

## RESEARCH-AND-METHODOLOGY SUPPORT FOR DEALING WITH THE INVENTIVE PROBLEM OF EDUCATION SUBJECTS

Galina Vladimirovna Terekhova\*

---

**Abstract:** The problem of support of creative activities in educational process based on the theory of inventive problem solving is discussed. Support functions are characterized, the problems of developing the scientific and methodological support of theory of inventive problem solving (TIPS) objects are described at different levels: user, performer and administrator in the fields of awareness, links and experience exchanges on the development of applied trends in TIPS education, targeted and timely methodological support to the staff in professional problems, expert assessment of syllabi and methodological documentation, providing a possibility of qualification upgrade in TIPS education.

**Keywords:** Theory of inventive problem solving (TIPS), TIPS education, psychological and pedagogical support, function of TIPS education object support, scientific and methodological support.

### INTRODUCTION

In the current context, the process of education based on TIPS (theory of inventive problem solving) has no approved standard, is built upon authors' schools of various orientation, is not included in the content of contemporary educational patterns. Current experience in TIPS-education content development is primarily based upon inventive and psychology-and-pedagogical activities; materials for designing support programs for a particular educational institution require development.

The necessity for theoretical analysis of problems relevant for this environment, experience exchange, methodical and technological awareness, and instrumental resolution of the problems emerging in the course of support has required the production of research-and-methodology developments (Methodological recommendations on psychological and pedagogical support of students in educational process under the conditions of education modernization).

### METHODS

The purpose of research-and-methodology support is to create conditions for implementation of the functions of psychology-and-pedagogical assistance rendered to TIPS-education subjects of different levels: the user, the performer, the developer and the administrator. At the user level, those supported and those who provide support implement ready-made packages, cases, programs. The material is ready for self-directed learning of TIPS-elements with the minimum implementation

---

\* South-Ural State Humanitarian Pedagogical University, 454080, Lenina 69, Chelyabinsk, Russian Federation

support. At the performer level, the materials offered for creative activities organization require the initiative in assimilating, additional preparatory works in applying, and competence in implementing innovative products. Supporting the parties of TIPS-education independently developing the elements of creative activities, new products for administration of these activities requires high level of operational availability to solve problems, development of skills in creative activities organization, personality traits of an innovator, and also the experience in innovative introduction. At the administrator level, the materials in the field of TIPS-education facilitating management functions, such as planning, analysis, coordination, as well as the peculiarities of TIPS-based innovative products introduction, are strongly sought for. It should be noted that the level of user support is the most desirable in the system of up-to-date (popular) TIPS-field, while the performer level – when implementing the programs of classical (conventional) TIPS-education. Those involved in advanced (prospective) area of TIPS-education programs support are more of the developers, than performers or users. Administrational level is needed in all the areas, but possesses distinctive features in terms of the content and processes.

Activities on research-and-methodology support for the contributors of TIPS-education were carried out in the following areas:

1. Assurance of awareness within theoretical and practical activities on assimilation of the experience in creative activities based on TIPS;
2. Organization of communication and sharing experiences in the development of applied areas in TIPS-education environment;
3. Provision of targeted and timely assistance to the staff members both directly and indirectly carrying out the function of support for TIPS-education, who found themselves in difficult professional situation; coordination of research-and-methodology operations in educational institutions;
4. Execution of the expert review of program-methodical and analytical records on dealing with problems; provision of the assistance in conducting monitoring surveys, diagnostic kits design and adaptation depending on the research goals; elaboration of the criteria for control over the assimilation of TIPS-based educational programs;
5. Enabling professional development in the field of TIPS-education, both short-term and continued step-by-step training of staff members providing support for TIPS-education subjects.

## RESULTS AND DISCUSSION

We will specify the implementation of the areas of research-and-methodology support for the subjects in educational process based on TIPS.

When describing **the first area of activities**, it is necessary to point out that awareness as a type of human cognitive reaction, the ability to identify in order to

express one's attitude to the subject, to recognize feelings and emotions triggered by the subject of awareness, has several levels. The level of TIPS-education subjects' awareness has the influence on the formation of the vision of reliability of information, evaluation of particular educational opportunities availability, making decisions on further actions, goals and objectives setting, activities planning, position regarding the decision, etc.

Assurance of awareness was carried out in several aspects: content-related (what exactly do the subjects know about TIPS-education?), procedural (do they know how to get necessary information about TIPS-education?), and resultative (based on which information the decision is being made). Each of the aspects at a particular level defines the autonomy in choosing opportunities, situational awareness; fulfills the function of raising awareness of the educational situation. When the level of awareness is minimal, the accountability is lower in the educational situation, which will require a higher accountability level in supporting activities.

