in Serbia.

**Key words:** Generation „X”, „Y” and „Z”, functional-logical thinking, reform of education, employment, competences.

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#### Characteristics of Generation „X”, „Y” and „Z”

Generation „X”	Generation „Y”	Generation „Z”
1961–1980	1980–2000	2000–20xx
<i>(Span the years from source to source is different!)</i>		

All three generations were educated (are being educated) on the basis of traditional-reproductive educational system.

Generation „X”, was born in time of the Cold War, at a time that marked the political turmoil, and economic progress. They think global, are technologically literate and informed. They trust in themselves and work to live.

Generation „Y” or „millennium generation”. The main influence on this generation has technological development. It serves the community, is IT literate, tolerant, trustworthy, moral and optimistic. It’s socially conscious.

Generation „Z” or „internet generation” is internet and technologically conscious, caring for the environment and it’s globally connected. The main influence on this generation had a war against terrorism, concern for ecology, development of smart phones and social networks <http://www.alfa-portal.com/generacijomoja-x-y-ili-z/>. Their language is a „PHOTO”. According to Hilčenko [2015b: 91–105], “characteristics of Generation «Z» are: «I can not listen to you more than 15 minutes», «I want that yesterday» and «I don’t wont story – I want ‘Z’ animation»”. And while programming enters the curricula and programmes of preschool institutions around the world (from England to Australia), Informatics in Primary School in Serbia is still an electoral instructional subject. They unprofessionally self-literate themselves in informatics!

Today we talk about the „Alfa generation”, born – 2010 to 2025 years. *What a burden it will carry on its back, time will tell in front of us?!*

### **The mensas „NTC” – learning system**

Author of „Nikola Tesla Centre” (NTC)-learning system, Dr. Ranko Rajović, neurophysiologist, president of Mensa World Committee for gifted children and UNICEF’s collaborator on the project of early encouragement of intellectual development of children emphasizes that the program „NTC”-learning system is based on scientific neurophysiological researches Organisation for Economic Co-operation and Development [OECD 2010], which is directed towards the development of cognitive abilities of children. It is based on findings that indicate that the brain establishes 75% of all neural connections up to seven years of life (the greatest development potential is from 2 to 4 years), of which 50% of synapses have already formed up to five years. This argument is convincing enough to devote a lot of attention on (pre)school age, the learning system and encouraging of creative and functional-logical potentials of children. If during the formal primary and secondary education we are working with only 25% of the remaining possibilities of using the potential capacities of the brain, it is important to know how the child develops up to seven years of age. The fact is that intelligence does not depend only on the number of neurons, and that is not conditioned with only genetic potential but also with the connections between neurons, so called synapses. The period up to this year of life is the most valuable for forming of new neural connections (synapses). „NTC”-learning system

deals with the question of **HOW** to stimulate the development of synapses, and thus the enormous potential of children before going to school and at school. This issue is directly related to the level of gross domestic product of one country [Hilčenko 2015a].

„NTC-learning system means learning based on the theoretical foundations of neurology, neuropsychology and other sciences, particularly pedagogical – family pedagogy, didactics and methodology for preschool and elementary school ages. That learning system represents the operationalization of theoretical knowledge of listed scientific disciplines, which is a good indicator of how to connect theory with educational practice. Thereby it means a new approach to learning, where dominates thinking activity of the child and its successful development. The system is very well and thoroughly developed, applicable in the family, preschool institutions and in teachings in primary schools” [Rajović 2009]. This system is recognized by the EU, but not in Serbia!?

### **Research methodology**

In our study, the methodology of this paper was based on the study of professional-scientific literature, papers, magazines, the Internet and own practical research. The survey covered a total sample of  $(3 \times 54) = 162$  randomly and voluntarily selected respondents of three generation, „X” ( $\approx 50$  years), „Y” ( $\approx 35$  years) and „Z” ( $\approx 15$  years). The backbone of the research was the method of a written test with 10 puzzling tasks for verification of the functional-logical thinking, of adequate (medium) difficulty, of which  $1/3$  is in school textbooks.

