

Essence and Levels of Development of Pedagogical Project Activity of First-Year University Students

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Abstract Purpose of the study: The aim of work is to know how the project activity development dynamics of first-year students of psychological and pedagogical departments could be arranged and prove suggestions of project activity development levels: reproductive, productive, constructive. **Methodology:** The content analysis method was used which collect data associates with the student's ability to project activities. **Main Findings:** The work describes results of forming experiment in which seventy-six first-year students of the Institute of Psychology and Pedagogy of Siberian Federal University took part, including 52 people from two experimental groups of psychology-pedagogy occupation and 24 persons from the control group of pedagogy occupation. The results show that the progress in project activity development of experimental group students is vastly different from progress in project activity development of control group students. **Applications of this study:** Theoretically grounded principles of the organization of the project activities of students in the article can be the basis for the development of specific methods for their implementation in practice. The development levels of project activities — reproductive, productive, and constructive — can be used to monitor the professional competencies of humanitarian students. **Novelty/Originality of this study:** the article proposes a system for organizing educational and professional activities of a student to build a transition from a student's activity according to a rigid, non-varied plan to a flexible, variable pedagogical project based on the principles of development. This opens up the possibility of becoming a dialogic type of student professionalism already in the process of its preparation.

Keywords Development, Project Activity, Activity Approach, Project Activity Development Levels

1. Introduction

In the year 2014, the Ministry of Education and Science of the Russian Federation launched a large all-Russian experiment for the development and implementation of applied Bachelor's degree programmes at higher education institutions. According to A. Margolis, "a graduate of a pedagogical occupation should be completely ready to carry out his/her professional activities at class in accordance to the structure and content of the job functions listed in the professional standard"[1]. It is an acute problem for each institution of higher professional education to develop its own system of academic and professional activities for students on the basis of the job functions listed in the standards, for the students to explore and acquire knowledge being the foundation of their professional development.

The analysis of works by Russian researchers [2, 3, 4, 5, 6, 7, 8] as well as the Federal State Education Standard for Primary General Education has proved that it is the project activity of the teacher that ensures the development of students, not the application of pre-set methods and academic plans. In its turn, it means that for the students to discover new academic knowledge instead of digestion and reproduction of ready, development and testing of the academic activity scenarios by the teachers is required.

For this reason, there appears a task to determine the essence of project activities of students as future teachers, intended to organize learning activities of primary school students.

To ensure the discovery of project logics and principles of pedagogical project development, the following system of experimental pedagogical activities for students was developed and implemented at the model seminars:

1. Topic selection; organization of a seminar discussion based on the plan developed by the students themselves.

2. Setting problems of the students' actions by both students and the teacher in the process of plan implementation. Discussion of discrepancies between the plan and the established targets, as well as implementation practice.
3. Discovery of pedagogical activity principles used by the students at the seminar and formulation of the principles in cooperation with the teacher. Selection, clarification or development of pedagogical activity principles for further implementation at the seminar.
4. Reconstruction or completion of the students' seminar activities on the basis of "here and now" principles of pedagogic activities. Continuation of the topic discussion in accordance with the formulated principles.
5. Summary of the seminar results, formulation of the process and results of the experimental pedagogical project activity.
6. Establishment of new pedagogical tasks in accordance with the discovered principles and project follow-up.

In order to detect the faults of the initial seminar plan and to reconstruct the basis of pedagogical activity formulated by the students, the teacher needs to act as an activity approach expert who in the process of communication explains the open pedagogical activity principles, i.e. the essence of dialogic, variative, prognostic, reflective, concept-based actions.

The principles of pedagogical project activities discovered by the students in cooperation with the teacher can be classified as follows:

- principle of trial activity handling: transformation of a target into a method and back (reflective conversion) as a way of transition from comprehension and interpretation of certain processes to implementation and practical control of the processes and back.
- principle working with thinking and communication: arrangement of reflection, establishment of argumentation logic, support of argumentation with practical experience and ties to existing materials, forecasting etc.
- principles of knowledge operation: development of notions, movement from general to specific, schematization, modelling etc.

