Empirical Research Of The Use Of Personality-Oriented Methods In Primary School

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Abstract

The paper considers and analyses the influence of experimental teaching program (introducing extra curricula classes of personality-oriented teaching) on the development of intellectual abilities and creativity of primary schoolchildren (with the help of changing the indexes of their intellectual operations) with the help of the chosen methods.

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Keywords: personality-oriented teaching, personality-oriented teaching methods, empirical research.

1. Introduction

Nowadays personality development takes the first place in pedagogical science. Many scholars conduct research on various new methods of personality development, creativity development and many other new and modern approaches. In this paper we would like to consider and analyze the influence of experimental teaching program (introducing extra curricula classes of personality-oriented teaching) on the development of intellectual abilities and creativity of primary schoolchildren (with the help of changing the indexes of their intellectual operations) with the help of the chosen methods. Selected texts allow seeing the level of the maturity of the theoretical way of problems solution, theoretic approach to problem situations, the level of the development of the ability to act mentally, also analysis and reflection (Table 1).

Methods brief description used in practice

A.Z. Zak method is considered to be one of the most efficient means of psychogenesis of theoretic thinking development.

The test “Qualitative evaluation of tasks solution” designed by Zak diagnoses the level of general

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intellectual abilities, contains information about the level of mental development of schoolchildren, their individual peculiarities of cognitive activity. To evaluate a schoolchild intellectual activity correctly it is necessary to proceed from modern data about thinking as different ways of tasks solution: the generalized and unshared.

A.Z. Zak method contains 22 logical tasks. It allows to understand the nature of difficulties, arising while educational material acquisition and to plan the ways of their elimination.

This method allows conducting the research both individually and in-group.

The method is designed that it allows diagnosing the level of the development of the following qualities and thinking operations:
- ability to act mentally (AM): tasks 1-4;
- determine structural commonality of a number of numerals, tasks (SCT): tasks 5-10;
- problem statement analysis (SA): tasks 11-16;
- reflection (R): tasks 17-18;
- Planning of the steps and stages of mental solution (P): tasks 19-22.

Qualitative evaluation of the task solution is done according to the following scheme.

Table 1. Parameters and their criteria being researched in the paper

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Criteria</th>
<th>Method used</th>
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</thead>
<tbody>
<tr>
<td>Intellectual abilities</td>
<td>Analysis</td>
<td>A.Z. Zak “Qualitative evaluation of tasks solution”</td>
</tr>
<tr>
<td></td>
<td>reflection</td>
<td>A.G. Gaitshtut “Test of Math analysis”</td>
</tr>
<tr>
<td></td>
<td>ability to act mentally</td>
<td></td>
</tr>
<tr>
<td></td>
<td>structural commonality determination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>planning of the steps and stages of tasks solution.</td>
<td></td>
</tr>
<tr>
<td>Creativity</td>
<td>non verbal creativity, as the ability to produce new original product</td>
<td>E.P. Torrens “Complete Figures”</td>
</tr>
<tr>
<td></td>
<td>heuristic thinking</td>
<td></td>
</tr>
</tbody>
</table>

If the schoolchild has solved only task 1, it means that he can not mentally replace this relationship for the reverse one. If 1 and 2 are solved, consequently the schoolchild is able to act mentally, as he can replace this relationship for the reverse ones but only in the beginning of solving one type tasks. We can conclude that he has a developed analysis skills but at a minimum extent.

It is proved by the fact that he is distracted from the external similarities of tasks statement and the question with the statement of the first and second subject in the task statement. Incorrect tasks solution with meaningless words proves the fact of not enough development of conditions analysis, inability to single out structural commonality of these tasks with the preceding ones, as tasks 5, 6, 9, 10 are designed in the same way as 1, 7, 8, 3 and 4.

Incorrect solution of the tasks 11-12-13-14, 15, 16 speaks about insufficient development of analysis. If the schoolchild has written the name of only one person in the tasks 17 and 18, whose relationship directly coincides with the task question we can conclude that reflection is not developed enough with this schoolchild.

Refusal to solve or incorrect solution of the tasks 18-22 stipulates the fact of relatively low development of planning action, as while solving these tasks in particular it is necessary to plan the course and stages of one’s judgment.

Successful solution of all the tasks by the schoolchild speaks about relatively high level of the maturity of intellectual abilities according to his age. Actually such A.Z. Zak method “Qualitative evaluation of tasks solution” is enough to judge the level of theoretic thinking judgment. To complete the test schoolchildren should have definite skills and abilities: analyze the task statement, plan tasks solution, conduct reflection.

This method can be used to diagnose the level of intellectual development of primary school children.

