Galina V. Belova;
post-graduate student
secondary school 1900, gymnasium 1538
Moscow

Computer Training or Training the Computer? [*Galina V. Belova*]

Key words: *logical thinking, computer training, algorithmic thinking, training computer, motivation to learn.*

Annotation: *The widespread introduction of computer technology in the educational process not only sets new requirements to the organization of teaching, but also creates new conditions for intellectual development of pupils. Learning with computers should not only use computer equipment for the process of learning, but to give the child the opportunity to develop the intellect in particular self-teaching computer hero.*

The informatization of higher, middle and professional schools, essentially, means the beginning of revolutionary changes in the field of education. Computerization is neither more nor less than one of the lines of socialization of human mental development in the modern scientific and technological revolution. Because of this, information technology is a permanent, ever-increasing, and an important factor in irreversible mental retardation student. Widespread introduction of computers in the educational process puts greater demands on the organization of mental activity, but also creates qualitatively new conditions for the development of students' thinking.

On the psycho-pedagogical point of view there are several lines of such changes. Firstly, operation and development are carried out in an orderly thinking ecologically artificial environment. The purposeful dialogue interaction with a computerized human ecology occurs. Secondly, the activities are carried out in dialogue not only with others, but also with the computer. Thirdly, the use of a computer to enhance the effectiveness of their professional activities creates conditions for the emergence of new types of personal reflection.

The present level of computer technology expands horizons applicability of ICT in learning, not only changes role accents, but also thinking. With the rapid development of the new information society related sometimes paradoxical phenomena in the field of psychology and human development of intelligence. James Flynn (JamesR.Flynn), a scientist from New Zealand, described the phenomenon that sociologists and psychologists still can hardly explain: since the beginning of the 20th century, IQ level is continuously growing [1]. Flynn found that this increase occurs at a speed of about 0.3 points per year, i.e. 3 points per decade. He traced the changes for 30 years and found a statistically significant increase intelligence. This phenomenon is now called the Flynn effect. One of the strangest features of the Flynn effect is its uniformity. The growth occurs systematically from year to year. It means that children decide to test about 10 points more successful than their parents.

In order to explain the Flynn effect, it is necessary to analyze the features of modern thinking. Modern child's virtual world has become an integral part of the real world and sometimes can replace a full-time communication with other people. At the same time mastering the new computer technology, usually occurs with minimal teacher's role. Curiosity and interest in the new underlies the rapid development of user interfaces, programs, and chat in the ubiquitous Internet with virtual interlocutors helps to solve a technical problem. According to many psychologists, the Flynn effect is likely not associated with the fact that people are getting smarter, and the fact that they think differently. A new way of thinking, in my opinion, can be called "virtual thinking".

Modern school cannot sidestep these phenomena. It is now clear that, along with changes in the forms of lessons, we need to change and other approaches to learning. The rapid development of forms of computer-based training not only proved the right to life this form of learning, but also revealed some shortcomings.

Psycho-pedagogical and methodological approaches to the use of computer technology in teaching disclosed in the works of N.N. Antipov, A.P. Ershov, A.A. Kuznetsova, M.P. Lapchik, V.S. Ledneva, V.M. Monakhova, B.E .Starichenko etc. Questions of computers introduction in the educational process in the studies considered by A.A. Abdukadyrova, B.S. Gershunskii, V.F. Gorbenko, L.I. Doliner, S.R. Domanova, V.I. Zhuravlev, A.G. Kouchnirenko, E.I. Mashbits etc.

In the early development of computer forms of training there was considered a model in which the teacher appeared only as the author of the course (Fig. 1). At the same time he was supposed to provide the student reaction to the course material, different tiered approach to learning, control materials to create learning material etc.
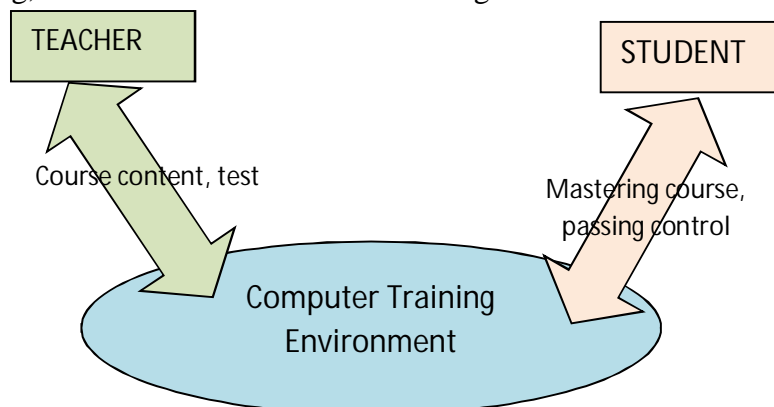