Therefore in order to measure quality and quantity of student's project activity development depending on seminar organisation, it is necessary to discuss the theory and empirical evidence of construct such as project activity development and seminar organisation model.

2. Literature Review

The variables implied are framed in the following theories and empirical evidence: the system of academic

activities that stimulates children to discover new knowledge was developed by V.V. Davydov, V.V. Repkin, D.B. El'konin. Within this system, the teacher organizes the activities of children and adults in order to make children get the "experience of discovering new notions, images, values and regulations" in an activity shared with the teacher, getting more independent after [2]. This means that to train future primary school teachers, the higher education institution needs to provide its student with the experience of discovering his/her own professional knowledge to support the same process in their further professional activity at primary school.

Based on the previous research [9,10] and experience of working with future teachers, we suggest a suggestion that in order to organize learning academic activity of children, a student needs to discover his/her own logic of pedagogical project, which, besides the commonly known project stages of idea – implementation – result also includes discovery of pedagogical principles as the main essence of professional knowledge instead of using a ready pattern.

In this sense, the development of one's own pedagogical knowledge is only possible after a practical trial of performing an action and transforming it in accordance with the pedagogical activity principles discovered in the process of the trial and/or as a result of a follow-up analysis.

The statement that "without theoretical interpretation of one's own practice, without proper understanding of its principles it is impossible to bear any responsibility for the consequences of one's deeds" [11] has been proven by the works of G.P. Shchedrovitsky and other contemporary methodologists. This sentence has a special meaning in respect to the development of children and the students themselves.

The principles of student's educational activities organization are considered and discussed by many researchers. William Kilpatrick based on the ideas of J. Dewey developed a project method. According to him, training is carried out through the organization of targeted acts. Children in the process of learning activities plan (design) the implementation of a specific practical task, including there and learning activities. In spite of the fact that the management of the activity remained with the teacher, this method was based on the child's existing experience, his own way of searching, overcoming difficulties.

A.S. Neill organized the educational process as setting tasks by the child himself and making decisions in a democratic way, both about the educational process and about the organization of children's life at school.

It is remarkable that researchers, although they propose a project approach and educational initiative as principles for organizing the educational process, do not speak about the mechanism of how these principles can be implemented.

To find out the mechanism for the of student project

activity development, the students' university seminars were organized in specific form in which. first-year students got their own experience of professional knowledge discovery.

According to the works of V.V. Davydov, D.B. Elkonin, V.G. Vasiliev, the project approach in education can be realized only through the project activity principles discovery by the student himself. So students must perform the following actions at the seminar to make this possible:

- offer your plan of occupation (seminar) and your task;
- fix the difficulties encountered in the process of solving the problem;
- find yourself at least one option to overcome the difficulty;
- return to the plan of employment in moments of difficulty in solving the problem;
- adjust the intention of the lesson (seminar) upon its completion;

If students perform these activities during the semester, then we will be able to see the transition of students to the next level of project activity in the next semester.

Initially, students acts at the request of the teacher, not understanding the meaning of action. This is what we call the reproductive level. Secondly students assign these actions as a general way of doing any difficult work, and can use this method on their own. This is what we call the productive level. And the last level of project activities development is that students can not only use these actions as their own way, but also understand the principles on which it is based. This is a constructive level of student's project activities

So we define the development of students' project activity as a transition in three levels. Reproductive level means that the student acts according to the teacher's task and is not capable of mastering this or that action without the teacher's assistance. Productive and constructive levels mean that the student acts according to his or her own principle or method, which proves our research hypothesis that students discover the project logic of pedagogical activity themselves.

After the afore-mentioned analysis, the research question is ratified: does the implementation of the above-mentioned actions by a student really lead to the development of a student's project activity? What is the model of organization of the educational process, which can better explain the phenomenon of research?

Consequently, the hypothesis (H1) is: students' project activities development is possible only if the student himself discovers the principles of project activities in the educational process.

