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**TEACHER'S BELIEFS AS A FACTOR OF INDIVIDUAL
PROGRESS OF PUPIL**

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Abstract

The purpose of this research is to identify elemental composition of educational practice analysis scheme. This scheme allows to keep a coherent system of "teacher – pupil – subject matter" relationships during design of conditions for individual progress. The paper justifies teacher's beliefs to be an essential element of the analysis scheme. The theoretical basis of the paper are two positions. The first one is that the measure of individual progress of a pupil is degree of acquisition of the cultural ways of acting and thinking with accordance to the conception of Vygotsky (1983). The second one is the study by Kardanova et al. (2014), that shows that such construct as beliefs of teachers defines the specifics of their educational activities. We used the diagnostic tool «Delta» to identify the dynamic characteristics of individual progress of pupils during the four years of study (from 6th to 9th grade). We have developed a questionnaire to reveal constructivist and traditionalist beliefs of teachers. The authors found that the teacher with the constructive beliefs ensures a larger-scale progress of pupils. This result proves the expediency to implement this construct into the analysis scheme of teacher's activities. The research results are applicable for both theoretical studies and for improving teachers' training system.

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Keywords: Individual progress, constructivist beliefs of teachers, model of levels of mastering of cultural action pattern.



1. Introduction

Individual progress of pupils is an important quality indicator of the modern school education in accordance with the new educational standards (Ryabinina, 2013). Teacher's efforts should focus on creation of conditions for individual progress of all pupils during the learning process, which requires him to restructure his or her own activities on the basis of new pedagogical conceptions and methodological approaches.

The effectiveness of these efforts largely depends on the availability of theoretical schemes and methodological tools for analysis, design and assessment of educational practices. Our research is based on the activity approach, based on the provisions of the cultural and historical conception of Vygotsky (Vygotsky, 1983; El'konin, 1994; Nezhnov, 2015). Within the framework of this approach, training is understood as the process of mastering cultural patterns, methods, tools and means, and as a prerequisite for the normal mental development of a child, including development of his thinking (Vygotsky, 1983; El'konin, 1994; Nezhnov, 2015).

Two aspects of such psychological growing-up of child could be identified. The first one is living through the growing-up cycles adopted in society. The second one is functional mastering of socially adopted patterns of action (Vygotsky, 1983; El'konin, 1994; Nezhnov, 2015). According to Vygotsky, if training is properly organized, the process of mastering of cultural action patterns facilitates. This process goes through three qualitatively distinct stages, determined by approximating pattern of action mastered by individual:

- mastering the "external structure of sign" and "external," "associative," "magical" usage of it;
- mastering the content of sign, establishment (building awareness) of the relevant substantial "connection";
- "Growth" of the sign into the structures of thinking; "the final phase of internalization" (Vygotsky, 1983, 157-163).

The followers of this approach develop a level model and diagnostic tools for assessing individual progress (Aronov & Znamenskaya, 2006, 2010; Monitoring, 2006; Znamenskaya et al., 2014; Nezhnov, 2015). They perceive an individual progress of student in the course of subject matter mastering as the functional aspect of the pupil's psychological upbringing, his functional development in the given subject area. At the same time, the degree of mastering of cultural patterns of acting and thinking is perceived as a measure of the student's individual progress.

There are three levels in the model of mastering of cultural action patterns that correspond to the above three stages, not yet entitled in the academic literature:

- the first, lowest level - reproductive or performing, or formal;
- the second level - reflexive or objective, or contextual level;
- the third, highest level - resource or functional, or competence level.

We will use the terms "reproductive", "reflexive" and "resource" in further reasoning on levels of mastering patterns. This enables us to describe the content of the pupil's actions at this level. We will introduce the abbreviation "Level model 3R" for the model of levels of mastering of cultural action pattern.

For the moment, literature studies the content of the first and the second mastering levels most thoroughly. The traditional training system is oriented at the first level of mastering the cultural action patterns.

The system of educational development by El'konin and Davydov (1996) is oriented at pupil's reaching the second level of mastering of cultural action pattern. Many current studies use the key terms of system of educational development. For example, the criteria and indicators for achieving the first and second levels: the notions of a "common action pattern" and the "sample-based action pattern", the notion of an essential relationship and its model, the structure of second-level tasks with "hindrance" of conditions etc.

