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**APPLYING PSYCHO-TECHNICAL FAIRY TALE TO DEVELOP**  
**CHILD'S LOGICAL THINKING ABILITIES**

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***Abstract***

This paper describes the result of application of psycho-technical fairy tale as a method of transferring knowledge of the main laws of logic and forming a child's abilities of independent logical thinking. The psycho-technical fairy tale specially developed for the research purposes was used in the child's (a girl, 10 years old) informal educational process. We tested this new approach to child's developing logical thinking and analyzed the results by means of ideographic method appropriate for investigating individual case. Our hypothesis was the following: the psycho-technical fairy tale used for transferring knowledge of the main laws of logic can significantly contribute to developing the child's abilities and motivation for logical thinking. The research hypothesis was confirmed. After reading a psycho-technical fairy tale, the child began to regularly focus attention on the logical mistakes in the discourse with adults and peers. The research results will be useful for teachers, psychologists, philosophers to conduct experimental research in order to get nomothetic knowledge about general regularities of developing children's logical thinking. Besides, the research results can be used as an additional methodological instrument in the developmental activities with children.

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**Keywords:** Child's development, logic thinking, primary school children, fairy tale.



## 1. Introduction

Developing child's cognitive abilities is one of the most complex and urgent problems in psychology and child education in the knowledge economy, when memorization of facts and procedures is not enough for success (Sawyer, 2006). Logical, system, critical thinking is necessary for effective acquiring new theoretical knowledge and solving new practical tasks. At the same time, parents and teachers face the children's limits to think logically on a daily basis. Thus, the search for effective methods and instruments of developing child's cognitive abilities, especially abstract logical thinking, is crucially important.

It is common for children to mix arguments and spontaneous desires when they cannot reflect their own thinking process and separate logical conclusions from opinions formed under the influence of children's wishes or emotional conditions. In this situation, it is impossible for adults to reach understanding, or evoke a response from a child. Sometimes adults can correct logical mistakes in children's train of thought to help children to come to conscious conclusions, but this outside help does not contribute much to developing children's abilities of independent logical thinking.

Relatively low level of self-reflection and willpower does not allow children to make necessary subjective efforts in order to focus attention on arguments which can change spontaneous opinions and destroy the feeling of self-righteousness. The childish wish to be right provokes insensitivity to inconsistent argumentation. Such insensitivity can be considered a kind of psychological defense mechanism which allows avoiding disappointment and feeling of guilt connected with accepting a mistake (Bogdanova et al., 2016). Children's self-indulgence of spontaneous wishes and attitudes can result in the form of irresponsible behavior because of children's low abilities to reflect cause-effect connections and predict long-term consequences of actions. They concentrate mainly on immediate effects, for example, on pleasures.

In practice, these general psychological peculiarities of children's development vary depending on real children and real situations. Nevertheless, these peculiarities explain why direct verbal transmission of information or meanings (which endangers children's opinions) is not effective. There is a need in other forms of acquiring knowledge and developing cognitive structures which correspond to children's leading activities and developing new psychic formations.

At primary school age leading activities changing and appropriate new psychic formations develop (Leontiev, 2005; Vygotsky, 1982; Ericson, 2000) in the process of educational, social-assessment activities, regulated games and other activities based on actions sequence. In particular, new psychic formations, developing at primary school age, which favor forming a child's logical thinking are the following: voluntariness of psychic processes, reflection, planning, developing of willpower, intellectualization of psychic functions, symbolic mediation of cognitive activity, and theoretical thinking (Vygotsky, 1982; Elkonin, 1989; Siegler et al. 2004). Thus, intentional developing logical thinking is possible due to these new psychic formations at primary school age.

Hence, it is necessary to start developing logical thinking intentionally at primary school age. The basis of developing and further improving logical thinking is understanding the four main laws of logic (Vinogradov et al., 1954; Ivin, 1986). However, a low level of reflection and interest in abstract knowledge together with low attention stability complicate transferring knowledge about logic and logical thinking through verbal communication. In addition, according to Vygotsky and Leontiev's activity theory, the development of a child's new level of consciousness (abilities to think logically) requires a child's

involvement in appropriate new thinking activities (Kravtsova, 2006). Taking into account the relation between cognition and emotions (Roth, 2008) and a great role of imagination in active child's involvement in new cognitive activities (El'Koninova, 2002), some appropriate psycho-technical instruments are necessary for acquiring not trivial knowledge and developing new cognitive structures.

Myths, fables and fairy tales have successfully been used for educational purposes since ancient times and remain quite common in education (Suransky, 1982; Zinkevich-Evstigneeva, 2010), but they still have not been used for developing children's logical thinking. While this form of transferring meanings greatly interests children, fosters their emotional engagement, and provides attention stability. Thus, we suppose, that if knowledge about the laws of logic and logical thinking is transferred through a fairy tale, a child can effectively interiorize this knowledge, significantly develop logical thinking (cognitive aspect), and form a negative attitude to logical mistakes and a wish to think without them (motivational aspect).

