Influence of modern computer games and telecommunication means on personal and societal development

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This topic has emerged because recently I have read books on neurophysiology, and acquired basic knowledge of the subject. On the other hand, I came across few articles about positive influence of computer games on reaction time and possibly other human abilities. Let me assure you that I do not have bias against computer games, neither mobile telecommunication gadgets (except for the fact that microwave radiation affects biological tissues, and not in a good way). However, the arguments presented in the mentioned articles seem a little bit unilateral and not really convincing. This is the recent discussion with my son that motivated me to eventually put some thoughts on paper. I hope that this might help to understand how the human brain's abilities, people's personalities and the whole society are affected by computer games and permanent connections to other people and the virtual world through the smart phones, iPods, etc.

Computer games

No question that computer games strengthen lots of neuron connections in the brain; in the same way as any mental activity does. Physiologically, this is manifested as certain well expressed mechanisms, such as an increase of the number of acetylcholine vesicles in synaptic endings, receiving receptors on the opposite side of a synaptic gap, etc. We won't go into details, since, first of all, I am not the right person for that, given my basic familiarity with the subject, and also because that will make our story long. For those willing to get into the subject, there is a good book by R. Campenot, "Animal electricity". By now, I read several books, this one gives very good introductory knowledge at the right level - neither overcomplicated nor oversimplified. In this regard, this is a balanced book.

So, a gamer, indeed, develops numerous groups of neurons responsible for the success in the computer game. However, the thing is that all these challenges come as the tasks derived from algorithms. This is where the potential problem, in my view, resides. By definition, algorithm is (a) *restricted*, (b) by and large, *permanent*. It means that the range of problems to be solved is also restricted and repetitive. This, accordingly, results in neuron specialization in a narrow range of tasks. Some developed skills might have a wider application, like, for instance, reaction time, although even in this case one has yet to study, if this reaction time affects only the "eye - mouse click" chain, or it also affects reaction time of other muscle groups, like the ones used for sprint starts. My prediction is that the effect of improving mouse-clicking reaction time won't have much effect on how quickly the same person starts running. The reason is this. The mechanism of formation of action potential (electric impulse) in

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the brain, which triggers the appropriate action potentials in the spinal brain, which in turn starts coordinated movement of different body muscles, partly uses the same paths as the action potential generated in a computer game, but only partly. The following neural paths to the spinal brain and to the legs' and other required muscles are completely different from the mouse-clicking neural networks. So, it seems to me, that the skills developed in computer games are not much transferrable to the overwhelming majority of human activities supporting our life existence, in all its meanings. Here, I mean both activities like solving real everyday problems, fulfilling work related duties, pursuing real life achievements, etc, as well as supporting physiological needs, like the need in physical activity, or the most important one - reproduction. (A short note about the last one. We arrive to this world as human beings exactly in order to reproduce the next generation of human beings, to continue the evolutionary chain our ancestors managed not to break - and the greatest possible thanks them for that! Now, it's our turn not jeopardizing their efforts.) That tremendous task requires numerous skills from us, of which the expertise in computer games constitutes only a small fraction, if any.

Life is a demanding affair, for many reasons, not the least of which is its unstoppable movement, change of the environment we live in. The whole world becomes quite different every decade, while these changes accelerate last years, and so we have to adapt to it, all the time. Even every day is different, every week, bringing something new. If we don't notice this, that's ours problem - life never fails to fulfill its duties in this regard; it never stops changing. This is where the constant nature, the permanency of the algorithmic behavior, intrinsically inherent to all algorithms, including the ones implemented in computer games, comes in conflict with the real life. The innermost nature of life (and this is very important to understand this!) is *non-algorithmic*. In order to follow its development, to remain in close contact with the objective reality, we have to change older approaches and methods and to create, invent new ones - all the time. Otherwise, we will soon fall behind and lose connections with the reality. The outcome of such development is quite predictable - a failure, in one way or another.

The next important thing to consider is how the skills acquired in computer games relate to solving real life problems, including demanding scientific and technological tasks. All such problems - everyday tasks, or challenging scientific quests - usually have a heuristic element. This means that there are no ready-to-go solutions for the real life problems. At the least, we have to somehow accommodate the known solution to a particular problem, to our situation, which is always different from even very similar situations other people dealt with. Yes, many use stereotypic solutions, and somehow it works for them, but are these solutions optimal? Do they always produce good outcome? You know the answer, right? Look back at your own life.