Awareness-raising activities were carried out by means of implementing the function of informing TIPS-education subjects in the following forms: individual and group counseling, public presentations as part of teacher-parent meetings, teacher council meetings, department and association meetings, lectures, meetings with experts, Skype-meetings, seminars, conferencing, information stands preparation, issuing news bulletins, publications in printed and electronic scientific and methodical media, publicist articles, interviews, compilation materials, electronic correspondence, reports, analytical notes, publication of information on specialized websites, issue-related author's page on the website devoted to TIPS-education, thematic conversations, mail-outs, information circulars, presentations, video/audio messages, announcements, exhibitions, project weeks, start-ups, etc.

The content of awareness was defined according to the specificity, type and profile of the educational institution, the level of general and psychological, pedagogical and innovation-oriented culture of the subject informed both as an individual, group, collective and as a mass audience, as well as according to a particular problematic situation. Differences in raising awareness depending on the category of the subject are reflected in the following topics divided into units:

### **Unit 1. Psychological Awareness**

*The basic objectives:*

1. Formation of scientific concepts of the psychology of creativity and the development of capacity for creative activities in different age;
2. Popularization and explanation to the subjects involved in the educational process of the results of psychological research related to TIPS-education;

3. Formation of the need for the use and application of psychological knowledge, experience in creative activities for the purposes of one's own creative development;
4. Prevention of didactogenia, psychogenia (iatrogenia) in the course of dealing with non-typical problems.

### **Unit 2. Pedagogical Awareness**

*The basic objectives:*

1. Familiarization of the educational process subjects with the fundamentals of theoretical knowledge in the field of TIPS-pedagogy;
2. Popularization and explanation of innovative ideas and concepts in the field of pedagogy, and their practical relevance;
3. Formation of the need for the use and application of pedagogical knowledge, TIPS-education experience for the purposes of one's own creative development;
4. Prevention of didactogenia, psychogenia (iatrogenia) in the course of interaction aimed at solving non-typical problems.

### **Unit 4. Innovation Awareness**

*The basic objectives:*

1. Formation of scientific concepts of innovations, state-of-the-art achievements in science and technology;
2. Popularization and explanation to the parties of the educational process of the methods of application of new, unconventional, effective inventions from various branches of knowledge;
3. Raising innovation awareness of futuristic prognostications;
4. Prevention of didactogenia, psychogenia (iatrogenia) in the course of interaction aimed at the assessment of non-typical problems resolutions.

Thus, raising the level of TIPS-education subjects' awareness allows forming the educational environment required to obtain experience in creative activities in the course of solving non-typical problems, the opportunity to obtain high-level results of research, innovative, inventive and productive activities.

**The second area of activities** – organization of communication and sharing experiences in the development of applied areas in TIPS-education environment sought to fulfill the function of awareness raising and development. Organization of information support, the exchange of external and internal information flows of educational system, multimedia support of TIPS-education fulfills the functions of awareness raising, projection and design of educational resources in the course of training problem-solving activities. Coordination of research-and-methodology

work in educational institutions fulfills the functions of awareness raising, coordination and development.

The purpose of activities in this area was to provide TIPS-education subjects with essential interaction for the development within the framework of creative activities through the creation of environment. The basic forms include the following: conferencing, research-to-practice seminars, authors' pages, project pages on websites devoted to the problem of TIPS-education, interactive means of communication.

At the present stage of TIPS-education development, there are several dozens of websites dedicated to the issues of problem-solving activities organization based on TIPS-tools, of which the problem of psychology-and-pedagogical support is purposefully addressed by the websites of Jonathan Livingston international project: OTSM-TRIZ, Academic Bulletin "POLET" of the Internet Magazine "Litsey" (coordinated by A.A. Nesterenko), Volga-TRIZ (coordinated by T.A. Sidorchuk), RATRIZ (coordinated by A.V. Kislov, E.L. Pchelkina), Educational Technology Laboratory (coordinated by A.A. Gin), Education and Entertainment Site for Creative Problem Solving (coordinated by V.I. Timokhov) (Nesterenko and Terekhova 2012; Nesterenko 2010; OTSM-TIPS in education; MA TIPS official website; Development of creative abilities in teaching, learning and upbringing on TIPS basis).

The websites content reveals characteristic features of assimilation of the experience in creative activities in educational process within the subjects belonging to different categories. Theoretical and practice-oriented materials reflecting all the areas of TIPS-education development are being published. On each website, the functions of informing arranged in the form of subscriptions to new publications newsletters, as well as the authors' pages, where the materials for solving problems under the academic guidance of the developers in the field of TIPS-education are posted, are intended. For example, the results of this experiment can be found on the author's page of the websites of Jonathan Livingston international project ("Jonathan Livingston" international educational project).

