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# STUDENTS' DEVELOPMENT IN DIFFERENT EDUCATIONAL SYSTEMS

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## ABSTRACT

The article reveals the findings of the experimental work that has been done in order to compare three Russian educational systems (traditional system, Zankov's system and the system of Elkonin-Davidov) in their potentials to develop the junior schoolchild intellectual abilities and personality traits. The complex of indices (intellectual abilities and personality traits) has been identified to examine the educational systems. They are the indices of attention, memory, thinking, imagination and personality traits (achievement motive, learning motives and empathy). As a result of conducted experiment of the students' development in different educational systems it has been identified that each of examined systems are 'developmental' however each develops different mental functions and operations.

***Keywords:*** educational system, development, intellectual ability, learning activity, mental functions and operations, personality trait

## INTRODUCTION

The present situation in primary education in Russia is characterized by orientation to cardinal changes of prior objectives in learning: the *developmental* function of learning is come to the foreground and provides the development of intellectual abilities of junior schoolchild and their personality traits. In Russian psychology and pedagogy some innovative educational systems have been developed. Thy have been termed as 'developmental'. First of all, two educational systems should be addressed to. They are Zankov's system and the system of Elkonin-Davidov. Nowadays the pedagogical community takes an active part in discussion of such issues as "Is the traditional educational system concerned with the development or might it be referred to the 'developmental' educational systems?", "What does differentiate one educational system from another in regard to its 'developmen-

tal' effect on intellectual abilities and personal traits development?" and "What educational system might be preferred to?". These issues are not addressed only to educational systems developed in Russian psychology and pedagogy. They might be addressed to any world-wide educational system.

The present research reveals our attempt to give the answer on the questions we have raised.

## METHOD

The aim of the present research is to compare three educational systems in their potentials to develop the junior schoolchild intellectual abilities and personality traits. In keeping with the aim the diagnostic measurements has been synchronously conducted in three systems by using the same battery of tests. The tests are chosen according to participants' age and conditions of diagnosing including group forms.

The complex of indices (intellectual abilities and personality traits) has been identified to investigate the above named educational systems. They are the indices of attention, memory, thinking, imagination and personality traits (achievement motive, learning motives and empathy). To measure the given indices the relevant tests has been chosen (Table 1).

*Participants*

In the study the students of the three and four grades of Moscow schools, which are used the different educational system such as traditional system, Zankov's system and the system of Elkonin-Davidov, are took part. The total sample is 332 students of eight to ten years old (Table 2).

Table 1. Techniques and indices used to diagnosis the students' abilities and personality traits

| Index | Technique |
|---|---|
| *Attention indices* | |
| The productivity of volitional attention | Bourdon test |
| *Mnemic abilities indices* | |
| Short-term memory span | Memorizing (10 words) |
| Short-term indirect memory span | Memorizing (pair of words) |
| Short-term indirect meaningful memory span | |
| Indirect memory span | Pictogram |
| *Thinking ability indices* | |
| The level of verbal and logical thinking | Verbal and logical thinking test |
| The level of nonverbal spatial thinking | Raven Progressive Matrices |
| The level of reflexive generalization | Test "Postman" |
| The level of search planning | Test "Bishop-castle" |
| *Imagination ability indices* | |
| The level of nonverbal imagination originality | Test "Complete Figures" |
| Nonverbal imagination flexibility | |
| *Personality traits indices* | |
| Motivation to avoid failure | Rean test |
| Success achievement motivation | |
| Success achievement motivation | Assessment scale of a need for achievement |
| Qualitative analysis of learning activity motives | The technique of learning activity investigation |
| The level of empathy | Test "Empathy level" |

Table 2. Educational system distribution of the participants (N=332)

| Educational system | Grade | The number of grades | The sum of students in each grade | The total sum of students |
|---|---|---|---|---|
| **Traditional** | Third grade | 3 | 61 | 127 |
| | Fourth grade | 3 | 66 | |
| **Zankov** | Third grade | 3 | 77 | 143 |
| | Fourth grade | 3 | 66 | |
| **Elkonin-Davidov** | Third grade | 2 | 43 | 62 |
| | Fourth grade | 1 | 19 | |

Data was conducted using SPSS 11.5 and Statistica 6.1. The descriptive statistics, comparative and criterion analysis of means, Mann–Whitney U test, correlation analysis have been used in data processing.

