

## **Game methods used in teaching “Science” in Ukraine**

The traditional educational system needs serious reorganization since it possesses mostly a ‘reproductive’ character and as a result forms uncreative and unmotivated personalities – passing along imperfect academic knowledge that cannot be practically utilized. As one of the ways to increase the efficiency of education we would like to propose an innovative way of school subject integration, and active use in teaching practice of the newest pedagogical technologies, in particular, game technologies [1].

Working above questions of integration of unrelated subjects we have developed and tested a course of Natural Sciences, which is taught in a foreign language at the elementary school level [5]. Trials were conducted during five years at the Kiev Specialized School in Ukraine. The creation of the integrated course allowed us to conduct and analyze several tasks, which included the following major focal points:

1. increase in student language competence, due to the creation of a foreign language speaking environment during lessons;
2. increase in student subject competence, due to the favorable combination of integrated teaching methods;
3. decrease in negative instructional influence on students’ physical and psychological health, due to the creation of a positive atmosphere in the classroom and a decrease in the general course load;
4. formation of a creative person who is ready for international interaction or collaboration, due to an increase in his/her intercultural competence level.

We think that the main advantages of the aforementioned, is that we can achieve all of these points without an increase in the general course load, while teaching different school subjects in foreign languages. In our case, natural science courses in English, involved one hour of foreign language and one hour of natural science instruction. Thus, the volume of hours allocated for the study of both English language and natural sciences were increased, while at the same time, the general course load remained constant.

Simultaneously, this new curriculum doubles classroom instruction time for natural science, and grants us the opportunity to involve new interactive pedagogical technologies, including game techniques [1,2,3].

We would like to draw your attention to the fact that in these natural science lessons the basic goal of instruction – learning a foreign language – is hidden from the pupils. The students try to retain material obtained from the study of natural science and thus use the language only as a tool for obtaining other knowledge. At the same time, as they become more familiar with foreign language components, students involuntarily receive information about natural phenomena.

Some pedagogical researchers consider, that the ideal didactics is the tactic of ‘imbedding’ the instruction within another more attractive medium. In this case, the child longs to obtain the knowledge himself. A Russian teacher-researcher once wrote that, “Should the lights go off – he reads by candlelight! Nothing can prevent this because he is now genuinely interested.” For this reason, the overall objective of any lesson should be embedded; attention paid to the lesson involuntary; and curiosity constant! [12] In his natural science lessons, a child opens up for himself wonders, makes experiments, uses his life experience and checks in practice getting information, simulates or models certain processes or the phenomena. Use of unusual teaching methods makes study of natural sciences interesting for students, and the use of foreign languages as a tool brings a constant game element into the learning process.

In teaching the aforementioned school subject, we widely used the following pedagogical techniques:

- ‘TITS – method’, the ‘theory of inventory task solving’, developed by Heinrich Altschuller and provides for a decrease in the psychological load on students and the formation of creative thought;

- “Business games” techniques – solving problems from different points of view and introducing personally oriented trends into the teaching process, providing for the development of creative thought;
- “Emotionally substantial” technique developed by I. Shekhter and G. Kitajgorodska, injects humanism into the teaching process, helping to support constant student interest in the subject;
- “Cooperative learning” technique, helps to decrease the emotional load on students and helps to successfully form student interaction and collaboration, making the process active instead of reproductive.

Among all the aforementioned techniques, in our opinion the most effective is the ‘TITS’, as for the teaching of natural sciences, which we would like to detail further.

‘TITS’ is a methodology involving a search of new creative decisions, accompanied by positive emotional backgrounds from participants in this process. The author of this technique was the scientist, researcher, writer and visionary, Heinrich Altschuller, which he detailed in 1946. The ‘TITS Association’ was founded in 1989 with its main purpose being, to support the growth of personal creative qualities. At the beginning the ‘TITS’ techniques were developed as a technical discipline to provide new technical task solving, but later ‘TITS’ principles were incorporated into psychology, pedagogics, medicine, art, management organization and so on. Vast experience from the use of ‘TITS’ in education has been accumulated in Russia, and Ukraine has only just begun to use this technique in the field of pedagogic [9,10].