The neurophysiologic mechanism of finding a solution is about the same for difficult scientific problems and making any non-trivial everyday decision, like when

and where going shopping, buying this house or not, replacing the furnace now or trying to survive one more winter, etc. The thing is to find the right solution in case of scientific problems, and an optimal one for the everyday life affairs. The mechanism is best illustrated by the solution process of a scientific problem, although it is applied to any other non-trivial task. The main properties of the solution finding process are its iterative and incremental nature. We cannot solve a complex scientific problem at once. We have to assemble the whole picture gradually - incrementally and iteratively, in which each next iteration is the result of consolidation and processing of new information, new data, new experimental observations, new considerations - you name it. In other words, one has to assemble a whole picture from multitude of details, often of different nature. The path to a scientific truth (or to optimal solutions of everyday problems) is like a traverse on a mountain crest, where one can make so many wrong steps, and only very few are the right ones. And so one has to take into consideration many meaningful factors, often intricately interrelated. This task (a) cannot be done at once, (b) requires every time, and even in every iteration, using some new neural paths. So, you can see that this kind of intellectual activity is rather different, and even *fundamentally* different from the well established and highly developed neural networks which computer games build up. To some extent, the required skills are the opposite; what is needed is the ability to create diverse new neural networks every time from the available base, which in real life is every time different, the ability to quickly acquire new information, make conclusions based on new inputs, often subtle ones, and immediately incorporating these new considerations into the next iteration, and do it rightly, which includes the right prioritizing, the right evaluations of connections with other factors, the timing, the right place, the dynamics of the factors and how all these and other things change the entire picture. By all means, this is a non-algorithmic process. Later, when a solution is found, it can be described in formal terms, like logical constructs, diagrams, etc., but the actual process is non-logical and non-algorithmic.

One of the vivid examples of such post-factum explanations could be a so called logical approach used by Conan Doyle, of which he was a famous master and which he popularized widely. The history of his adherence to such a logical method is an interesting one. Being a medical student, during his studies, he was very much impressed by demonstrations of a famous doctor how to diagnose diseases. This doctor was undoubtedly a very intelligent man. To teach students, he chose the logical conclusions as a *presentation form* of how the diagnostic deductions could be made. However, it was not how the doctor himself actually made the right diagnosis. The doctor used lots of and lots of other inputs and very well weighed and carefully measured previous experience, so that all these intricate and subtle inputs were processed subconsciously first, and then were delivered to his consciousness. The path to the solution was not algorithmic, but included many other things, many of which we are not even aware of, and, for sure, it included a heuristic component.

What happened, many people "bought" the aforementioned presentation *form* for the *content*, and seriously tried transferring this method to real life, in order to find, to their surprise, that the logical approach, the main inquiry method exercised by Sherlock Holmes, does not work for *real* problems. Please understand me right. I read all these stories too, and certainly admire with the genius of Conan Doyle as a writer, who created such wonderful literature personages. However, this is not how conclusions - of any kind! - are reached in real life, and this distinction has to be made very clear, in order to not misguide people.

The problem with the so called purely logical thinking is that it does not have several attributes inherent to the things from the real world. Such, it cannot simultaneously weigh several factors, interrelate them in order to create a single unity, and then interrelate this unity with the whole picture. Neural networks physiologically are organized exactly in a way to process such information, that is to weigh numerous inputs from many different sources and make a decision (to create or not to create an action potential, which could result in certain action). This organization of the nervous system is the reflection of the organization of the real world, and if we think for a moment, it could not be otherwise, since only the organisms, whose organization represents an adequate reflection of the real world, could win the "evolutionary contest". What is the world we live in? This is a collection of things, each of which manifests itself in some way, and which also reflects on the surrounding world, that is reflects on the numerous surrounding things, all sending their manifestations at once. And so the only way to survive in such a world is to receive the stream of all these manifestations, and *simultaneously* process them, weighing their significance, importance and implications *also* simultaneously. This is what for, and how the nervous system and the brain were created.