## RESULTS

The results of conducted experiment are presented in table 3 and 4.

Table 3. The level of intellectual ability and personal trait development in different educational systems (means analysis)

| Index | | Educational system | | |
|---|---|---|---|---|
| | | **Traditional** | **Zankov** | **Elkonin-Davidov** |
| The productivity of volitional attention | | 121,7 | 124 | 108 |
| Short-term memory span | | 6,6 | 6,5 | 7,1 |
| Short-term indirect memory span | | 12,3 | 12,6 | 10,9 |
| Short-term indirect meaningful memory span | | 8 | 7,8 | 7,7 |
| Indirect memory span | | 8,5 | 10,9 | 10,6 |
| The level of verbal and logical thinking | awareness | 8,5 | 9,3 | 8,5 |
| | classification | 8,2 | 9 | 8,5 |
| | the level of generalization | 7 | 8,7 | 8 |
| | thinking by analogy | 5 | 8 | 6,3 |
| The level of nonverbal spatial thinking | | 108,7 | 116,5 | 113,9 |
| The level of reflexive generalization | | 1,7 | 2,2 | 1,5 |
| The level of search planning | | 3,6 | 7,8 | 6,8 |
| The level of nonverbal imagination originality Nonverbal imagination flexibility | | 3,8 | 3,3 | 3,4 |
| Success achievement motivation and motivation to avoid failure | | 14 | 12,7 | 13 |
| The level of success achievement motivation | | 11,8 | 11,1 | 10,5 |
| The level of empathy | | 56,8 | 46 | 41,9 |

Table 4. The level of significant difference between mean indices of intellectual ability and personal trait development in different educational systems

| Index | | The significant difference level (p) | | |
|---|---|---|---|---|
| | | Elkonin-Davidov vs Zankov | Elkonin-Davidov vs Traditional | Zankov vs Traditional |
| The productivity of volitional attention | | 0,001 | 0,061 | 0,089 |
| Short-term memory span | | 0,051 | 0,112 | 0,697 |
| Short-term indirect memory span | | 0,001 | 0,001 | 0,900 |
| Short-term indirect meaningful memory span | | 0,584 | 0,432 | 0,609 |
| Indirect memory span | | 0,185 | 0,001 | 0,001 |
| The level of verbal and logical thinking | awareness | 0,001 | 0,811 | 0,001 |
| | classification | 0,008 | 0,479 | 0,001 |
| | the level of generalization | 0,016 | 0,001 | 0,001 |
| | thinking by analogy | 0,001 | 0,001 | 0,001 |
| The level of nonverbal spatial thinking | | 0,001 | 0,005 | 0,001 |
| The level of reflexive generalization | | 0,016 | 0,253 | 0,001 |
| The level of search planning | | 0,001 | 0,001 | 0,001 |
| The level of nonverbal imagination originality Nonverbal imagination flexibility | | 0,008 | 0,003 | 0,001 |
| Success achievement motivation and motivation to avoid failure | | 0,428 | 0,005 | 0,001 |
| The level of success achievement motivation | | 0,064 | 0,001 | 0,010 |
| The level of empathy | | 0,011 | 0,001 | 0,001 |

## DISCUSSION

The findings of the present research let us to conclude that each of examined educational systems has advantages as well as shortcomings.

The *traditional educational system* leads credibly students to progressive development. In our experimental work it has been identified that the learning which uses traditional methods and technique develops students' nonverbal imagination originality and imagination flexibility, the level of a need for achievement and success motivation and the level of empathy. The nonverbal imagination originality and imagination flexibility help a students to freely work with an image-bearing material, especially to process, rearrange and creatively adapt it for a task needed to be solved. The level of a need for achievement and success motivation is an evident finding that reveals the student need to achieve the success and to be acknowledged in different activities. The students have expressed the high level of empathy as the ability to understand and share the feelings of another.

However the students of traditional educational system have shown in comparison with Elkonin-Davidov and Zankov's systems a lower level in some areas of their development. It has been identified that in doing verbal and logical exercises the less developed are:

- the level of verbal and logical thinking which is the ability to classify, generalize and think by analogy;
- the short-term indirect memory span that requires the use specific mnemic techniques and operations in unconditioned and purposive memorizing;
- the level of nonverbal spatial thinking that is to solve the logical exercises by use of graphical material;
- the level of search planning.