As Nezhnov (2015), El'konin et al. (1994), Khasan, (2006) noted, the third level of mastering of cultural action pattern and indicators of its achievement are the least developed in the literature. Aronov & Znamenskaya (2010) admit that reaching the third level means formation of the relevant competence in the framework of the competence approach. Nezhnov (2015) contributed greatly to the understanding of the third level's contents. He introduced the concept of "functional field of action", which is used for characterizing the student's action at the third level. The logico-psychological criteria and empirical indicators of pupil's reaching each of three levels are described in (Nezhnov, 2015; Davydov, 1994; Aronov & Znamenskaya, 2006; 2010) in more or less details. The change of a pupil's attitude to subject in transition to higher level of mastering is discussed in (Aronov & Znamenskaya, 2006; Khasan, 2006). The results of our systematization and contribution to the elements of the level model 3R are presented in Table 01.

Table 01. The characteristics of the level model 3R (the reproductive, reflexive, resource levels of mastering of cultural action pattern).

	1 level (Reproductive)	2 level (Reflexive)	3 level (Resource)
Type of intermediary action	Assimilation of the external aspect of the cultural action pattern (its general meaning and form)	Mastering of the essential basis of action pattern	Functionalization of action pattern Emergence of the «cultural immediacy» of action, separation method from the conditions of its formation
Approximate basis of action pattern (Context of sign)	The external characteristics of the object situation and its corresponding operations	The notion, the essential relation that underlines the action pattern within class of situations	The metanotion in the basis for understanding of action pattern and limits of its possible transformations
Mediator	Pattern (rule, template, algorithm)	Action pattern, principle, notion	Key idea, metanotion
The sign structure	Template, pattern, algorithm	Model	Metamodel
Type of thinking (mind)	Formally-empirical thinking by Davydov (everyday life thinking, rational thinking by Hegel)	Substantial-theoretical thinking by Davydov (thinking in terms, reasonable thinking by Hegel)	According to El'konin, thinking that generates conscious productive action (It requires mental reflection actions,

			synthesis and generalization of a high level, and in fact, the ability to take a supra-subjective position)
Logical and psychological criteria of a level achievement	Reproductive action by the rule that is based on the identification of task situation according to its external features	Reflexive action based on the act of understanding of subjectivity of the task situation	The action is based on the functional-semantic representation of the task situation as a system of coordinated elements: the purpose, conditions, means
Empirical indicators of levels of action pattern acquisition (type of task that pupils solve)	Solving typical pattern-based tasks (reproduction of sample solution is required) The task whose solution is possible through identification of the task type and implementation of the relevant formalized pattern (algorithm, rule) according to external features of the task	The model is used to solve task with "hindrance" (It is required to overcome the "hindrance" of the situation) Tasks in which external characteristics of a problem situation can not be used as an approximate basis of action pattern and the essential relation is masked by extraneous details or is in contradiction with the formal structure of the conditions	Carrying out of tasks requiring functional acquisition of action pattern (it is required to modify the action pattern or condition of its employment) Problems, the solution of which requires a free attitude to the action method developed and method inclusion into the system of other intellectual resources available, where it is in demand as a transforming material for another subject matter
Attitude of pupil to the subject matter	Assimilation (attitude to the action pattern as similar) The pupil can learn new rules and patterns and apply them to solve standard tasks with varying degrees of ease	Mastering (The relation to the action pattern as being able to be reproduced) The pupil is aware of what is meant by the rule or pattern. He or she is able to think independently and search for solutions using this pattern.	Acquisition (attitude to the pattern as to natural self-action) The pupil is able to hold a researcher position in relation to the methods, means and tasks acquired

The level model 3R underlines the diagnostic toolkit Delta widely used in Russia for assessing individual progress of pupils, as well as for the internationally known toolkit SAM. The Delta toolkit was developed by specialists from the the Institute for Psychology of Development Practices (Krasnoyarsk) and the Psychological Institute of the Russian Academy of Education (Moscow) (Monitiring, 2006). The toolkit SAM was developed by a research team under supervision of P.G. Nezhnov (Nezhnov, 2015). Samples of educational materials ensuring studying process for Mathematics (Znameskaya, & Ovchinkova, 2016; Znamenskaya et al., 2012; Aronov, & Znamenskaya, 2010), Russian language (Ryabinina, & Caban, 2015) and other courses are designed on the basis of this model (Znamenskaya et al., 2014).

