Development of Schoolchildren's Cognitive Activity with the Help of Various Interactive Technologies

Ekaterina Sergeevna Krasnozhonova

Pyatigorsk State Linguistic University, Pyatigorsk, Russia

Abstract: As the title implies the article describes the development of cognitive activity of schoolchildren with the help of various interactive technologies. The aim of the article is to provide the reader with some material on such terms as cognitive activity, cognition, cognitive principles. Much attention is given to the necessity of introduction and studying of new forms and methods of development of intelligence with use of various interactive technologies. This article is dedicated to the problem of development of cognitive activity of schoolboys at modern school as the author considers that the motivation to study foreign language is absolutely or partially absent. The aim of the article is the analysis of studying of interactive methods of teaching causing the development of cognitive activity. Article is devoted to the complex research of theoretical base of the interactive methods used as in Russia and abroad. In article such essential problems of modern pedagogics and methodology as use of interactive methods in work of teachers, the structure of cognitive activity is briefly presented. The article gives a detailed analysis of cognitive activity, its principles and different methods of its development.

Key words: Cognition · Cognitive activity · Cognitive principles · Interaction · Interactive technologies

INTRODUCTION

Orientation of school to humanization of education and development of the personality of the child assumes necessity of a harmonic combination of educational activity, for which frameworks base knowledge, skills, with activity of the creative, individual inclinations of pupils connected with development, their informative activity are formed, ability independently to think, thus solving non-standard problems. In this connection at the present stage school education problems vary. It cannot be reduced only to transfer and to master knowledge, acquisition of necessary skills. Before school education there is a problem of education of the competent, productively conceiving person owning system of knowledge and developed mental abilities, allowing it independently to raise an educational level throughout the subsequent life.

Success in absorbing and digesting of the necessary information is limited to time in this connection, it is necessary to find and realize potential possibilities of optimization of school process of training: application of new methods of the training which is stirring up informative activity of pupils, developing their mental abilities necessary for successful process of knowledge. In pedagogies and a technique search of the rational organization of the educational process, stimulating informative activity of pupils is intensively conducted. Many innovative models of training and modern educational technologies at the Russian school are constructed for the purpose of development of informative processes in structure of the person. In practice there are some educational programs which increasecognitive activity of younger schoolchildren and growth of their progress. A lot of schools use these programmes in their work. Use of various games and exercises in educational process renders beneficial influence not only on cognitive, but also personal sphere of pupils. The favorable emotional background created at lessons promotes development of educational motivation that is a necessary condition to effective adaptation of the younger schoolboy to conditions of new environmental area and its further successful adaptability and development of cognitive activity [1;15].

Corresponding Author: Krasnozhonova, Pyatigorsk State Linguistic University, Pr. Kalinina 9, 357532 Pyatigorsk, Russia

During an epoch of informatization and intellectualization of a society the great value is given to a problem of intellect, intellectual development. There is a necessity of introduction and studying of new forms and methods of development of intelligence with use of various interactive technologies.

First of all *activity* is understood as ability of the person to change surrounding validity according to own requirements, sights, the purposes. Activity in training allows the schoolboy faster and more successfully to master social experience, develops communicative abilities, forms the relation to the surrounding validity. Activity defines degree (intensity, durability) "contacts" of the pupil with a subject of its activity.

We share D.S. Godovikovoj's point of view that activity of the child is a display of requirement of its vital forces, therefore it is possible to consider both the precondition and result of its development. Any activity which is carried out by the person, results its physical and spiritual forces in an active condition. Activity of the schoolboy develops, accompanying all process of formation of the person. Essential changes in activity are reflected and in activity and development of the person is expressed in a condition of its activity.

In structure of activity of D.S. Godovikova allocates following components:

- Readiness to carry out educational tasks,
- Desire to act independently,
- Consciousness of doing of the task, such a system of training,
- eagerness to raise the personal level, etc. [2;31]

We start with concept «informative or cognitive activity». According to its sights cognitive activity takes place close to level of requirement in structure of cognitive activity. Cognitive activity can be defined as a state of readiness to informative activity, that is that condition which precedes activity and generates it [3;38].

It means that *cognitive activity* -is a personal quality which is got, fixed and develops as a result in a special way organised process of knowledge taking into account individual qualities and age. Cognitive activity defines an orientation of the person, makes the basic core of orientation in a life, behaviour, activity; defines the sense of understanding the person of the phenomena of a life and the methodology of behaviour caused by it; comprises criteria principles of an estimation of the relation to the world and the relation to the world of other people.

In my opinion, cognitive activity of the younger schoolchildren is shown, first of all, in ability of the child to accept from the adult and independently raise an informative problem, make a plan of action, select means and ways of the decision with use of more reliable receptions, to make certain actions and operations, to receive results and to understand necessity of their check. Thus, it turns out that cognitive activity is a strong-willed, purposeful action and a process of cognitive activity is defined by level of inner (cogitative) activity which bears in itself elements of creativity [1;12].