Hereby the traditional educational system better stimulates the development of such personality traits as motivation for approval, for getting good results, for encouragement in significant others. Here it is evident the stimulation of learning activity by assessment that prompts the students to get better results rewarded with good mark and approval and encouragement from teachers, parents and others. This is proofed by a high level of empathy development, by bias to share the feelings of another, by presence of expressed emotional relationship with others, and as a result by the need for their positive emotions and appreciations. The traditional learning has better developed students' imagination, ability to creative, image-bearing and associative information processing in reasoning as well as in mnemic activity directed to memorize the separate material. At the same time the students demonstrate the less developed ability to logical and abstract thinking, to setting an algorithm of working with material, and to doing clear and structured exercises. In this regard their thinking is developed on a lower level in any activities that require making the intellectual efforts.

The *Zankov's educational system* in comparison with the traditional and the Elkonin-Davidov systems is more effectively develop students:

- the verbal and logical thinking including awareness, ability to classification different information and its generalization, ability to think by analogy in doing similar exercises by logically transferring effective algorithms to previously unknown exercises;
- the productivity of volitional attention that identifies the ability to task-oriented attention;
- the short-term indirect memory span in systemically memorized sets of data and pair material;
- the indirect memory span that requires the use of specific mnemic techniques and operations in unconditioned and purposive memorizing;
- the level of nonverbal spatial thinking that is the ability to logical task doing which are based on graphic (schematic) material required completing the logical links, defining the general regularities by careful analysis, comparison, systematization, classification, generalization, etc.;
- the level of reflexive generalization that is an in-depth analysis of data and the ability to complete the missing links (it is considered as students intellectual reflection);
- the level of search planning including the ability to define the perspectives based on preset logics and raw data.

The students which have been taught by the Zankov's system have demonstrated the high level of nonverbal imagination originality and imagination flexibility, and the ability to verbatim learning of separate and disordered material. In comparison with other educational systems that we have examined the Zankov's system is helpful to develop students' logical and systemic thinking. The students are able more effectively to do complete exercises, make decisions without any assistance by seeking out regularities, working out at the action and expected findings algorithms in order to do the exercise and transferring these algorithms to new exercises. However they are less oriented to socially approved success, they also do not attach importance to their success and achievements as it has done by the students of traditional educational system.

As for the *Elkonin-Davidov educational system* it has effectively prompted to develop students' short-term memory span that defines the level of such ability development as ability to spontaneous mechanical memorizing disordered material. The results of other students' ability examining taught by given system have high values though they are not prevailing in comparison with other systems.

The Elkonin-Davidov system progressively develop other abilities, for example:

- the short-term indirect and meaningful memory span that is an evident of the development of students' mechanical memory as well as different operational mechanisms that enhance the productivity of mnemic processes;
- the nonverbal spatial thinking is developed on the same level as it has been identified with Zankov's system (there are not significant difference between these two systems);
- the nonverbal imagination and imagination flexibility are actively developed and been on the same level as they are in traditional system;
- the level of search planning in combination with effectively developed spatial thinking and meaningful memorizing, and high indices of search planning has evidenced that in the Elkonin-Davidov system the cognitive processes are foregrounded (in given system it has been identified lower indices of volitional attention productivity that is a mechanical process in comparison with the thinking and imagination);
- the level of reflexive generalization and verbal and logical thinking are developed at the same level as it has done in traditional system, and implicate the use of verbal thinking links (the less developed verbal and logical thinking evidenced nonverbal choice).

Thus, it should be conclude that the Elkonin-Davidov educational system develops mainly nonverbal meaningful and cognitive processes or in other words the mechanisms that relate to thinking and imagination. Such development leads to increase the productivity of the abilities in which the given mechanisms are effectively used. Additionally, the students learned by the Elkonin-Davidov system have demonstrated a high level of development in empathy, in success achievement motivation and motivation to avoid failure. However the students of given system have evidenced the lowest level in achievement motivation and this finding might be understood by that that in this system the students do not impose on any types of motivation. As for the empathy, success achievement motivation and motivation to avoid failure, they are at the same level of development as in Zankov's system.

## CONCLUSION

The students' development in different educational systems is conditioned by didactical principles and the educational technologies that are based on these principles. So, each of examined systems are 'developmental' however each develops different mental functions and operations. To choose the educational system is to know the final results of learning organized by the system that is going to be chosen in comparison with other educational systems.