3. Methodology

Present the materials, methods, survey, questionnaire etc

used for the study. Author should explain whether this study is experimental, or review study, or simulation based or survey based. Discuss software, hardware's used during study with their brand names. Mention all research conditions, assumptions, theories followed. This section should be easy enough for any reader to repeat the study under similar conditions.

The research procedure assumed arrangement of an activity trial for first-year students before and after the project activity seminar cycle within the framework of "Development Pedagogy" course. The research was participated by 76 first-year students of the Institute of Psychology and Pedagogy of Siberian Federal University, including 52 people from two experimental groups of psychology-pedagogy occupation and 24 persons from the control group of pedagogy occupation.

It's experimental research, constructing like forming experiment. To assess the level of the project activity at the beginning and the end of the semester, the following research procedure was introduced: the teacher and senior students assess the project activity of the first-year students on the basis of certain questions. The questions were designed to classify the students' activities into three levels. Next, the data was processed by content analysis.

Experimental impact was made in relation to the experimental group and was not made in relation to the control group. Experimental impact consisted in organizing seminars on the described model, including actions to propose a lesson and task, fixing difficulties, finding a solution to overcome difficulties, retaining the plan of the seminar and its redesign.

Data analysis was made with content-analysis using following criteria: arrangement of reflection, establishment of argumentation logic, support of argumentation with practical experience and ties to existing materials, forecasting, development of notions, movement from general to specific, schematization, modelling in the process of solving a problem.

4. Results

Provide logical, and scientific analysis of findings of the study. Present evidences to support your analysis by citing work of earlier researchers or existing theories.

We present the results in Diagram 1. We see four lines: two dashed lines are data from the beginning (light line) to the end (dark line) of the experiment in the control group (CG), two solid lines are data from the beginning (light line) to the end (dark line) of the experiment in the experimental group (EG). On the horizontal axis of the graph - the levels of development of the project action, on the vertical axis of the graph - the percentage of students who showed a particular level.