Generations „X” and „Y” beside years, we stabilized them also with gender, women (W) and men (M):  $2 \times ((W) - 27 + (M) - 27) = 108$  and 3 level of vocational education:  $2 \times ((18(\text{lo}) - \text{lower} + 18(\text{me}) - \text{medium}) + 18(\text{hi}) \text{ higher/high}) = 108$ . These respondents ( $2 \times 54$ ) were the inhabitants of the town Sombor.

On the other hand, Generation „Z” was represented by 15-year-olds (VIII Elementary school „Nikola Vukićević” Sombor), also unified in (years), gender and school success:  $2 \times ((W + M) 9(\text{go}) - \text{good} + 9(\text{vg}) - \text{very good} + 9(\text{ex}) - \text{excellent}) = 54$  students. There were no students with the score fail and enough. All tests were performed on the same day in occasional school premises for a period of  $3 \times 45$  minutes. In results analysis, has been applied descriptive-statistical method of work with tabular display of data.

### **Results**

Summary results of functional-logical test (10 puzzling questions) from 3 groups of representatives of Generations „X”, „Y” and „Z” are presented in Table 1.

**Table 1. Summary results of the functional-logical test subjects**

RESULTS OF FUNCTIONAL-LOGIC TESTING OF RESPONDENTS							
QUESTIONS		gender	Generations			Σ answers	
			„X”	„Y”	„Z”		
			Correct answers + (vocational education and success in school)			T	⊥
1.	<i>What people are happy when there is no more bread?</i> <b>(Answer: bakers)</b>	(W)	0 (lo) <b>2 (me)</b> <b>3 (hi)</b>	0 (lo) <b>3 (me)</b> <b>1 (hi)</b>	0 (go) <b>3 (vg)</b> <b>3 (ex)</b>	<b>15</b> (18.51%)	66 (81.48%)
		(M)	0 (lo) <b>2 (me)</b> <b>2 (hi)</b>	0 (lo) <b>1 (me)</b> <b>1 (hi)</b>	0 (go) <b>1 (vg)</b> <b>2 (ex)</b>	<b>9</b> (11.11%)	72 (88.88%)
2.	<i>What bees have on their eyes, and what dont have on their head?</i> <b>(Answer: the hair)</b>	(W)	0 (lo) 0 (me) 0 (hi)	0 (lo) 0 (me) 0 (hi)	0 (go) 0 (vg) 0 (ex)	<b>0</b> (0%)	81 (100%)
		(M)	0 (lo) 0 (me) 0 (hi)	0 (lo) 0 (me) 0 (hi)	0 (go) 0 (vg) 0 (ex)	<b>0</b> (0%)	81 (100%)
3.	<i>What is it that has two spines and countless ribs?</i> <b>(Answer: stripes)</b>	(W)	0 (lo) 0 (me) 0 (hi)	0 (lo) 0 (me) 0 (hi)	0 (go) 0 (vg) 0 (ex)	<b>0</b> (0%)	81 (100%)
		(M)	0 (lo) 0 (me) 0 (hi)	0 (lo) 0 (me) 0 (hi)	0 (go) 0 (vg) 0 (ex)	<b>0</b> (0%)	81 (100%)
4.	<i>It is the weapon, not chewing gum, each strip is sticky. What is that?</i> <b>(Answer: a spider web)</b>	(W)	0 (lo) 0 (me) 0 (hi)	0 (lo) 0 (me) 0 (hi)	0 (go) 0 (vg) 0 (ex)	<b>0</b> (0%)	81 (100%)
		(M)	0 (lo) 0 (me) 0 (hi)	0 (lo) 0 (me) 0 (hi)	0 (go) 0 (vg) 0 (ex)	<b>0</b> (0%)	81 (100%)
5.	<i>What does constantly knocks, and does not measure the time?</i> <b>(Answer: the heart)</b>	(W)	0 (lo) <b>6 (me)</b> <b>5 (hi)</b>	<b>1 (lo)</b> <b>5 (me)</b> <b>5 (hi)</b>	<b>2 (go)</b> <b>4 (vg)</b> <b>4 (ex)</b>	<b>32</b> (39.50%)	49 (60.49%)
		(M)	0 (lo) <b>6 (me)</b> <b>7 (hi)</b>	0 (lo) <b>4 (me)</b> <b>5 (hi)</b>	<b>1 (go)</b> <b>3 (vg)</b> <b>4 (ex)</b>	<b>31</b> (38.27%)	50 (61.72%)
6.	<i>What has five fingers and no fingernails?</i> <b>(Answer: a glove)</b>	(W)	0 (lo) <b>2 (me)</b> <b>3 (hi)</b>	0 (lo) <b>4 (me)</b> <b>2 (hi)</b>	0 (go) <b>3 (vg)</b> <b>2 (ex)</b>	<b>16</b> (19.75%)	65 (80.24%)
		(M)	0 (lo) <b>2 (me)</b> <b>1 (hi)</b>	0 (lo) <b>2 (me)</b> <b>3 (hi)</b>	0 (go) <b>2 (vg)</b> <b>1 (ex)</b>	<b>11</b> (13.58%)	70 (86.41%)
7.	<i>It grows from the air, and is not live</i> <b>(Answer: a balloon)</b>	(W)	0 (lo) <b>2 (me)</b> <b>2 (hi)</b>	0 (lo) <b>2 (me)</b> <b>2 (hi)</b>	0 (go) 0 (vg) 0 (ex)	<b>8</b> (9.84%)	73 (89.79%)
		(M)	0 (lo) <b>3 (me)</b> <b>2 (hi)</b>	0 (lo) <b>2 (me)</b> <b>2 (hi)</b>	0 (go) <b>1 (vg)</b> 0 (ex)	<b>10</b> (12.34%)	71 (87.65%)

