Ways of Psychological Support of Adolescents with Prominent Aptitude for Mathematics

Eduard V. Galazhinskiy, Olga M. Krasnoryadseva*, Irina Y. Malkova

National Research Tomsk State University, Lenin Str. 36, Tomsk 634050, Russian Federation

Abstract

Presented are the results of testing of psychological support program for adolescents with prominent aptitude for mathematics. Research select query comprised 120 adolescents with prominent aptitude for mathematics from several regions of Siberia, who were participants of special events for gifted children, organized by Tomsk State University. Psychological-educational technologies of giftedness potential actualization are described. Directions of implementation of the system of network psycho-educational provision of continuity and succession of cooperation between various educational institutions prioritizing development of gifted children and adolescents are being discussed.

1. Introduction


* Corresponding author. Tel.: +73822529720; fax: +73822529710.
E-mail address: krasnoo@mail.ru

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Wolflea, etc.). In studies of mathematical giftedness as a psychological phenomenon, such characteristics as the high level of intellectual development, general and mathematical abilities, special intuition; independence, curiosity, reaction to frustration, desire for privacy, peculiarities of motivational characteristics, goal setting, self-regulation, self-efficacy, anxiety are often noted (C.H. Solanoa, J.M. Tuia, M.M. Mazzoccobc, V.V. Stetica, V.V. Vidovica, L. Arambasica, 1999, J.R. Malpassa, H.F. O'Neil, D. Hocevar). Often there is a marked specificity of children's achievements, their inextricable connection with the age characteristics and influence of the surrounding company, which is no longer detected in adults (N.S. Leites, J. Freeman, H. Gruber, R. Siegler, K. Kotovsky, R. Stemberg). Traditionally, children's giftedness is treated as a potential, favorable internal conditions of mental development, the possibility of outstanding achievements in the future (B.G. Ananiev, N.S. Leites, A.M. Matjushkin, K.K. Platonov, S. Rubinstein and etc.). Originality of children's and adolescents' achievements is of relative nature and is determined mainly by the degree they differ from the ones that are normal for their age. Conceptual constructions of systemic anthropological approach, developed by the Department of Psychology at Tomsk State University [2], allow us to consider the phenomenon of mathematical giftedness as a systemic personal quality in the context of creative life fulfillment as the brightest manifestation of giftedness, as an individual measure that characterizes transferring their opportunities into reality at specific stages of self-development. It is here that we see the possibility of psychological support for teens, which must be provided by technologically fixed procedure of transferring potential (mathematical abilities), hidden from the learner, into potency, i.e. opportunities that have the power of fulfillment. Such technology should not be manipulative, but of humanitarian character, and be based in its design on a complex understanding of man as a multidimensional and holistic phenomenon [1].

2. Procedure

The strategic objectives of the psychological support program for adolescents with prominent aptitude for mathematics are:

1) actualization of axiological motives of actions in gifted learners: understanding of their own potential abilities; assistance in determining their own goals and recognizing the need to develop and change as conditions of a decent quality of life;

2) actualization and development of self-fulfillment resources, building human ability to amplify the intensity of his activity, going beyond the situation conditions, the ability to self-transcendence, to design environments for their own development, to form conscious values of responsibility, flexibility, creativity, positive psychological attitude (relation to oneself, people and the world), active mental activity;

3) construction of success in life as systemic education that determines motivational readiness to fulfill giftedness potential: finding their own goals and perspectives in educational and socio-economic environment space; definition and development of optimal life strategies and styles of activity, that will provide a guaranteed advance to success; optimizing individual characteristics, goal profiles and methods of their implementation, assistance in finding a balance in social and personal characteristics for self-fulfillment as a process and a result of the implementation of giftedness potential.