Can computer games deliver such an adequate simulation of the real world? The answer, unfortunately, is no. The reason is an inherently algorithmic nature of computer games (well, of all games, for that sake). However, there are lots of and lots of different computer games around now. Their multiplicity could develop a certain base of different skills, whose combination might have some use in real life. Clicking a mouse key and pulling the rifle's trigger is very similar, is not it? No doubt that many computer games can be used for the introduction to the problem and maybe initial training and study. However, no computer game can be substitution for the real life experience. It's like teaching theory of swimming and the real swimming. One can read tens of books about swimming technique, spend hundred hours playing computer simulations where the personage has to swim, but it does not mean that such a pupil will be able to swim in real water. This is a good and adequate analogy, by the way. It gives about a *real* measure of difference between the real world and skills acquired in computer games.

Although I do not have statistics in my disposal, but I am pretty sure that the correlation is modest between the computer games skills and achievements in real life,

or in high level intellectual activities. The reason, in my view, is the different way of thinking, and accordingly different physiological mechanisms of thinking, required for these tasks.

One note about a virtual character of computer games, which is called virtual reality these days. The term is rather a misnomer, and a "virtual world" could be a better name, but the term "virtual reality" is in use already. Again, here, we can see an inherently algorithmic nature of the virtual reality, in which everything is possible. There is a confirmed physiological effect that when somebody imagines a situation, his physiological reaction is *the same* as if it really happened. Scary? No? Then you did not get the terrifying consequences of this discovery. Computer simulations exploit your *real* physiological mechanisms, all biochemical reactions in your organism are *real*, yours neural networks are programmed as for *real* actions. Thus, a computer gamer actually begins living in the mixture of two worlds; he *physiologically* cannot separate them. Of course, the adequacy of his perception of the "real reality" inevitably suffers, and so the adequacy of his decisions. There is no need to explain, that such a situation is not for the good of gamers' personalities. It was reported that in some instances it led to insanity, although how much namely the computer games contributed to this outcome, remains unclear. In any case, living in the virtual worlds of computer games apparently does not help people predisposed to insanity.

So, it follows from our consideration that computer games might present rather a harmful thing for the personal development. Especially harmful such things can be for young people, whose personal development, adequate to the real world, is of paramount importance at younger ages, since this is what will form the base of their personality. Their development needs the real world, the real physical things, they need touching physical objects, feeling their mass, acting force, texture, impact, compression, and so on and so forth. They need feeling of a real three dimensional space, distances, heights, slopes, frictions, their relation to time intervals, etc. They badly need interaction with real people, watch changes of expressions on their faces, voice intonations, gestures, mimics, eyes, they need to understand people, in order to subconsciously monitor social communication, social interactions, people's behavior, mood, intentions, personalities, etc, without which it is impossible to learn and succeed in social environments. People should know real nature, but not its pictures, however nice the ones could be. Without knowing the real world, the objective reality, there are no chances to succeed in the real world. The objective reality, as my son says, is such a thing that always remembers about you, and which will necessarily find and get you. There is no way to escape its embrace.

Modern telecommunication means
These days, one can see lots of people walking and texting, looking at the screens of their gadgets, like iPhone, smart phones, etc, and punching keypads. Is it good or not? Or neutral? Everything can be a cure and a poison, and so the gadgets are. In Zurich, a

young man in the tram helped me to locate a stop I needed to make a transfer at, retrieving information in seconds from his smart phone. A young woman fell into the deep ditch and broke her bones because she did not see where she walked being busy texting an absolutely non-urgent message. Doctors say that the number of patients coming from the scenes of violent auto collisions, in which texting was involved, surged tremendously, and is actually acquiring epidemic proportions. How many people were killed on the roads due to distractions from the telecommunications gadgets? I am sure, a lot, but I did not find such statistics, although lots of and lots of stories about particular tragedies. So, there are pros and cons in the use of these gadgets, as usual. Regarding the automotive accidents, the solution could be simple - every car eventually must have a device, which makes impossible for the driver to use a cell phone during driving. For now, anybody caught with the use of a cell phone during driving must install such a device that jams the signal. However, in this society, a screaming will immediately begin about freedom of speech, communication, and similar argumentation, without considering the main issue - a death threatening driving on the roads these days. I see that drivers text and speak on the cell phones on the street lights everywhere - in the city, on the country roads; people text and read messages during driving all the time. I myself had to wait, absolutely unnecessarily, so many times on the street intersections, because somebody in a car in front of me was texting messages and did not see that there was a green light to go long time ago. (Practically mandatory usage of cars is another grieve reality of our life, but maybe we will discuss the issue in English in a separate article some day - in Russian, I wrote such an article a while ago.)