8.	<i>From the air it lives and is afraid of the rain</i> (Answer: fire)	(W)	0 (lo) <b>3 (me)</b> <b>3 (hi)</b>	0 (lo) <b>2 (me)</b> <b>3 (hi)</b>	0 (go) <b>2 (vg)</b> <b>1 (ex)</b>	<b>14</b> (17.28%)	67 (82.71%)
		(M)	0 (lo) <b>2 (me)</b> <b>2 (hi)</b>	<b>2 (lo)</b> <b>3 (me)</b> <b>3 (hi)</b>	0 (go) <b>2 (vg)</b> <b>2 (ex)</b>	<b>16</b> (19.75%)	65 (80.24%)
9.	<i>When it is alive it cools you, and when it is not it warms you</i> (Answer: wood)	(W)	0 (lo) 0 (me) <b>1 (hi)</b>	0 (lo) 0 (me) 0 (hi)	0 (go) 0 (vg) 0 (ex)	<b>1</b> (1.23%)	80 (98.4%)
		(M)	0 (lo) 0 (me) 0 (hi)	0 (lo) 0 (me) 0 (hi)	0 (go) 0 (vg) 0 (ex)	<b>0</b> (0%)	81 (100%)
10.	<i>Who on every birthday receives a gift of one ring?</i> (Answer: wood)	(W)	<b>2 (lo)</b> <b>2 (me)</b> <b>2 (hi)</b>	0 (lo) <b>3 (me)</b> <b>1 (hi)</b>	0 (go) <b>2 (vg)</b> <b>1 (ex)</b>	<b>13</b> (16.04%)	68 (83.95%)
		(M)	<b>1 (lo)</b> <b>2 (me)</b> <b>1 (hi)</b>	0 (lo) <b>1 (me)</b> <b>2 (hi)</b>	0 (go) <b>1 (vg)</b> <b>2 (ex)</b>	<b>10</b> (12.34%)	71 (87.65%)
Σ		(W)	<b>2 (lo)</b> <b>17 (me)</b> <b>18 (hi)</b>	<b>1 (lo)</b> <b>19 (me)</b> <b>14 (hi)</b>	<b>2 (go)</b> <b>14 (vg)</b> <b>11 (ex)</b>	<b>98</b> (12.09%)	712 (87.90%)
		(M)	<b>1 (lo)</b> <b>17 (me)</b> <b>15 (hi)</b>	<b>2 (lo)</b> <b>13 (me)</b> <b>16 (hi)</b>	<b>1 (go)</b> <b>10 (vg)</b> <b>11 (ex)</b>	<b>86</b> (10.61%)	724 (89.38%)
		Σ (W+M)	<b>70</b>	<b>65</b>	<b>49</b>	<b>184</b> (11.35%)	<b>1.436</b> (88.64%)

