MUTUAL ADAPTATION OF THE COMPUTER ENVIRONMENT AND INDIVIDUAL

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Abstract: In article the problems of mutual adapting of the humans and computer environment are reviewed. Features of image-intuitive and physical-mathematical modes of perception and thinking are investigated. The problems of choice of means and methods of the differential education the computerized society are considered.

Keywords: image-intuitive modes of perception, physical-mathematical modes of perception, differential education.

Introduction

At present the human society and computerized environment are going through the complicated process of mutual adaptation. The new approaches to the solution of the tasks and problems, making scientific researches, studying, many more. Some of the processes are completely new for the humanity that is why they demand undivided attention of the researchers and society on the whole. It is important not only to study tendencies and to analyze possible consequences but to work out the means and methods of purposeful control of them. The purpose of this work is to single out some key-problems, to set possible ways of their solution.

Image-Intuitive and Physical-Mathematical Modes of Perception and Thought

The existed modes of studying and description of objects, processes and phenomena may be conditionally united into two groups, named further as physical-mathematical and image-intuitive modes of perception and thinking. The basis of physical-mathematical modes is formed by traditional for physics and mathematics approaches and methods, including formalization, Laplacian determinism [1]. The basis of image-intuitive mode is orientation to the image thought, intuition, subconscious, collegial and other informal methods of making decisions [2].

It's natural that such division is rather schematic without clearly marked borders. It is easy to explain because very often in practice a kind of symbiosis of these two approaches and the attempts of strict division may seem to be controversial, artificial, incorrect.

For humanity image-intuitive mode is more usual, because it has appeared incomparably earlier historically. So there is no wonder that small children in their attempt to know the word use image-intuitive mode only. Even their abstractions and generalizations are based on the combination of imagines and inherent intuitive methods of perception. But the traditional views towards science and education prefer physical-mathematical mode. Such prevalence very often reveal itself in the primary school where to children with imaginary, intuitive thought physical-mathematical mode of cognition of the world is instilled. But only for minority it is useful.

Rather typical test, connected with description of the leaf's flight from the tree. The child of pre-school age describes such flight rather adequately. But as for the senior students very often they try to do this with the help of physic's textbook not taking into the consideration the striking difference between experimental and theoretical results.

It is well known [3] that every individual has his particular features of thought, perception, cognition of the world. For one people the complicated mathematical formulas bring the feeling of harmony and the understanding of the heart of the matter. For another they are not more than dry notes which are hard to understand, and the real harmony and understanding of heart of things is contained in quite another (the classical example — Mozart and Saliery). Wrong selected way of teaching contradicts with the innate world of the man, with his subconscious, mode of thought, becomes the obstacle for the development of the individual and society in whole.

The methods of differential education, taking into consideration the abilities, inclinations, the character of pupil were developed and used by different pedagogues [3, 4]. Not going into details of these methods, we should admit that they are oriented into pre-computer world reality. That is why they demand reconsideration and further development.

The Formation Individual's Personality in His Intensive Coordination with Computer Environment

One of the most important factors making the influence on the forming of the modes of perception, thought and cognition of the world is global computerizing. A human being as one of the biological spices has got virtual intellectual assistants, advisors, prompters, persons to talk to, friends, the performers of the everyday work, which take a lot of duties, functions unknown before. The role of influence of these assistants is not always obvious and with only one meaning. But they exist, develop quickly enter different areas of human activity. So it is time to take into consideration that not simply an individual with his abilities, priorities, modes of perception and making decisions lives, studies, works, but the individual who has the virtual assistant.

More over, the development of the computer environment has reached such stage when the virtual assistant performs a lot of tasks and functions more effectively than the man. That is why to our mind the teaching of one or another specialist is advisable to consider as a process of creating and teaching the one human-computer team, in which a man adapts to his virtual assistant (computer), and computer adjusts to the one particular man. As the tasks, possibilities, needs of the man change during his whole life so the process of mutual adaptation of each of the participators from every man-computer team may last during whole life.

This problem is complicated, closely connected with the help of return contact with a lot of other different tasks and problems. That is why we should solve this problem from different sides. Because psychology, pedagogy, computer sciences, and fundamental preparation and plus a lot of professional human cultural knowledge abilities and skills are important here.