The development environment for direct interaction of TIPS-education subjects is also presented by the organization and conduct of research-to-practice conference "The Development of Creative Abilities in the Process of Training and Education Based on TIPS" (organizing committee: V.G. Berezina, L.A. Kozhevnikova, G.V. Terekhova); there have been arranged the reports made by schoolchildren, students, teachers, tutors, parents, psychologists, the representatives of educational institutions administration, teaching staff of higher education institutions and other subjects of educational process on the problems of TIPS introduction, as well as manufacturing sector representatives – engineers, inventors, patent specialists and others dealing with problems on the basis of TIPS-tools. Workshop sessions, round-

table discussions, research-to-practice seminars, the diagnostics of TIPS-education subjects and other events enabling assurance of subjects development in this field, were held within the framework of the conference.

**The third area** – provision of targeted and timely assistance to the staff members both directly and indirectly carrying out the function of support for TIPS-education, who found themselves in difficult professional situation, fulfills the function of educational situations analysis, as well as projection and design of educational resources in the course of problem-solving activities assimilation. Delivery of assistance in the development and introduction, implementation, analysis of pedagogical projects, educational programs fulfills the functions of correction, counseling and coordination.

Psychology-and-pedagogical aid renders support for current problems settlement, which might emerge spontaneously, unintentionally in the course of dealing with a problem or in the process of interaction between the subjects of educational activities. In this regard, the forms presupposing anytime access for consultations, as and when required, were included in the system of work, such as: electronic correspondence, Skype-meetings, social media profiles and other optional forms. A network of qualified experts in different areas of TIPS-education was also created, to request one-time assistance, if so agreed. For instance, to solve the problem of social nature, an Educational Psychologist working with a school-age child needed a consultation on an associated problem from Mathematics, but related to research in the field of TIPS, which required a specialist with the relevant expertise to be involved.

**The fourth area** – execution of the expert review of program-methodical and analytical records on dealing with problems fulfills the functions of prevention and control in educational activities based on TIPS. Provision of the assistance in conducting monitoring surveys, diagnostic kits design and adaptation depending on the research goals; elaboration of the criteria of control over the assimilation of TIPS-based educational programs fulfills the functions of diagnostics and control over the educational activities based on TIPS.

Criteria: updating the process of dealing with a problem, operational availability for problem-solving, efficiency of the solution, subjective resources to deal with a problem, methods of dealing with a problem.

**The fifth area** – enabling professional development in TIPS-education, both short-term and continued step-by-step training of staff members providing support for TIPS-education parties, correction and development, awareness raising, analysis of educational situations, improvement of classes conduct; designing methodical and technological products of educational nature on the basis of TIPS fulfills the functions of projection and design of educational resources in the course of problem-solving activities learning, correction and development.

The purpose of professional development is to arrange provision of the necessary theoretical and practical resources for problem-solving through the use of TIPS-tools in educational process while continuing to perform the main job. The following alternatives have been implemented: (1) short-term support: specialist training is carried out in the form of a seminar or a short-term course, after which the acquired knowledge is applied in practical activities, and if the target goals are achieved, the resolution of particular problems is demonstrated in the form of a research-and-methodology product; (2) extended support: training has been practiced for a long period (one year or more), TIPS-support parties are offered separate theoretical units, training classes, methodical counseling, projects, and the deadlines for obtained knowledge and skills to be put into individual practice, for the experience to be learnt, and for the outcomes to be discussed with colleagues and coaches on the training program (Scientific and methodological support of school staff: pedagogical advising and supervision, p. 59).

## CONCLUSION

Thus, research-and-methodology support for dealing with a problem was implemented in the areas fulfilling the functions of psychology-and-pedagogical assistance rendered to TIPS-education subjects and comprised theoretical and practical support for working with the subjects belonging to different categories and with different levels of expertise: the user, the performer, the developer, and the administrator.

## *References*

- Development of creative abilities in teaching, learning and upbringing on TIPS basis. International Conference proceedings, (2005). Chelyabinsk: IITs "TRISForum".
- "Jonathan Livingston" international educational project. (N.D.). Retrieved August 4, 2016, from <http://jlproj.ru>.
- MA TIPS official website. (N. D.). Retrieved August 11, 2016, from <http://www.maTIPS.ru>.
- Methodological recommendations on psychological and pedagogical support of students in educational process under the conditions of education modernization: append. To the letter of the Russian Ministry of Education of 27.06.03 No. 28-51-513/16. Retrieved August 5, 2016, from <http://iemcko.ru/3201.html>.
- Nesterenko, A.A. and Terekhova, G.V., (2012). Current state of TIPS education: analysis and development prospects. Germany, LAP Lambert Academic Publishing.
- Nesterenko, A.A., (2010). Knowledge workshop: tools of problem focused education on the basis of OTSM-TIPS. Moscow: OOO "Remote technology and education".
- OTSM-TIPS in education: website for teachers and parents. (N. D.). Retrieved August 10, 2016, from <http://jlproj.ru>.
- Scientific and methodological support of school staff: pedagogical advising and supervision. Novgorod, Yaroslav Mudry University; In-t of educational marketing and human resources, (2002). Veliky Novgorod: Publishing House of the Novgorod State University.