2. Problem Statement

The level model of cultural action development makes it possible to describe and design the dynamics of the relationship "pupil – subject matter" that allows teacher to create diagnostic and educational materials. However, this is not enough for ensuring conditions for the individual progress of pupils during studies.

As Khasan (2006), Aronov, & Znamenskaya (2010) noted, the progress of pupil in the study of the subject, means, on the one hand, a change in his attitude to the subject towards greater awareness, independence and freedom of action, and, on the other hand, the restructuring of relations with the public adult (teacher), accompanying this process, in the course of mastering the subject (Khasan, 2006; Aronov & Znamenskaya, 2006). In other words, one of the conditions for an individual progress of a pupil is the ability of teacher to build different relationships and to take different positions in the course of training (from a "teacher as instructor" to a "teacher as tutor" positions).

Thus, a complete scheme of analysis is necessary for ensuring orientation in educational practice and the design of situations of individual progress of pupils. This scheme needs to contain the elements which allow to analyze and to design dynamics of the "pupil – teacher" and the "teacher – subject" relationships. At moment, the composition of these elements that is compliant with the level model of mastering of cultural action pattern has not been studied in the literature.

One of the main directions of studies of the professional qualities of teachers are the studies of their beliefs. In the line of the works by Pehkonen (1994) and Kardanova et al. (2014) we will define beliefs as "conceptions, views and personal ideology of the teacher that form basis of his or her practice". The beliefs of teachers mediate the transition from the cognitive to the activity components of teaching. The beliefs are divided into traditional and ones in (OECD, 2009) in accordance with relevant approaches to teaching. In Russian practice, a constructive approach is often called as "developing" one.

Teachers with constructive approach and relevant beliefs are oriented at building knowledge and task solving by pupils themselves through specifically organized activity. Pupils, for them, are active participants of the study process. Traditionalist teachers suppose that their main role is to ensure the concentration of pupils on their explanations, and to search for the most effective means of presenting the didactic material, including right ways of tasks solving.

Studies by Kardanova et al. (2014) show that real teachers in their practice always base their teaching on a set of notions that include elements of both approaches in various combinations. According to Pehkonen (1994), despite sufficient stability, the beliefs can change and evolve passing through several levels of development. Foreign researchers assume Kardanova et al. (2014) that teachers, adherent to the constructivist approach, organize the most favourable conditions ensuring educational achievements of pupils.

Our work refers to studies aimed at identifying the elemental composition and design of the scheme of educational practice analysis. This scheme allows to keep the coherent system of "teacher-pupil-subject matter" relationships during design of conditions for individual progress.

3. Research Questions

We assume that the presence of the teacher's constructivist beliefs about his or her subject matter and the learning process is one of the key factors in ensuring individual progress of pupils.

4. Purpose of the Study

The purpose of this research is to justify teacher's beliefs to be an essential element of the scheme of analysis of the educational practice.

5. Research Methods

The methods of measuring the individual progress of pupils were selected in accordance with the following criteria:

– the diagnostic toolkit should be based on the level model of formation of the cultural action pattern described in (Monitoring, 2006; Znamenskaya et al., 2009, Nezhnov, 2015);

- the toolkit should be designed to measure the pupil's individual progress in the process of learning school courses (Russian language, mathematics, natural science);
- the data should allow to determine the rate at which class pupils showed progress when the system of notions and means in the subject area had been mastered (from 6th to 9th grade);
- there were schools where the toolkit was used massively and regularly.

In Russia, two diagnostic tools are based on the model of level of mastering of cultural action pattern: «Delta» (Monitoring, 2006; Znamenskaya et al., 2009; Znameskaya et al., 2014) and SAM (Nezhnov, 2015). The content for SAM include the subject notions of the primary school. The content for «Delta» cover a system of basic notions of the mathematics and the Russian language courses at primary and secondary school.