## **2. Problem Statement**

Logical thinking is one of the core abilities for acquiring new knowledge and becoming more responsible in thinking and actions. While developing new psychic formations at primary school age provides an opportunity to develop children's logic thinking intentionally, their low abilities to focus attention on abstract things and relatively low level of self-reflection requires applying special proactive methods of developing abilities and motivation for logical thinking. Nevertheless, there is a lack of research efforts in investigating effective methods of children's logic thinking developing at primary school age. In particular, there is absence of information about the application of a psycho-technical fairy tale as an instrument of boosting the development of a primary school child's abilities and motivation for logical thinking.

## **3. Research Questions**

To solve the research problem, we have to answer the following research questions:

- Is it possible to use a psycho-technical fairy tale as a semantic instrument for transmitting the sense of knowledge about the main laws of logic?
- Can psycho-technical fairy tale significantly impact the development of a child's ability and motivation for logical thinking?
- What are the consequences (results) of applying a psycho-technical fairy tale designed to develop child's logical thinking abilities and are they stable?

## **4. Purpose of the Study**

The purpose of this study was to create and apply psycho-technical fairy tale as an instrument of boosting the development of a primary school child's abilities and motivation for logical thinking.

## 5. Research Methods

In our research we used a psycho-technical fairy tale as a specific instrument for developing a child's logical thinking abilities. A psycho-technical fairy tale is understood as a text designed in the form that activates a child's psychic abilities, in particular – abilities and motivation for logical thinking.

The psycho-technical fairy tale was developed by a team of scientists with the appropriate background in philosophy, psychology and education in accordance with the research goals. The design of the psycho-technical fairy tale was based on the philosophical dialogue method, that is inherent for a game activity. It contains the main elements: story, content, role, imaginary situation, rules, game actions and operation, and game relationships (Elkonin, 1999).

To test the research hypothesis, we used the ideographic method of individual case study. The reader of the fairy tale was a girl, 10 years old (third grade in primary school). As it was an investigation of the individual case, the element of psychological conjunction was applied at the beginning of the fairy tale. The main character of the fairy tale Masha was the same age and gender as the reader and also studied at school. The story began with describing her trip to school and her thoughts over the question why she never had any wish to go to school. On her way to school, she heard the talk of two elder boys, during which one boy complained to the other that his girlfriend did not have any logic, so he broke up with her. Masha wanted to know what logic meant and why it was so important that its absence could lead to broken heart. These thoughts evolved dreams, in which Sphinx asked logical riddles and gave one day to find answers. In each riddle, Sphinx described an imaginary situation and then asked a question. The answer to this question could be given only with the help of one of the four laws of logic. During the day, Masha searched for answers and answered Sphinx's questions at night.

The reader was intentionally given only the first part of the fairy tale – 18 pages (22 200 symbols), including the starting point and two Sphinx's riddles, which explained the meaning of the law of identity, the law of contradiction and simple definitions of all the four laws of logic.

Before the research, five questions to observe the results were formulated (see Table 01).

## 6. Findings

Results have been observed during nine months and grouped according to the previously formulated questions (see Table 01).

**Table 01.** The results of observation

Questions to observe the research results	Results: the child's reactions, changes in cognitive and communication strategies
Did the fairy tale interested the child?	The child has read the fairy tale by herself at once. After reading she said that it was interesting to read.
Did the child have a wish to read the second part of the fairy tale?	Immediately after she has read the fairy tale she asked the second part of fairy tale. Regularly (practically every day) during two weeks after reading she continued to remind about the second part.
Did the child apply the knowledge of the laws of logic acquired from the fairy tale?	Nine months after she has read the fairy tale she began to use expressions "this is illogical", "there is not logic in this", "this illustration does not match the example" and etc. and she was able to prove her expressions with logical arguments. Earlier (before reading the fairy tale) this kind of thinking and treating information was not character for the child.

Did the child began to feel subjective significance of logical thinking?	After she has read the fairy tale she began to react the remarks containing the assessment of her abilities of logical thinking more emotionally.
Did the child considered the abilities to think logically useful for other children?	After the child has read the fairy tale, she returned it, marking the places in the text which are hard for other children's understanding for her opinion. She asked to formulate them more clearly and gave an example of the book for children which was written good and clear to her mind.

Additionally, parents of the child noted that it was much easier to discuss complex topic and life situations with a child which require focusing on cause-effect connections and understanding long-term consequences. Besides, in spite of the increased emotional reactions to the assessment of her abilities to think and verbalize thoughts logically, the child began to accept her own logical mistakes faster during the discussion.

## 7. Conclusion

The results of the research showed that:

Applying psycho-technical fairy tale as an instrument of developing the child's abilities and motivation for logic thinking gave positive results: the child began to pay attention to logical mistakes and attach importance to them (earlier she did not demonstrate these abilities), use verbal constructions pointing on applying the laws of logic in disputes and discourses. Besides, the child's increased abilities to think and verbalize thoughts logically and her readiness to accept own logical mistakes faster, according to the activity theory, contribute significantly to her personal growth and responsibility (Sokolova, 2011).

Quality changes in the child's behavior led us to a conclusion about the necessity of designing and applying psycho-technical fairy tales as instrument of boosting the development of a primary school child's abilities and motivation for logical thinking. This ideographic research opens new research directions in investigating general laws of primary school children's logic thinking, allow to design stimulus material for quantitative research aimed at search for nomothetic knowledge. Basing on this research experience we are going to continue to improve psycho-technical instruments for developing children's logic thinking and to develop application of psycho-technical fairy tales in educational process.

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