However, texting during driving is one aspect, although very important one. Maybe the mandatory jamming of cell phones' signal will become a standard in some countries one day, and this will solve the problem of distracted driving and will save lots of lives. What about the effect of modern telecommunication devices on personal and societal development, and quality of human material?

The first thing I observe here is a frequent distraction of users of such devices. As we discussed earlier, in order to think efficiently, people have to have time to think iteratively and incrementally, and this is the only way to develop thinking abilities. Otherwise, if people do not concentrate on the same issue for certain amount of time, they won't be able to assemble all necessary factors into a whole, neither they can go over and over the same issue to make next iterations and increments. People rarely can grasp more than two factors in one pass, if untrained, but training requires concentration, time and repetitions. If somebody is distracted all the time by new incoming information, then he has no time and opportunities to think thoroughly about anything, or, in other words, making next thinking iterations about the subject. So, such a person begins "thinking" in terms of one-two factors only, while a quality thinking requires taking into account many more factors than two. Thus, people acquire a superficial thinking, and such becomes the quality of their solutions. Once

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the majority of society members turn into such one-factor "thinkers", the quality of society and its institutions, and the quality of life as a whole, will adjust accordingly. The primordial animal instincts residing in the reptilian and lower mammals' brains will remain in place, but the reasoning will suffer, and so the life of such societies will be (and maybe "is" already in some places) guided by primordial instincts and stereotypical ideas, like unquestionable statements kind of "global warming is a result of human industrial activity". Yes, from I know thanks to my younger son, it definitely is, but one thing is to *know* this, and quite the opposite thing is to *believe* in global warming. In the same way, they could just believe in global cooling, which statement comes first. Unlike the global warming, many stereotypes are unreasonable and even harmful. One has not to be a genius to make his own inferences about climate change, which was always a normal thing in the course of the Earth history. If not for the warming eleven thousand years ago, CN Tower (a TV tower in Toronto) would be barely visible above the ice sheet, by the way. However, today, the major cause of all this excessive noise about climate change is about making money from nothing, like carbon tax emissions, etc, is not that clear? Well, seems like not, given the number of enthusiasts ready to support the idea. (I am perfectly agree that there is an overexploitation of fossil fuels in the modern economy, which is overwhelmingly due to big profits made by oil producers. The technological advances in the use of cleaner energies could be much more impressive, if not for the oil magnates, which relentlessly put lots and lots of efforts and resources to suppress such developments. If not for their greed, then cheep and viable electrical cars could be ubiquitously available today on a mass scale.)

It is hard to say with certainty that this factor of permanent distractions is already changing the modern societies. There are clear signs of degradation of university education and scientific studies in many western countries, which might be attributed to lower intellectual development due to telecommunication distractions, but there are also other factors, which work in the same direction besides the intervention of telecommunication gadgets into the personal development process. More people come to universities, and so the average level has to objectively become lower, otherwise many students won't be able to get the pass marks. The standards for the school education lowered too, for several reasons, like accessibility of information through the internet, when pupils do not have to memorize so many things as before (while memory is the very foundation of thinking), and so they do not have to *think* themselves, but use the easiest way of finding solutions on the internet. The incoming of "credentialism" epoch, when the fact of possession of diploma becomes more important than knowledge, is another sign of our times (I can't help but to recall the works by Glubb here, who described the natural cycles of empires, which almost one-to-one - up to the minor details! - coincides with the transformational paths of the modern Western world!)

The scientific studies also experienced transformation, becoming, first of all, the means of getting funds for living. The number of "degreed" people increased dramatically, and so the average level of scientific researches has had to drop, and it did. Science is an interesting area, in which a high intellectual level makes a big difference, but any environment, which begins to fill with mediocrities, will be eventually run by mediocrities; society, which accepts unscrupulous people, will eventually become unscrupulous society; flood of people with different mentality eventually overwrites the previous mentality; such is a societal law. So, few talented scientists will not make difference in such scientific communities, since these communities, very naturally, are becoming busy with other more "earthy" things, and so the scientific "quest for truth" does not have much priority in there.