But we should start with the analysis of the influence of those principally new factors which computer brings into the creative, innate world of the man. To our mind the most important are as follows:

1. The high level of lability, disposition, adaptation of the computer according to the tastes, needs, and demands of different users.

2. A friendly programming environment which allows even unprepared users to establish effective cooperation with computer.

3. The elements of game which exist in the associating with the computer. Clearly expressed play origin arises the level of motivation of the users even in process of making everyday and burdensome work.

4. The possibilities of practical use of the most difficult methods of mathematics other sciences and subjects by non-specialists.

5. Completely new possibilities of communication and multimedia.

6. The presence of the means and methods of fixation and notation of events, actions, decisions making possible to simplify the following analysis and adaptation of the system.

7. The possibility to cooperate not with the real objects and phenomena but with their virtual copies and worlds [5].

This and other factors connected with the rapid development of the computer environment make great influence as well as on separate individuals and on the whole society. Some of these factors are considered lower.

The Development of Means of the Differentiatial Education in the Computerized Society

Taking into the consideration upper said, we keep to the mind that for every student should be selected individual combinations and proportions of different methods of teaching. The most important factors in such selection must be:

- the particular features of the mind, perception and the character of the individual;
- the particular features of the future specialization and the work of the individual.

This supposes the necessity:

- the differentiation of the profession, the areas of activity, the teaching methods, in dependence from correlation different modes of thought and making decisions;
- effective distribution of functions, tasks, roles among the society, individual and computer as it applies to one or another situation, profession, area of activities.

To put it differently there are a lot of obvious and non-obvious dependencies and connections between the choice of teaching methods and the distribution of functions in the computerized society in general and human-computer systems in particular.

We do not claim to determine what subjects and in what amount should be studied by one or other student. Our purpose is to investigate the mutual influence of the tendencies in the computer environment

development and teaching methods. It is important to understand some things, to investigate general laws based on the simply and impressive examples.

As one of such examples we have chosen the tasks connected with the architect education. The foundation for such selection was follows. For the first, the profession of architect supposes the possession of both imagine-intuitive and physical-mathematical thought. For the second, the profession of architect is in the great demand according to creators of the systems of computer-aided design / computer-aided design manufacturing (CAD/CAM) that let us say about the experience and tendencies. For the third, strongly pronounced architect-builder inclinations reveal itself in a rather early childhood, that gives the reasons to consider this profession and part of the conclusions and recommendations rather broadly.

It is obvious that the education of the architect, who designs the objects with the help of computer is one thing. And the training of the architect who has to create computer programs of the calculation constructions and expenses is quite another thing. The first one based on the image-intuitive way which is inherent to the creative process. That is why he must "feel" mathematics, thermal physics, economics more than to know them (it is supposed that this general technical subjects are based upon corresponding CAD/CAM or the calculation group). The second one must know deeply all basic subjects because without it he can not "apply" them in his programs.

Both of these two architects must professionally use proper CAD/CAM and effectively make every possible constructions and calculations. The analysis of the present tendencies with the high level of confidence make possible prognosis of two things. For the first that CAD/CAM will become the main working instruments of the architects. For the second that for the majority of the architect-students the most effective methods of studying of the courses and the units of the general technical subjects will be admitted the methods, based upon the practical calculations, constructions, projects with the help of the intellectual instruments.

For example the methods of studying the courses oriented toward the first student to our mind must include the possibilities of making the virtual experiments. When a student chooses one or another construction, the results of this experiment are immediately shown: the gradients of thermal fields, voltage waveforms, the grades of heat irradiation. When student changes the construction the appropriate modifications of fields and loads appear on the monitor.

It is quite possible that at the beginning the student will advance to the acceptable decision with the help of the cut-and-try method. But the experience of use of game situation shows that very quickly appear a kind of understanding of the laws based possibly on the feeling of innate harmony. The chaotic selection of the variants is changed into the sensible use of the method of the successive approximations. A man begins to "feel" the problem, studies to solve it effectively.