As our research shows when you teach a foreign language the communicative competence is prevailing, to seize which, without being in the country of studied language is rather difficult. Therefore the important problem of the teacher is creation of real and imagined communicative situations at the lesson of foreign language, using for this purpose various methods and interactive technologies (role games, discussions, creative projects, etc.). At the decision of the given problem the huge role is played by means of computer technologies, which allow teacher to give pupils fuller and more exact information on a studied topic, raise visualization of training and cause desire to the further perfection of language culture [4;2]

As Frank L. Greitzer and his colleagues suggest that many online training applications that employ state-of-the art multimedia are not successful. Implementation of multimedia-based training features that allow students to interact with simulations, animations, video and sounds may give the impression of engaging the student in more active forms of learning, but sophisticated use of multimedia features does not necessarily produce the desired effect [5;25].

As Michael Allen considers in his article advocating discovery-based e-Learning: " Lurking behind many of today's slick delivery system are shop-worn, passive learning paradigms that Socrates spurned in the fifth century B.C" [6;20].

We agree with Frank L. Greitzer's opinion that "the most important prescription for the use of interactivity is that the design of active learning applications should be grounded in principles of cognition. Interactive examples should be selected that meet criteria of relevance, realism and importance. Design of interactive features should focus on providing opportunities for students to learn (through virtual experience) the functional value of the material by working directly with the content" [5;24].

Table 1. Cognitive Principles and Methods Employed in *e*-Learning Design/Development

Cognitive Principle	Design/Approach	Re-usable Implementation
Stimulate Semantic Knowledge—Relate material to the learner's experiences and existing semantic knowledge structures to facilitate learning and recall.	Interaction elements: • Did You Know? • Heads Up	Training content independent of user interface
Manage Cognitive Load—Organize material and build up gradually from simple to complex concepts.	• Simple → Complex • Train and test in small chunks	Interaction elements focused on specific learning objectives
Problem-Centered—Immerse learner in activities that enable learners to work immediately on meaningful, realistic tasks.	• Checkpoint interaction elements	Flash, ShockWave, QTVR
Interactive—Emphasize interactive, problem-centered activities that require manipulation of objects to encourage active construction/processing of training material to help build lasting memories and deepen understanding.	• Multimedia objects • Integrated Exercises • "Game" objects	Interactive scenarios built from combinations of interaction elements
Frequent and Varied Practice—Implement a variety of interactive problems for practice, exercises and tests that aid understanding and provide feedback.	• Optional quiz items and interactions • Random selection of alternative instances of quiz and test items	Multiple-use interaction elements for test and practice

Greitzer (2002) outlined a set of cognitive principles to guide the design of active learning applications. Table 1 summarizes these principles and lists methods and techniques that were employed to implement these principles in interactive training. The foundation for the design and implementation of these principles is the notion of interaction elements, which form the basis of our student-centered/active learning approach of Interaction elements are basic objects for engaging the learner through ideas, problem-solving activity, or interaction. By associating specific learning objectives with interaction elements, the instructional designer can transform them into learning objects that transcend their original purpose and enable their re-use by other courses that call upon the same or similar learning objectives.

These ideas and methods are discussed below.

Training Relevance: Interactive experiences in applying what has been learned should be presented in realistic contexts. When carefully designed, quizzes and interactive exercises can provide unique and valuable opportunities for learning through exploration and discovery. The key is incorporating student-centered activities involving manipulation of objects to solve problems (working directly with the content rather than answering factual questions that only require rote learning) [7; 2065].

- Problem - centered activities.
- Problem – centered training helps to instill learning experiences that are intrinsically rewarding, relevant and enjoyable for the student [8;21.1].

Engaging learners in problem-solving activities, rather than passively digesting course content, not only increases motivation, but also compels them to think about, organize and use the information in ways that encourage active construction of meaning, help build lasting memories and deepen understanding.

Competent use of video resources by the teacher at lessons of a foreign language allows, besides tasks for understanding, give pupils the task for treatment of a mimicry and gestures ("body language"), on recognition of style of mutual relations so that in a real situation pupils won't do not do blunders in communication with representatives of other cultures. The video fragments used at a lesson, represent and at the same time illustrate language in a live context, connect a lesson with the real world. Also the video resource is a training means which enriches semantic fullness of the lesson and helps to overcome cultural and language barriers at foreign language studying.

In our opinion there are some key moments when use of such kind of a resource is the most successful and effective:

- Representation of the finished language context;
- Studying of nonverbal communications of representatives of different cultures on the basis of presentation of the communicative language;
- Working out and representation of situations of success in a class (for example, role game);
- Development and perfection of communicative skills (skills of the description and retelling);
- Enrichment and expansion of the thesaurus of pupils;
- communication or discussion stimulation.