‘TITS’ is a pedagogic of co-authorship between teacher and students; the teacher therein functions as an unusual explorer who follows behind. In this technique, and for practical purposes there are no teachers or students! Only one common goal: to understand and learn the logic of thought. Children are wise men and philosophers from birth. And this creative filling-up of a child, we, the adults shouldn’t lose, to the contrary we should develop and support it in every possible way. The main thing is to understand, that the child who thinks, searches and solves his own problems is the norm! And his creative development, which is at the same time the final goal of education - to teach the

child the consequences of each of his actions. Experience shows that ‘TITS’ methods can be efficiently utilized in every school subject. ‘TITS’ is not a ‘ready recipe’; it is a work in progress, in a mode of constant research and refinement, a creation of the author’s pedagogic [12, 13].

Working out the integrated course of natural sciences/English, we took into account the principles of availability, sequence and seasonal prevalence in choice of material and at the same time use specific principles of the ‘TITS’ method: Freedom of choice, openness and feedback. The high level of students’ emotional state, and interest in the subject at lessons were supported due rhythmic changes in the kinds of activities, such as: dialogue – game – experiment – work [14].

We would like to describe in more detail some methods and techniques of ‘TITS’ which we actively used in Science lessons.

1. ***“TIT-method” of learning new material.*** This method provides for the segmentation of work with a new textural or visual material. The first stage consists of dividing up a plot into separate objects (*occurrence of the storyteller “Dividor”*) - separating objects of the text on chart within their own circles. The next step involves linking the objects by identifying the different levels of connection between them. (*occurrence of the storyteller “Combiner”*) Then effectively discuss the entire picture with the help of different sensory organs (*occurrence of the storyteller “I only I hear”, “I only I see”, “I feel taste”, “I smell”, “I feel touches”*). And at the end of working with this new material we offer the chance to use the transformation method of textural or visual material into the sign system of recordings produced earlier produced by the class. As result we have free retelling of a new material from natural science study in English without previous preparation and completely avoiding thoughtless repetition [8, 12].
2. ***Trial and error method (search of new decisions).*** Related to this method we offer the introduction of natural science text for work in oral mode. For example, we would like to describe game called Chaos wherein the teacher reads a text-mess, and pupils

should react in appropriate way: It is autumn. People start to collect snow in the fields. Leaves on the trees begin to grow. We are looking forward to falling leaves, then snowfall and branch fall. Animals begin to prepare for winter. The bear has cuddled himself away in order to hibernate. The fox has dried nuts and mushrooms for the winter. Soon the hare will change its hair and it becomes navy blue. Days become all colder and shorter...” The result of using this technique is good audio understanding of English at a highly motivated level. This technique is also an element for a pupils’ non-standard thought development, which is one of the steps toward the formation of a creative, free spirited person [9,13,14].

3. **Method of the morphological analysis.** This method forms the child’s skill for reorganizing environmental object into fantasy. It necessary to build morphological table to successful application of this method. For example we are going to invent an unknown animal. In that case in the morphological table vertically we should arrange the basic parts of an animal, and horizontally - various variants (the characteristics of these parts). The total sum of variants, which are provided with such a table, is equal to result of multiplication of elements on vertical and horizontal. Rules of sorting out are absent. Thus we get endless space for creativity. Children with satisfaction invent unusual animals, plants and planets etc [10, 14].
4. **Method of revival.** Differently this method refers to as - a manipulation with small people - they may be children (children – “alive pictures”). With the help of this method children can model world around, its phenomena: for example, physical stages of things - solid, liquid, gaseous; phase transition and interaction between subjects and so on [9,10].
5. **Method of Puzzle making.** We take an object. Then answer the question: “What is it?” – in this way we can find a lot of attributes to this object. Then we pick up the more the better nouns to each attribute. So we can build a puzzle [13].

Way of search, which we have chosen, is interesting and difficult at the same time. The main difficulties, which are connected with aforementioned integrative subject launch, are absence of the methodical supplying, shortage of qualified staff, insufficient financial providing and so on. But never lasting interest with which children study the

subject and satisfaction, which teachers get from this work, all these clearly prove perspectives of our scientific research' results practical use in schools.

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