At the set example with two students we have considered some extreme cases: image-intuitive thought or physical-mathematical. In ordinary life such cases take place not very often. The intermediate variants are more typical.

For example, in many professions connected with the design the best results achieve the specialists who effectively combine image-intuitive and physical-mathematical modes of thought. A lot of experienced specialists have learned on practice how to set themselves into one of another mode of thought, to select important proportions of these modes according to the character of the tasks which are being solved and works which are being made.

As people are very different and solve very different tasks so one of them are at a lack of the image-intuitive thought and other are in need of physical-mathematical thought. This lack could be compensated at the expense of choice of appropriate profession and work. But it is so not always. That is why a special attention is paid to the creation of intellectual assistants, which are able to compensate the lack of knowledge, skills and abilities of the individual.

We should stress that computer is not very reliable from the point of view of increasing the potential of the image-intuitive mode of thought. The main achievements in this field are qualitative visualization, wide multimedia possibilities. The rest is much worse, not talking about the intuition. This is significant argument in favor of abrupt increasing the pedagogues' attention to the development of the image-intuitive mode of thought. Because the lack of development of physical-mathematical mode of thought computers compensate more successfully.

One of the most effective methods of purposeful development of one or another ways of perception and thought is the practical cooperation with the appropriate developing and teaching computer programs. These programs usually contain a big number of specially selected game situations, which substantially increase the level of user's motivation and simplify the teaching. There are a lot of such programs and games. The

spectrum of them is rather wide too. Some of them are considered to be strictly specialized other is used for wide application. There is positioning in fields of activities, age, interests. For the last years developing computer games appeared which are ranged as the games for children of 3 to 5 years (we should notice that they are played even by 2 years old children with the help of adults).

The analysis of results of practical use of such games persuade us in advisability of fundamental expansion in this direction. The basing on the game approaches gives powerful stimulus for the development and teaching the child. At the same time the investigations directed on the revealing and use of another positive treats and particular features of child's perception are necessary. Without it the game may bring not only the benefit but harm. Besides this, it is very hard to develop the scenarios of games, create appropriate interesting understandable and at the same time useful play situations, without studying the particular features of perception.   In this case it is advisable to our mind to base on such instincts of creation that the majority of people has. The child willingly builds something from the sand, bricks and details of constructor. That is why at the beginning the substitution of bricks, details of constructors by their virtual analogs may be possible. Then goes the rapid increase of the number and types of virtual details. A new effect will take place in that case if the computer begin to form a kind of evaluation figures of constructions created by the child. For example if it is said about the building of virtual house so such figures may be the durability of the house, the value of the flats, their temperature conditions, the isolation of sounds... In another words the things, which the child knows and understands.

 Practice shows that when a child plays so-called strategic and emulation computer games he begins to understand very quickly that a lot of things in the world are interconnected. The improvement of one thing leads to the deterioration of another. It leads to multi-criterion optimization by the certain examples. In games, which are oriented towards the children of pre-school age, should not be a lot of criterions (1 - 2). In primary school classes the number of optimization criterions may run up to 3. As regards senior school, a lot of things here depend upon the definite subjects and teaching purposes.

It is obvious that the extension of range of the studied problems leads to increase of optimization criterions. The same example with the construction of buildings supposes the studying and analysis of many factors (including visual, social, ecological). That is why the number of optimization criterions may reach 10 and 20. As for the means and methods of education in the senior classes the author, taking into consideration the limits of article, can repeat the same arguments as in the example with architects. Adding that many things are still not clear, require studying, development and approbation.

Studying the questions of differentiation of education with the help of computers we should point to the possible risks and negative moments. The most obvious those demerits and difficulties which are on the top. For the first these are the factors of negative influence of computer environment upon the children, additional stratification of society, expenditure and difficulties connected with the considerable reorganization of educational process, the individual choice of educational programs, teaching forms, means and methods. Besides the differentiation of education at the primary school classes supposes the necessity of making appropriate decisions about career-guidance because such decisions are always connected with multitudinous risks.

As the humanity has started the path of rapid computerization and there are no other real alternatives so the demerits and possible risks only stress the main thesis of article: the problems of global computerization are complex, require special attention of investigators and society on the whole.

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