Fig.1. the initial approach to the forms of computer-based training

Such training can be carried out as monotehnology when all the training, all the management of educational process, including all kinds of diagnostics, monitoring, rely on the use of the computer.

Other types of computer-based training technologies are:

1) "penetrating " technology (the use of computer technology in training on specific topics, sections for individual didactic problems).

2) main defining the most significant of the technology used in parts, but not the only one.

In these cases, computer training is not the only or the main and auxiliary tool in the hands of the teacher. Practice has shown that the personal contact of the teacher and the pupil is necessary for quality learning and it is necessary to use other technologies (Figure 2).
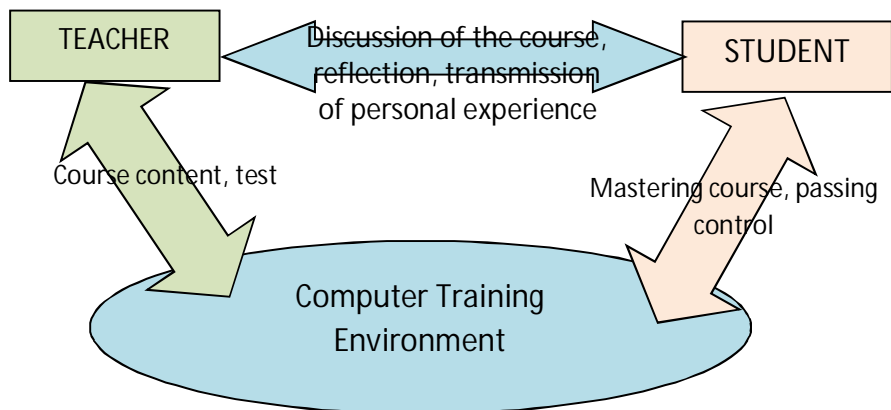
Fig. 2. A refined model of computer-based training

A totally unique opportunity for dialogue with the child, science and culture is the World Wide Internet. This conversation and correspondence, and interactive communication with people from all parts of the world and attract scientific and cultural information from banks, museums, warehouses worldwide. In this case, computer training scheme looks a little bit different (Fig. 3).
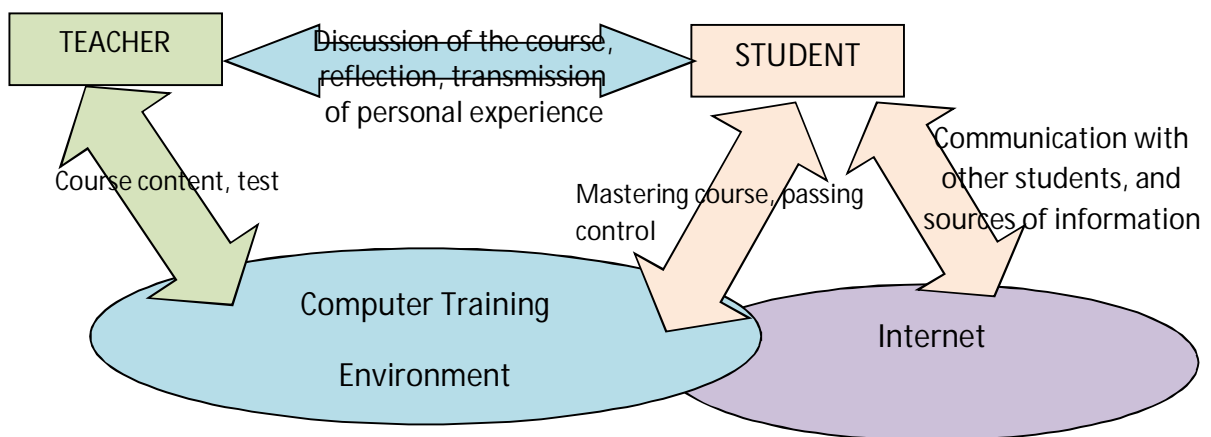