As practical experience shows that use of video materials are effective sources of communicative activity of pupils, allowing them to decide simultaneously some problems that corresponds to a principle of the complex approach in training. Pupils receive evident representation about a life, traditions and language realities of the English-speaking countries. Use of video recordings promotes an individualization of training and development of motivation of speech activity of the trained.

As the content-analysis of the methodical and pedagogical literature has shown that at selection of video resources it is necessary to be guided by following positions:

- Interests of the trained;
- The importance of the information about the culture and language of the studied language;
- Modern and actuality of material;
- Educational and regional geographic value of a video film;
- Degree of emotional influence;
- Methodical expediency.

It is necessary to notice that using a video film at the lesson is not only use of one more source of the information. Conditions for development of the various parties of mental activity of pupils and first of all, attention and memory are created. During viewing in a class there is an atmosphere of mutual cognitive activity. To understand the film maintenance, it is necessary for pupil to make certain efforts. So an automatic attention passes in the arbitrary. And intensity of attention influences storing process.

Thus, psychological features of influence of video films on pupils promote an intensification of educational process and create favorable conditions for formation of the communicative competence of schoolchildren. Successful solving this problem can occur only at regular display of video films and methodically organized demonstration.

As an example it is possible to name the American videocourse rather popular among studying English language "Family Album, USA" which is used in work with pupils of different classes.

The twenty six episodes of a course is made by history of a life of a typical American family and their friends. Presence of constant heroes gives the chance to connect plots together that promotes concentration of attention of the spectator. Training exercises in the end of each of three parts of an episode are intended for

fastening of speech samples, a phonetic, lexical and grammatical material and also development of abilities of audition of the regional geographic information.

Each of 26 episodes of a videocourse possesses relative independence in respect of the semantic maintenance. As considers O.I. Barmenkova that use of various video resources gives the chance to the teacher most to define the most suitable way of acquaintance with a material: consecutive introduction of video fragments in educational process or use of separate episodes with the account of conformity of subjects of a video film to a basic word stock and communicative situations [9;22].

CONCLUSION

Concerned parents, teachers, content producers, child advocates and policy-makers want to understand much more about how such a pervasive experience can contribute to and certainly not detract from our children's intellectual, social and physical development. We sense that, because of their unique properties, well designed interactive media have an extraordinary potential to not only help young people learn, but also engender a true love of learning.

We all share a powerful interest in finding out more: Children's content developers who could learn more about how to create engaging, educational interactive experiences; parents who could learn more about what media products might be helpful or even harmful to their children; policymakers and advocates who could build future policies on a firm foundation of empirical knowledge; and finally, researchers themselves, who might learn a great deal more by bringing together across academic disciplines work that often goes forward on autonomous tracks.

Cognitive Development: We have long understood that children learn and grow, socially, intellectually and even physically from playing games. They also learn skills, information and behavior from their parents, siblings and peers; from television, music, movies and comic books. But how much do we understand about whether the introduction of interactive media into the equation affects how and what children are learning? Is the very interactivity of newer technology a distinction that makes a real difference in what children learn? In simple terms, do playing collaborative learning games make children more likely to act collaboratively? Or playing violent video games make children more likely to act violently?

In general, research suggests that where interactive video games have been designed to teach certain skills, they can be highly effective learning tools. But there has not been enough research on games that are already in the marketplace to determine what their effect is on other cognitive skills. And until there is more research, we simply don't know enough to say whether children's access to and use of computers at home significantly influences their achievement in school. While early studies have suggested that home computer access may be associated with higher test scores, a variety of other factors in the home and family environment could also be relevant. Given the fact that the primary reason cited by parents for purchasing a home computer and connecting to the Internet is education, we have very little research to document whether using interactive media at home actually contributes to achievement at school.

The concept of media socialization, which examines specifically how different kinds of media influence children's cognitive growth, is a perspective which has emerged over the last fifteen years as a key framework for understanding how and what children take from their experiences with communication.

The cognitive approach is currently the dominant framework (or paradigm) for HCI. It characterizes humans as 'information processors' in which information undergoes a series of ordered processes. This draws from the idea that human brains work in a similar way to computers. We can therefore describe and model human activity in the same way that we do for computers. As information comes in from the world it is transformed into an internal representation that is acted upon through various mental 'cognitive' processes until it is transformed into an output.
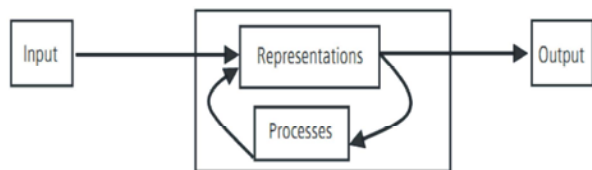
It is important to note that cognitive activity is seen as goal-oriented. This means that there is an intended and planned result for the processing of the information in the cognitive system. The human information processor knows when to stop acting on (processing) the information, because they have achieved their goal. This is known as 'means end analysis': determining the difference between the current state of a problem and a goal state [10; 12].

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