The next method that we used in our research is the Test of Math analysis, developed by A.G. Gaitshtut (TMA) – diagnosis of general intellect.

Assignments included in (TMA) test satisfy the requirements for any ability tests: they are standardized, homogeneous in structure, equivalent and regular according to difficulty. Besides, they correspond to the following requirements:

a) theoretic validity – diagnose Math ability as it is;

b) Ecologic validity – correspond to science-practical task.

As one of the most significant requirements for the assignments was their application in school practice we
used as a test material the tasks, designed by A.G. Gaishut, directed for the formation of such mental operations with school children as analysis, synthesis, analogy formation and generalization.

Tasks, offered by A.G. Gaishut are formed on the basis of the material from Math course from the 4th to the 10th grade and consist of five series: 4th grade, 5th grade, 6-7th grade, 8th grade, 9-10th grade. Every type tasks solution supposes knowledge of education material, but also intellectual ability to find out the relationship between extensive and signed elements of the tasks statement and the ability to conduct Math operations with Math structures. Thus, tasks offered by A.G. Gaishut can be used to diagnose the level of intellectual development, thinking ability to operate abstract structures on Math material.

Consequently the tasks correspond to our requirement: to diagnose at the same time the level of the development of production (discovering new relationship) and reproductive (finding out the solution with the help of knowledge application) intellectual abilities.

To diagnose creativity we used Torrens test short variant. E.P. Torrens complete test consists of 12 sub tests, grouped in three batteries. The first part is meant to diagnose verbal heuristic thinking, the second – non verbal heuristic thinking and the third for the verbal sound heuristic thinking. Non verbal part of this test was known as “Figure from of Torrens test of heuristic thinking” (Figural forms) and was adapted in 1990 with schoolchildren random.

We have made an attempt to approbate one of E.P. Torrens subtest “Complete Figures” at random of 4th grade school children (with the introduction of extra curricula classes with personality-oriented teaching approach) of secondary school. While approbation we made a special accent to find out non verbal creativity as some ability “to originate new original product in the conditions of minimum verbalization by other words – material verbalization, with which every school child has worked and the means of “originating” new product is not obligatory and was considered secondary. This test can be represented as a method for “originality” and the possibility to express oneself in an extraordinary way.

The offered tests variant represents a set of figures with some set of elements (lines), using which it is necessary to complete the figure to some meaningful image. In this variant 6 figures are used that have been chosen of the 10 original. These figures do not duplicate each other on their initial elements and provide more reliable results. In Torrens original test several creativity indexes are used. The most demonstrative of them is originality, otherness of the created by the test figure for the figures of the others. As the test is used to diagnose non verbal creativity the names of the figures given to the schoolchildren are excluded from the following analysis and are used as a supplementary means to understand the essence of the figure. Originality index by Torrens was calculated as average originality on all the figures (data to calculate the originality of every figure was taken from the special atlas, attached to the test). If figure originality was equal to 1,0, then such figure was acknowledged as unique).

Experimental study of personality-oriented methods use in primary school

During the first stage of empirical research we diagnosed the level of theoretic thinking using A.Z. Zak test. Qualitative evaluation of tasks solution by 4th grade school children (first grade – with introduction of extra curricula disciplines with heuristic technology, and 2nd grade was an ordinary class). The method was checked twice: first time – at the beginning of the school year, before introducing extra classes and second time – at the end of the school year, after training on the experimental program.

Data Math processing was conducted according to t criterion by Student.

In our research of intellectual abilities of primary school children our aim was to see the dynamics of the development of the constituent components of theoretic thinking. As the theoretic thinking development process itself with primary school children is first of all in the development of such basic components as (analysis, reflection, planning, ability to act mentally, determination of structural commonalities).

Results analysis received during the examination of theoretic thinking of primary school children allows to single out differences in children’s thinking of this age: the number of school children who solve the tasks by theoretic way increases from September to May. It means that a number of “empirics” become “theorists”; consequently, the differences on this parameter are flexible. During empiric research using this method, based on the results, received while school children testing we can distinguish the following levels: high, average, low that show the degree of children intellectual abilities development, those that learn on the traditional program and children from the class with introducing extra curricula courses.
Table 2. Average values of theoretic thinking maturity with primary school children