All respondents (162), of a total of 1,620 possible correct answers, achieved 184 (11.35%) correct answers. Average per generations was achieved 61.33 correct answers, or 1.13 correct answer per respondent.

Individually by generations (of 540 possible correct answers): Generation „X”, achieved the best results with 70 (12.96%) of correct answers, or 1.29 per respondent; then Generation „Y”, 65 (12.03%) of correct answers, or 1.20 per respondent and Generation „Z”, 49 (9.07%) correct answers, or 0.90 per respondent.

When it comes to gender of respondents, according to the achieved results are leading (W)-98> (M)86, or, „X”-37; „Y”-34 „Z”-27 correct answers, according to (M) „X”-33, „Y”-31 and „Z”-22 answers.

(W) are collectively better in the case of vocational education, „X”+„Y” (me)-36+(hi)-32=68>(M) „X”+„Y”(me)-30+(hi)-31=61. In (lo) vocational education the results are equal 3=3.

This also applies in vocational education of „Z” Generation – (W): (go)-2+(vg)-14+(ex)-11=27> (M): (go)-1+(vg)-10+(ex)-11=22 correct answers.

Of the 10 test questions, the most correct answers were in the 5<sup>th</sup> question (W)-32> (M)-31, while in three questions (2,3,4) there were no correct answers. The ninth question has only 1 ((W)-(hi)) correct answer.

If like the criteria for evaluating the performance of the test, we implement school grades (1 to 5), the results are as follows: a range of (0-324 answers) grade 1; range of (325 to 648 answers) grade 2; range of (649 to 973 answers) grade 3; range of (974-1297 answers) grade 4; and range of (1.298-1620 answers) grade 5. According to this criteria, no generation did not received a passing grade.

## Discussion

Results of unrepresentative sample, no matter how weak, are indicating that vocational education associated with life age (life experience) was crucial to the results of testing in Generations „X” and „Y”. In testing slight advantage was on the side of (W) gender, which can be accidentally or it can be interpreted as conscientious approach to testing. Of course, this hypothesis should be checked on a larger sample. The weakest results of Generations „Z”, pointing to the possible conclusion that the traditional approach to work, the overall success in school and gender did not significantly influence on mutual differences in test results or on better results of students compared to Generation „X” and „Y”. On weaker results in this generation is also witnessed by our research entitled „Computer – yes, but how? Socialize and encourage functional-logical thinking of your children at home” [Hilčenko 2016], where 100 students of 4<sup>th</sup> grade of primary school, on 4 puzzling questions, achieved only 2 correct answers. In the same study, an identical number of parents (W) also achieved somewhat better results in relation to the (M) 14>12.

## Conclusion

The research topic was the need to raise the current teaching practice and the learning process to a higher level, to show teaching content in a new and different way. Advantages of „NTC” – learning system in relation to the traditional approach would represent: better learning outcomes, reduce of the time for adoption of teaching content, a higher degree of motivation in work, in a more efficient differentiation and individualization of this teaching in which the student achieves the results and progress in accordance with his abilities.

All this leads to the conclusion that if we want that tomorrow students who will compete more equally with their peers on the PISA tests, and even more so for increasing competition for the workplace, we must innovate our education system. Will „NTC” will be included in that – learning system, will DECIDE those who should care about it. „However, time is not on our side!”

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