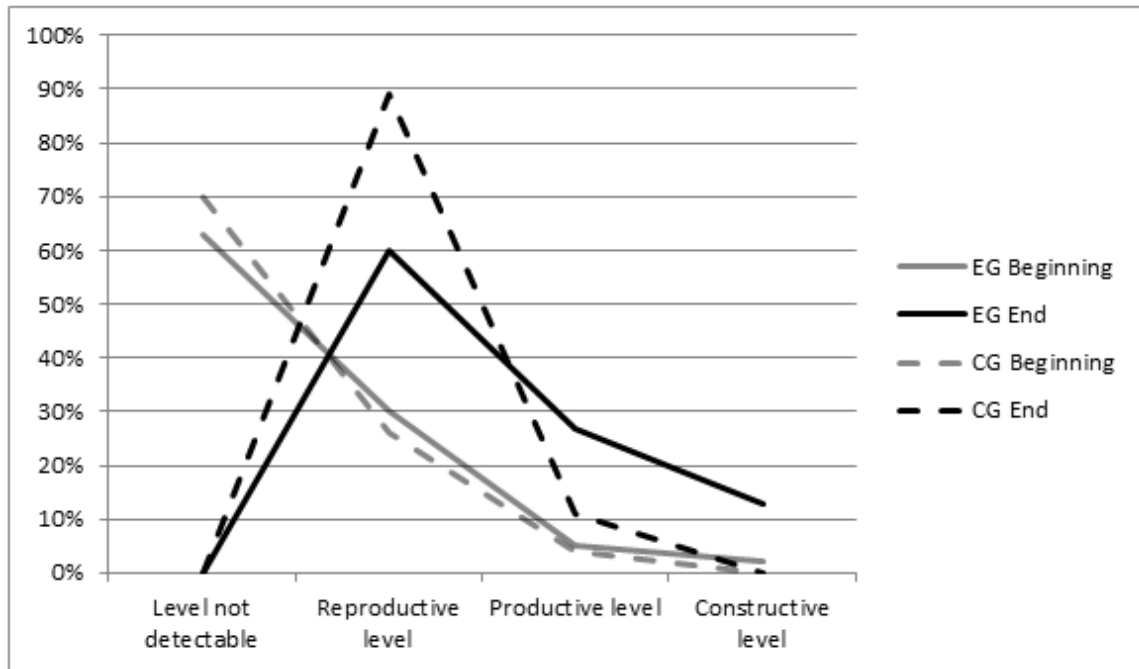


Diagram 1. The dynamics of the development of pedagogical project action in the experimental and control groups from the beginning to the end of the experiment

Table 1. Levels of the development of pedagogical project action in the experimental and control groups

Diagnostics period	Experimental group (52 people)		Control group (24 people)	
	Beginning of the semester	End of the semester	Beginning of the semester	End of the semester
Level not detectable	63% (32 people)	0% (0 people)	70% (17 people)	0% (0 people)
Reproductive level	30% (16 people)	60% (31 people)	26% (6 people)	89% (21 people)
Productive level	5% (3 people)	27% (14 people)	4% (1 person)	11% (3 people)
Constructive level	2% (1 person)	13% (7 people)	0% (0 people)	0% (0 people)

The data in Diagram 1 is presented in more detail in Table 1. The Table 1 below presents the results of project activity development diagnostics carried out among the first-year students of the experimental and control groups at the beginning and the end of the second semester of the year 2015 in accordance with the introduced research procedure.

We process the data using the Mann-Whitney statistical test to determine the statistical significance of the data.

Let's rank the table. When ranking, combine two samples into one. The ranks are assigned in ascending order of the value of the measured value, i.e. the lowest rank corresponds to the lowest score. Since there are related ranks (the same rank number) of the 1st row in the matrix, we will re-form them. The re-formation of ranks is done without changing the importance of the rank, that is, between the rank numbers the corresponding ratios must be

preserved (more, less or equal). The re-formation of ranks is performed in the following Table 2.

Table 2. Data ranking

Seat numbers in an ordered row	The location of the factors according to evaluation	New ranks
1	0	2
2	0	2
3	0	2
4	2	4
5	6	5
6	11	6
7	15	7.5
8	15	7.5

Get a Table 3 of ranks using the proposed ranking principle.

Table 3. Table of ranks X and Y

X	Rank X	Y	Rank Y
0	2	0	2
6	5	0	2
11	6	2	4
15	7.5	15	7.5
Sum	20.5	Sum	15.5

This data is sufficient to use the formula for calculating the empirical value of the criterion

$$u_{emp} = 3 \cdot 3 \frac{3(31)}{2} - 12.5 = 2.5$$

Hypothesis H0 about the insignificance of differences between samples is accepted if $U_{cr} < U$ is empirical. Otherwise, H0 is rejected and the difference is defined as significant.

Find the critical point U_{kp} .

On the table we find $U_{kp}(0.05) = 3$

On the table we find $U_{kp}(0.01) = 3$

Since $U_{cr} > U_{emp}$, we reject the null hypothesis in favor of H1 with a probability of 99%; differences in sample levels are significant.

The diagnostics results prove that both in the experimental and the control groups by the end of the second semester all students had reached a certain level; in both groups the share of students reaching the reproductive level from the beginning to the end of the semester is equal. It means that, solving the pedagogical tasks set before them, first-year students can work efficiently only with the help of the teacher.

By the end of the first year's second semester, the difference between the experimental and the control groups is seen on both productive and constructive levels.

We present the results in Diagram 2. Diagram 2 shows two lines: the solid line shows progress at the productive level of the pedagogical project action of the experimental group in comparison with the control group, the dashed line shows progress at the constructive level.