<table>
<thead>
<tr>
<th>Components of theoretic thinking</th>
<th>Class with the introduction of extra courses</th>
<th>Ordinary class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Septembe r      May      Difference   t criterion</td>
<td>September      May      Difference   t criterion</td>
</tr>
<tr>
<td>Ability to act mentally; Am</td>
<td>3.83  3.97    0.14    0.31p &gt;0.05</td>
<td>3.8  3.9      0.1     0.27 p=0.05</td>
</tr>
<tr>
<td>Determining structural commonality of the tasks; SCT</td>
<td>4.23    5.77    1.54    1.51p &gt;0.05</td>
<td>3.4  4.2      0.8     0.81 p=0.05</td>
</tr>
<tr>
<td>Task statement analysis; SA</td>
<td>2.33    5.57    3.24    3.46 p=0.01</td>
<td>2.4  3.3      0.9     2.02 p&lt;0.05</td>
</tr>
<tr>
<td>Reflection; R</td>
<td>0.30    1.27    0.97    2.47 p&lt;0.05</td>
<td>0.5  0.9      0.4     1.7 p&gt;0.05</td>
</tr>
<tr>
<td>Planning; P</td>
<td>0.30    2.90    2.60    5.92 p&lt;0.01</td>
<td>0.5  0.4      -0.1    0.61 p=0.05</td>
</tr>
</tbody>
</table>

While determining the levels we used complex index, taking into account both the number of tasks and empirically determined complexity.

Offered by A.Z. Zak test “Tasks solution qualitative evaluation” has shown that children from experimental classes succeeded more in it, where high level was 13.3 % and in control group non of the children have shown high level. Though it is necessary to point out that average level in control class was 73.33 % and in experimental 86.6 % and also in control group there was low level equal to 26.66 % and there was no such level in the experimental group.

As it is seen from the histogram there is a definite per cent of school children in the experimental group with high level of theoretic thinking. But in an ordinary class theoretic thinking is just being formed. The dynamics of thinking development of those two groups is not equal. We see the big difference and advantage of the ability to think theoretically with school children in the class with introducing extra curricula courses with heuristic technology.

Thus, primary school children theoretic thinking, learning on the special program with the introduction of personality-oriented technology is developed more successfully from September till May than those of the school children with traditional system of education. The increase of the number of tasks being solved by the children learning on the experimental program is relatively high (Table 3).

The check of differences significance was processed with the help of t criterion by Student. Every assignment – task of the method corresponds to a definite intellectual operation the completion of which had different degree of difficulty for school children.

According to the data, provided in Table 3 we can see that at the stage of education with the introduction of extra curricula classes with personality-oriented technology of education average values on all the components have increased (analysis, comparison, analogy formation, generalization) and in class with traditional education the dynamics of components development is practically insignificant.

It turned out that primary school Math development includes abilities to fundamental generalizations, guess, skill to mention common in different, differentiate the main from the secondary one, compare, analyze, make conclusions is significantly higher in class with introducing extra curricula class as Math material of functioning extra curricula courses (Math and Computer science) was supplemented with the system of contents-logic games, the system of non standard tasks and assignments of developing character, arithmetic and logic tasks with higher degree of difficulty.
Row 1 – ordinary class
Row 2 – class with introducing extra curricula courses with heuristic technology of education

Table 3. Average values of the degree of maturity of theoretic thinking of primary school children

<table>
<thead>
<tr>
<th>Components</th>
<th>Class with the introduction of extra courses</th>
<th>Ordinary class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t – criterion</td>
<td>t – criterion</td>
</tr>
<tr>
<td>Difference between average values</td>
<td>September</td>
<td>May</td>
</tr>
<tr>
<td>Analysis</td>
<td>1.07</td>
<td>2.73</td>
</tr>
<tr>
<td>Comparison</td>
<td>0.93</td>
<td>2.07</td>
</tr>
<tr>
<td>Analogy formation</td>
<td>0.40</td>
<td>1.83</td>
</tr>
<tr>
<td>Generalization</td>
<td>0.40</td>
<td>1.8</td>
</tr>
</tbody>
</table>

The levels of Math ability maturity on TMA test are presented in the diagram.
Also we would like to present some results of standardization “Complete figures” by E.P. Torrens and graphically present the levels of non-verbal creativity.
Row 1 – ordinary class
Row 2 – class with introducing extra curricula classes with personality oriented technology
To find out interrelations between the results received while processing tests by A.Z. Zak, A.G. Gaishtut and E. P. Torrens and determining the validity of empirical research we used the method of range correlation by Spirmen rs, using the following formula:

\[
 r_s = 1 - 6 \cdot \frac{\sum d^2 + T_a + T_b}{N \cdot (N^2 - 1)}
\]

PΦb. (d^2) - SS of differences between the ranges;
T_a and T_b – corrections for the same ranges;
N – the number of the testees or features that participated in the ranging.
Having conducted correlative analysis between the tests with the help of range correlation by Spirmen rs, we have determined concomitant dependence of theoretic thinking, Math analogies, non verbal creativity features in control and experimental groups and have received the results presented in Table 4.
Fig. 2  Hystogram of per cent indexes of the levels of comparative analysis of Math operations of TMA test by Gaishtut A.G. (May), (%)

Row 1 – the level of non-verbal creativity development of an ordinary class
Row 2 – the level of non-verbal creativity of the class with introducing extra disciplines with heuristic technology of teaching.