So, we cannot say with confidence that frequent distractions by internet connections or via the telecommunication gadgets significantly contributed to degradation of human material, and, as a consequence, to degradation of education and science. The answer is rather "yes, contributed", but how much, we cannot say at the moment. Certain tests could give an idea though. There were several articles about studies when young people had to spend eight hours without cell phones, or had to do some task without connection to the internet, while they had access to all other information, including books, journals. The results were bewildering. Only small percentage of participants were able to complete the tasks, although they were not difficult at all. Some participants began thinking about suicide, so uncomfortably they felt without cell phones. Deprived of cell phones, many young people experience real panic attacks. These are very appalling results, which already allow making some conclusions about possible future complications, but it seems that nobody really cares.

Physiology might give some understanding of this mechanism of dependency on the permanent telecommunication. Most people are not "thinkers" by their nature, but rather "consumers" of information. (Of course, all people cannot be thinkers, but it seems to me that the modern society increased this natural percentage.) Generally, people feel safer when in groups; this is an evolutionary trait, and flocking together was the only way to survive for such relatively weak species as humans' ancestors. Such a social unity is obviously a positive thing, since, without it, we will never become human beings, of which examples of children raised by animals are the proof. So, people, and especially young people, in whom such flocking instincts are particularly strong due to specifics of growth, tend to be in groups. It was always like this, but the great difference with the previous situation is that there was a *direct* human communication with all the richness of it, with all features, like live speech, intonation, images, gestures, touch - all real and evolutionarily necessary things, each presenting an additional communication channel and together creating different *quality* of communication. Now, what in many instances is left, is a narrow single communication channel, mostly textual slang messages. In my view, it is impossible to fully express a thought by a short text message. Some reasonable degree of approximation is possible

if the participants are entirely within the same context, which happens rarely, and even if this is so, it is difficult to convey adequate messages all the time, since the situation, and consequently the context, also change. Thus, short messages are open to ambiguous interpretation, or their content has to be so straight and simple that it cannot contain any ambiguities, neither expressing complex thought or conveing non-trivial information, nor branched considerations.

Such is the level of communication that is possible to support by short messages. It has to be simple. In very rare cases, it is possible to communicate on more complicated matters this way, but if and only if the participants are in the same context, which is a really a rare thing to happen. I do have my own experience communicating recently with a young person on moderately complicated issue. The degree of misunderstanding was such that I decided to switch to phone conversations. Maybe in part that was my problem, that I could not explain concisely what I meant. However, I am sure that it was not entirely my fault. We just have different visions of the context of the situation. On the other hand, given my previous experience, I am confident that a direct conversation, with facial expressions, variability of voice intonations would make this communication much more productive, and we would reach understanding much faster. Also, there was an aspect that was mentioned already, when my counterparty was not comfortable combining several factors at once, while I scrupulously described the situation as precise as possible. That did not work, because almost every time few factors were missed in the final conclusion on the other side; they just were not accounted for.

Now, on the top of a simple content, add the high frequency of incoming and outgoing messages, which is now almost a norm in texting telecommunication, and we have an environment, which hardly could contribute to deep and systemic intellectual development and nourish high level intellectual achievements. Instead, we have an environment where only short simple thoughts could be understood, while anything beyond that will be ignored, because the participants just won't be able to comprehend, what such an outcast is talking about.

A similar situation, in fact, can be observed in science and other areas. The overwhelming majority of modern scientists can understand small incremental novelty, but not new concepts or high level considerations. The reasons, why, were discussed above already, and the main one is the mediocrity of a scientific environment due to too many people engaged in scientific endeavors. The humankind just incapable to produce so many people with truly scientific minds capable to make real scientific breakthroughs. So, the Professor's status was devaluated, in order to match the pretensions of mediocre people desiring to get the most from their scientific engagements (which, in one way or another, converges to material gains; in some people mixed with vanity). Now, the universities commercialize education, bringing more students on board, which also drives the level of education further down. Professors and scientists are forced to do too much unnecessary work instead of

research and teaching, like writing exhaustive grant proposals, while reduction of funds - obviously - force people, in many instances, to resort to all sort of tricks to get the funding, since this is what their living depends upon. As a result, people in academic environment, in fact, have a hectic atmosphere with frequent distractions, as most teenagers do with their gadgets, also for different reasons. Such an environment is the worst possible one for scientific accomplishments of high level, which require time, concentration and sustained efforts. The present atmosphere of a permanent competition to get some hot result in order to get funding, and lots of different deadlines and obligations, can offer none of these conditions.