On the other hand, in the hands of a skilled teacher computer technology can be used not only as a learning environment, but also as an excellent tool for the development of children's abilities. Andrei Ershov well-known saying in the preface to Zvenigorod's book "The First Lessons Programming" [3], which essence was to ensure that even the rich academic or professional experience is not able to compete with the exuberant imagination of youth. Multimedia capabilities of modern ICT tools only support the manifestation of creativity in the children intellectual development.

Our country has recently been widely used frameworks LOGO[1], which have ample opportunities for educational activities for children. Logical thinking along with algorithmic

---

[1] LogoWorlds is Russian version of MicroWorlds, developed in LSCI, 1993 and PervoLogo (1996). Now there is a third version (3.0) and media LogoWorlds PervoLogo.

3

thinking defines the intellectual power of man, his creativity. Planning skills, the habit of accurate and complete description of their actions, the ability in accordance with the laws of logic to develop algorithms for solving of different origin are a necessary part of the scientific world view. Question of the relationship between the logical and algorithmic thinking types today is an open problem. Some textbook authors in computer science for primary classes (A.V. Goryachev, M.A. Lukashenko, L.A. Kamburova, A.L. Semenov, etc.) often use these terms interchangeably.

Using LOGO environments allows exploiting the potential visual-figurative thinking. Programming environments LOGO promotes the formation and development of the child's simple logical operations based on the use of the logical design. Logical structures are intuitive realization: the child himself sees the results of the work and can independently assess the correctness of reasoning. Learn the basics of algorithmic thinking student based on the concept executive. In environments LOGO it is a Turtle - controlled by a computer, simulating properties such as mobility, sensitivity and memory. Turtle is able to understand and comply strictly with certain assignments, the language of " Logo". Independence, manifested in proactive search for a solution of problems in the analysis of their conditions, critical discussion and justification of solutions, in the preliminary planning and playing different embodiments solutions, allows us to apply activity-based approach to the development of children's thinking. Model of educational activities (Fig. 4) in the case of a teacher IDEs looks different than in the case of a conventional computer-based training.
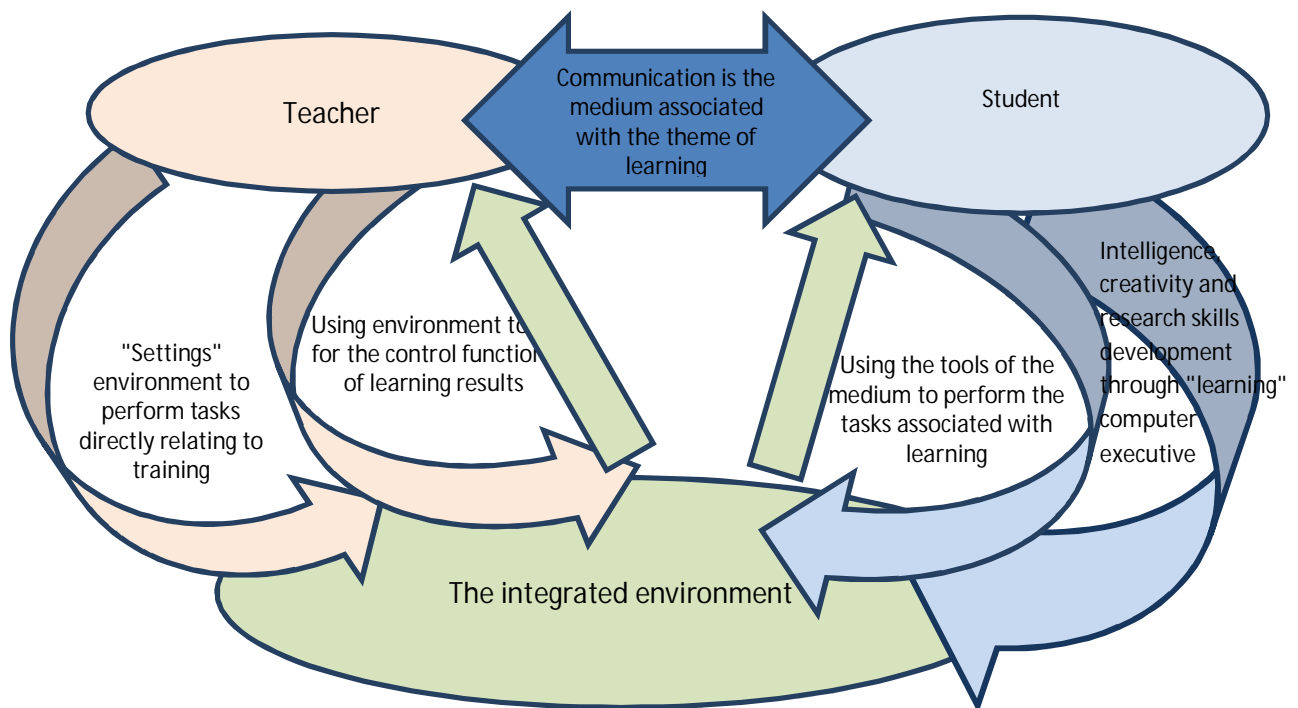
Fig. 4. A refined model of learning through integrated environments