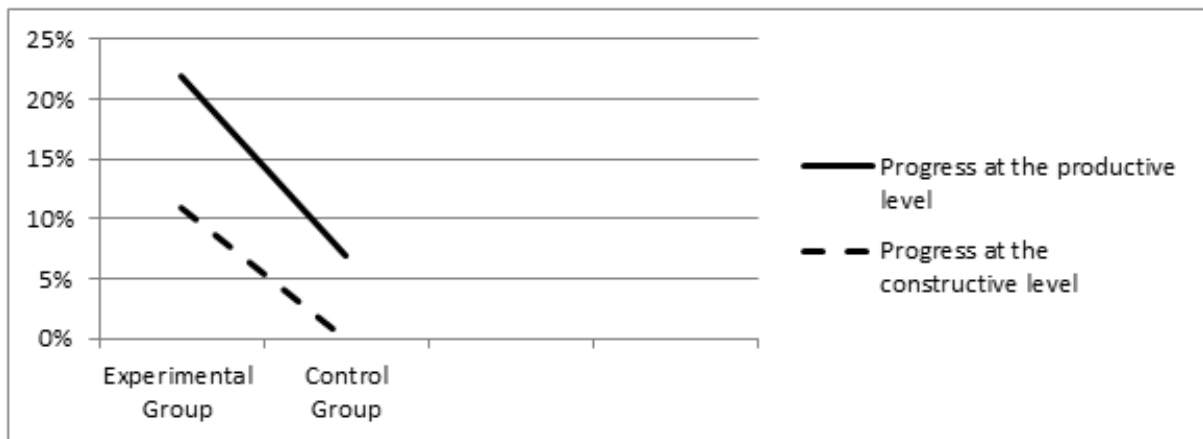


Diagram 2. Progress on the productive and constructive levels of project action in the experimental and control groups

The data in Diagram 2 is presented in more detail in Table 4.

Table 4. Progress of pedagogical project activity in the experimental and the control groups

Groups // Progress from the beginning to the end of the semester	Progress at the productive level	Progress at the constructive level
Experimental	22% (11 people)	11% (6 people)
Control	7% (2 people)	0% (0 people)

The table demonstrates that while the progress rate made by the end of the second semester at the productive level by the experimental group students is approximately three times more, the control group students do not reach the constructive level at all. It means that progress at the productive and constructive levels requires special arrangement of work with students to assist them developing and implementing their pedagogical ideas on the basis of activity principles discovered and formulated by them (productive level). By the end of the second semester, only a very small part of the control group (2 persons) are capable of coming up with their own way of organizing interaction between other people, formulating it, substantiating it with a certain activity principle. Moreover, the control group students do not express any initiative on the analysis, improvement or development of the said interaction methods (the constructive level).

Therefore, the theory-based experimental work carried out by the authors of the present research proves the hypothesis that students' project activities development is possible only if the student himself discovers the principles of project activities in the educational process.

5. Conclusions

The development of pedagogical project activity shows its efficiency as early as in the first year of study, provided that the education process of the higher education institution is based on the studies of disciplines related to activity logic.

Based on the said disciplines, the activity logic of project activity development assumes that a student cooperating with his/her peers discovers the principles of arranging pedagogical project activity, including the principles of organizing trial and search activity, principles of working with knowledge, thinking and communication. It happens in the process of trial actions carried out by the students in accordance with the established plan, followed by the analysis of the said plan efficiency for implementation at the seminars, search for new principles of interaction arrangement and their implementation assisted by the teacher, together with proper formulation of the principles. This is how a student's activity evolves from a trial plan-based action into pedagogical project activity on the basis of the principles discovered in the process.

The research of psychological and pedagogical project activity of the first-year students has been proved to be efficient with the levels introduced by the present article, including reproductive, productive and constructive levels. The levels' research procedure has been supported by the experimental data collected from the experimental and the control groups. The results show that by the end of the second semester, the progress at the productive level is approximately three times more prominent in the experimental group, while the control group students do

not reach the constructive level at all. Therefore, it is only the focused work of the teacher intended to develop and implement the pedagogical project ideas, based on the open search dialogue activity principles discovered and formulated by students, that brings them to such results as early as during the first year of studies.

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