Figure 3. Hystogram of frequency distribution of the researched schoolchildren with different level of non verbal creativity development (%)

Table 4. Comparative results on Gaishtut, Zak and Torrens methods

<table>
<thead>
<tr>
<th>Compared results on the methods</th>
<th>Correlation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ordinary class</td>
<td>Significance</td>
</tr>
<tr>
<td>Qualitative evaluation of A.Z. Zak tasks solution and Math analogies by A.G. Gaishtut tests and E.P. Torrens “Complete figure”</td>
<td>0.37</td>
<td>p&lt; 0.05</td>
</tr>
</tbody>
</table>
Let us consider in detail the development of the components of theoretical thinking of primary school children from September till May.

AM – ability to act mentally; SCT – determination of structural commonalities of the tasks; SA – tasks statement analysis; K – reflection; P – planning.

As a result we can see that the ability to act mentally is formed slowly and gradually and though there is some increase they are practically insignificant. Probably this is only the beginning stage of such ability formation. Acquisition while teaching the contents of education programs of personality-oriented teaching is made according to dynamic schemes “from the abstract to specific” at a greater extent should provide the formation with school children the ability to act mentally than acquisition at such age primary school curricula contents. Teaching experimental programs should be aimed at the development of this ability.

Let is consider in detail Math analogies development in the dynamics of its development and comparisons between control and experimental groups.

<table>
<thead>
<tr>
<th>AM</th>
<th>SCT</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.83</td>
<td>5.77</td>
<td>2.33</td>
</tr>
<tr>
<td>4.23</td>
<td>2.33</td>
<td>3.3</td>
</tr>
<tr>
<td>4.2</td>
<td>4.2</td>
<td>3.3</td>
</tr>
<tr>
<td>2.9</td>
<td>2.9</td>
<td>0.5</td>
</tr>
<tr>
<td>0.3</td>
<td>0.3</td>
<td>0.504</td>
</tr>
</tbody>
</table>

Fig.4 Histogram of frequency distribution of the researched with different level of the development of non-verbal creativity (%)
Comparative analysis, conducted by us, on the one hand proves the utility of introducing extra curricula classes of Math and Computer Science with personality-oriented technology into the educational process and on the other hand, reveals possible directions for its improvement: strengthen the module of tasks to act mentally and determine structural commonalities.

Conclusion

Having conducted this research we can make a conclusion that extra curricula component with personality-oriented technology influences abilities development (intellect and creativity). And general intellect and creativity influence the success of the teaching process (there is a direct dependence). The success of completion of the given tests is determined by speed qualities of the psychic and critics fairly point out the influence of high-speed intellect while solving tests tasks, diagnosing creativity. Creativity and intellect development is not possible if there is no creative environment. Environment enrichment was provided at the expense of the use of extra curricula courses, providing numerous variability of school children abilities application. Micro environments, having subject-information enrichment features had forming influence on behavioral, motivation components of creativity and intellect development. The influences of knowledge that go beyond the boundaries have positive character and we could observe that while conducting the research. Separate components (for example, teaching), responsible for creative process interact and aggregate effect of their interaction contributes to intellect and creativity development. Consulting was conducted according to the results of the diagnosis:

1) interested parents and class teachers of primary school classes were informed of the results of the diagnosis;
2) School psychologist was informed with the general results of the diagnosis.

We can outline the following problems arising during the experiment: not enough material, insufficient knowledge, difficulties with formulating questions while interview and diagnosis; anxiety and complexities in making contacts with school children being tested; insufficient planning and organization in the activity. All these difficulties were solved with time.

Received date proved our assumption that taking into account creative abilities in pedagogical activity determine the dynamics of these abilities development.

On the while those teachers who take into account school children creativity have kind attitude to creative children and they have developed idea about the possibility to develop school children creative abilities.
This fact also proves that taking into account creativity in pedagogical activity fruitfully influences children’s creative abilities.

As a result of conducted research our hypothesis has been proved that taking into account school children creative abilities in pedagogical activity really determines the dynamics of children creative abilities development. The main goal of education at school and outside school is to take into account creative abilities and support children research qualities. It is necessary to make an accent in pedagogical activity for the development of a child’s creativity in different kinds of work and look for most rational ways of these activities interaction.

References

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