An outstanding mathematician, programmer, psychologist and educator Seymour Papert can be regarded as an ancestor of using developing media education in general, and not only for teaching programming. He is also one of the founders of the theory of artificial

4

intelligence, the creator of the language Logo, the author of "Revolution in the Children Minds, Computers and Fruitful Ideas" (1980) and "Machine for Children: Rethinking School in the Digital Age" (1992), as well as numerous articles on mathematics, artificial intelligence, education, training and thinking. [5]

The use of such IDEs as "Logo" unusually expands horizons cognitive, design and creative activity in children and brings a lot of very new and incredibly complex problems. Russian teachers have accumulated considerable experience using tools LOGO environments. In contrast to the "closed" training programs, often containing finite sets of "test" questions on a specific topic of the textbook, or exercises to acquire some single skill environment LOGO are universal and open educational and developmental environment.

Using programming environments and environments with the performers in particular, have rich opportunities for the development of thinking. Kushnirenko and G.V. Lebedev emphasize that "Mathematics as a course in which predominantly formed a logical way of thinking, and computer science as a course specifically aimed at developing an algorithmic way of thinking, should be required to go into general basic high school courses." [4] Using learning opportunities LOGO frameworks can help to see the profound link between the physical and mathematical sciences and the humanities, not dividing these areas, and integrating them into the consciousness of the disciple. School, as a rule, is not engaged in problem solving ability to think. At the same time, knowledge about the art of "doctrine" would help to dispel the fear and reluctance before teaching. The second aspect is also important and concerns intellectual discovery in the process of learning.

The main characteristics of our age are the rapidly increasing speed and scale of the changes that affect virtually all aspects of contemporary reality. Consider the purpose of schooling children mechanical transmission notorious "amount of knowledge" aging faster than textbooks rewritten and revised curricula wrong. "Coaching" students on the decision of tests covers the development of the child's personality, beauty masks science job template set of tests. In this regard, the use of the computer not only as a learning tool and as a subject of learning at school, pushes the boundaries of the school, gives new opportunities to develop children's intelligence.

Sources:

1. JamesR.Flynn. Flynn's Effect. //Marguerite Holloway in scientific American, Vol. 280. No 1, pages 37-38; January 1999.

2. Gershunskii B.S. Computerization in Education: Problems and Prospects, M.: Education, 1987. - p. 264.

3. Zvenigorodskii G.A. First lessons in programming. Issue 41 series "Library of Quantum", Nauka, 1985 - p. 208.

4. Kushnirenko A.G., Lebedev G.V. 12 lectures about why we need a computer science school course and how to teach. Handbook, M.: Laboratory of Basic Knowledge, 2000.

5. Papert S. Mindstorms. Children, Computers and Powerful Ideas. Translation of the book: Papert S. Mindstorms. Children, Computers and Powerful Ideas. M.: "Pedagogy", 1989. - p. 234.