Thus, we have downtrends on both sides of educational equation, that is both majority of teachers and majority of students are benefiting from the lower educational standards and have no incentives to resist this development. Add to these trends the decreasing demand for high educated specialists from the industry and other institutions, which is a separate saga. Manufacturing and other companies move abroad, to cheaper labor markets, and so less and less qualified jobs remain in the western countries. Since there are many more educated specialists than available positions, salaries are low. One spends ten years in educational institutions to get Ph.D from a reputable University, in order ending up with a salary, which is barely enough for a physical survival of alone person. So, forget about family, forget about having children, and just be proud that even though you are the last generation in your clan, it ended its history with a Ph.D degree holder. Very comforting thought, indeed.

If there is no demand for high qualified specialists, why universities would adhere to high educational standards? That just does not make sense, does it? Well educated people are just not needed in western countries in mass, save for some financial institutions and global IT companies, busy with creating virtual realities, like computer games, global social networks, internet advertising, and the stuff alike, which, by and large, produces nothing material, while these are first of all the material things the quality of life depends upon. In Ontario, prices for electricity are just ridiculous, for example. I think that economy needs cheap electricity for development much more, than having virtual social networks.

This is where we are at the present, as of the end of November, 2016. US, with a new administration, maybe will try to reverse their trend to industrial and technological development more, but that could be too late - Gin is out of the bottle already. In Canada, the industrial and technological downtrend looks is well pronounced; it became almost a permanent fixture. There are no capable people on visible to me horizon to change these trends. However, who knows.

We went a little bit away from the topic though. However, it is better to have a greater picture in our case to understand the whole environment, where the new telecommunication epoch evolves, and what for. There is no purpose in this evolvement; the whole story is about making money in the newly opened market, exploiting human social nature. However, given the grandeur scale of the phenomenon,

it is impossible not to obtain noticeable side effects. Some of them we considered, many more were not even mentioned. I tried to find some clearly positive things, but I could not. Evil and goodness are so tightly intertwined in this phenomenon of a global scale, that it is very difficult to separate one from another. The telecommunication means played a noticeable role in revolutions in the Middle East and North Africa few years ago, as well in the riot in Manchesdter. Did life in those countries become better? The answer is no.

It all depends who is using these technological means of manipulation of people's minds, and for what purpose. It can be for the good, but it can be for the bad. Thus, we came to a point, where we started. We should state that it all depends on people, how they use the technological advances and what for. For now, this is rather the Evil, which benefits the most from them. And, as I see it, it is a long way to go, before the Goodness will begin benefiting more than Evil.

Comments by B. P. Tsvetkov

B. Tsvetkov commented on this article, recommending to explicitly underline the negative consequences of modern telecommunication means and computer games especially for children. Briefly, his comments (with my minor inputs for clarity) are summarized below. In his opinion, which I share, these new gadgets and computer games should be used in a very weighted way, in measure, which is not the case presently. Otherwise, these things consume energy, time and material resources rather useless for their users (not for the gadgets' and games' producers, of course - it's all about profit making, after all). The problem is that these things are used for the gear one takes *pleasure* from, but not what he *needs* to make his life meaningful and useful for himself and for the society.

The personal and societal developments these means provide, are rather unilateral, one-sided, if not primitive in many instances, considered them with regard to the skills which real life demands.

They train children for fast reactive actions and, by and large, do not contribute to a well-rounded development. In fact, they are harmful for the intellectual development, understood as an ability to self-sufficiently solve diverse real life problems (including, of course, the implementation of the solution, otherwise it won't be a solution ☺).

Smart phones are the sources of constant disturbance and a stressful load for the children's forming physic; this aspect is very much underestimated these days. One of the harming consequences is the permanent exposure to manipulation from different parties, for which the children (and many adults, for that sake) have no immunity and ability of critical analysis.

The dangers of such a stressful, both in content and the amount, informational environment are real and serious. The ability to find somebody's solution on the internet, but not creating it from scratch by himself, forms a mentality, the mind,

which is predisposed for manipulation, since it has no guards against intruders, being robbed of his own opinion and vision.

The thing is that if a child did not learn how to solve real problems himself before becoming an adult, and until he developed a critical thinking, the chances that he will learn it in later life are very small, even if the situation will press hard on him. His brain, at best, will be programmed for the virtual reality, but that does not have much value in a real (and, to be honest) relentless, ruthless and unforgiving world.