We used the diagnostic tool “Delta” to identify dynamic characteristics of individual progress of pupils. Gymnasium No 1 “Univers” situated in Krasnoyarsk became the site of our research. The toolkit «Delta» has been in use regularly for all pupils in this Gymnasium since 2010. This allowed us to analyze the data concerning pupils from 15 classes. The pupils were observed during four years of studies (from 6th to 9th grade).

The diagnostic procedure “Delta” is conducted once a year, so it consisted of 4 assessments during the training period. The result of each assessment gave information on the level at which a student mastered a particular subject at that particular stage of training. We counted the proportion of pupils that showed individual progress at least once during the diagnostic time. The very fact of “Delta” presence was important. We stated “Delta” as a qualitative leap, the pupil's transit to a higher level of mastering cultural actions. The initial level of pupil was not that essential. According to the diagnostic procedure, classes with similar starting capabilities were selected for further analysis. Namely, classes with 55% ± 5% of pupils who did not show any level at the first assessment and at least a quarter of pupils who showed the first level. And at the same time, any class picked for analysis should have some students who showed the level above the first one.

When we identified the traditional and constructivist beliefs of the teachers, we considered the current situation of introduction of the new government (federal) educational standards in schools. This situation requires all teachers, (regardless of their beliefs) to include the individual elements of the constructivist approach in training process. For this study, it was important to determine how strong the teacher's orientation is towards systematic actions that generate the activity (goal-oriented and conscious) or non-inactivity (executory, non-reflective) attitude of pupils towards the subject. A questionnaire was developed in co-authorship with A.M. Skripka. The survey involved 60 teachers who worked in schools where the "Delta" diagnostic tool was implemented.

The respondents were offered the list with options of training work that caused activity or non-activity attitude of pupils to the subject studied. For example, an independent search for solving problems referred to the first type of training work, including tasks with a contradiction and an unobvious result. The solution of typical tasks from the textbook on the basis of teacher's explanations of solutions referred to the training work that caused non-activity attitude of pupils.

The respondents were asked how often they used the types of training work from the list during the school year («practically never», «from 0% to 25% of lessons», «from 25% to 50% of lessons», «from 50% to 75% of lessons», and «from 75% to 100% of lessons»). This question was asked to be answered from three points of view: from the position of teachers with a traditional approach to training, from the position of teachers with a constructive approach to training, and from the position of teacher's own convictions and working experience.

For each type of work, the frequency of occurrence of each answer option was determined and the cumulative frequencies were calculated. On that basis, thresholds of respondents' answers were introduced in 50%, 60%, 70%, 80% and 90% of respondents. The 60% threshold was chosen as the main one. On the one hand, it was high enough, since it covered at least two-thirds of the teachers. On the other hand, it was low enough to reduce the influence of random factors. The data obtained for the 60% threshold allowed us to identify typical respondents' perceptions of how often each type of training work should be used with traditional and constructivist approaches to learning. For example, the type of educational work "pupil performance of tasks with a contradiction and unobvious result" should take no more than quarter of the number of lessons according to traditional approach, and more than half of the number of lessons according to constructivist approach. Thus, empirical limits were obtained for the frequency of implementation of both approaches to learning in training work types. Going beyond these boundaries means going beyond this approach to learning.

6. Findings

The results of the questionnaire survey among teachers working with the classes tested at the "Univers" Gymnasium revealed the following positive and statistically significant correlations between beliefs and actions. The teacher's own practice correlated with the actions of the traditionalist approach in 36.7% of cases, and with the actions of the constructivist approach 55.1% of cases. Also 8.1 % of respondents did not show commitment to any particular approach.

Teachers in classes under study had changed repeatedly during 4 years of individual progress monitoring. That is why we chose two classes where only traditionalist teachers worked and two classes where only constructivist teachers worked for further analysis.

We found that in two classes with constructive beliefs of teachers the proportion of pupils who showed the transition to a higher level of mastering of cultural action pattern was 71% and 80% respectively. In two classes with traditional beliefs of teachers, the proportion of students who showed progress was 59% and 47% respectively.

7. Conclusion

The obtained data proves the hypothesis under study that teacher with the constructive beliefs ensures a larger-scale progress of pupils.

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