The program is built on a modular basis and consists of three main modules (training, diagnostic and reflexive). Each module is organized around specific goals, training activities, which with a special nature of activity and interaction of its participants. Thematically the program depends on the level of development of its participants and their readiness to solve real competition problems, thus each group work on specific themes in the sequence that the group members make actual “here-and-now.” The program involves specially organized cooperative creative activities and dialog interaction of adolescents with each other. The content of program modules allows participants to reflect on and integrate their experience and gain real competences in co-creative
activity. Special attention is paid to analyzing the category of experience and differentiating it into positive/negative and neutral in order to identify conflict and internal contradictory personality trends that are often characteristic for gifted children. Identification of negative experiences and low value readiness in a gifted child will obviously indicate contradictory attitude to situations of success and, consequently, to the implementation of his own achievements potential. Experts record changes that occur with program participants at the end of each module using observation maps and psycho-diagnostic questionnaires as well as sharing procedure (free exchange of impressions).

3. Results

The program was tested at Tomsk State University with 120 teenagers from several regions of Siberia, who were participants of special programs for gifted children. The main criterion of forming the research select query was the presence of quite prominent aptitude for mathematics in adolescents.

In the course of implementation of this program, particularly in its initial stages, a number of psychological characteristics of adolescents were recorded, which can be attributed to evident socio-personal deficits:

1. The greatest difficulties of all gifted adolescents appeared to be concentrated in the sphere of interpersonal interaction. Almost 90% of all participants indicated that they felt diffidence and that “modesty” is an obstacle for them, or, as one participant said, "when modesty is an obstacle – it is uncertainty." Thus, in the process of training, when reflecting on their own and others' resources and deficits (strong characteristics and characteristics restricting their development), some of the participants stated that there were something like two sub personalities in them and some of their peers. "There is a small but determined man who lives deep down inside, and there is a second - external and big one, who is afraid saying and doing something. So far the second one wins…".

2. Increased intellectualization, which is a familiar learning environment for adolescents with prominent aptitude for mathematics (especially when it comes to gifted students, whose system of training is often more difficult than others’), was not needed in this program, which in some way knocked a significant part of the participants out of their "familiar comfort zone." Deep and rich communicative interaction, which was not very comfortable for gifted children, complicated their experience, calling to action a number of defense mechanisms, and interfering with inclusion at the initial stage of training.

3. Manifestations of adolescent dichotomous thinking were also quite clearly recorded in this group. Demonstrating increased discrimination of the preferred and not preferred in the social network, they tend to idealize the preferred partner and emphasize the contrast between themselves and the non-preferred one. All of the above signals the underdeveloped ability to differentiate between the concepts of man and attitude to him. In addition, a significant portion of the research select query made excessive demands to everything: life, the world, partners.

4. It is also of interest that most of the research select query see themselves as expressive, original, intuitive, visionary, independent, rather unruly, nonconformists.

5. Success achievement motivation level in this group is average, as a rule, tending towards low. Avoiding failures motivation is predominant. Adolescents are more focused on controlling the situation and eliminating the potential risks. It can be explained by their general focus on the long-term activity and a weak focus on the present current situation. Skepticism, rather negative emotional background and overall more pessimistic mood are their characteristic traits.

Holography, embedded in the structure of the proposed program, when each of the program modules, being dominant, compulsorily involves the other two, allowed us to take into account problems common for all the learners and psychological deficits, and focus on them in training.
The major psychological and educational effects of testing the program "Actualization of giftedness potential of adolescents with prominent aptitude for mathematics" may include the following:

1. A significant percentage of adolescents participating in the program first found it difficult to present themselves and establish new relationships in the group (most of the participants were not familiar with each other), but then began to feel more comfortable and open.

2. After completing the program, the participants mentioned their positive emotions, new contacts and established relationships in the group; many of them recognized successful exercising of skills necessary for further self-development and personal resources. However, after the first cycle of activities some of the learners expressed doubts about the "necessity of such kind of game formats", wishes of a "more intelligent kind of load", etc. In the majority of cases learners’ questions and doubts disappeared after the introduction of additional exercises in reflection and sharing.

3. The results of continuous diagnostic testing (run throughout the program) indicate that manifestations of cognitive, motivational, creative and leadership activities (the basic components of giftedness potential) increased in almost 70% of learners.

4. Discussion

Summarizing the results of testing of the program presented here (which includes training, diagnostic, reflective psychological technologies), we can state a distinct developmental potential of the program. The developed program is focused on enhancing the existing today various educational forms of supporting general giftedness development in children and adolescents, which are in many cases weakly interconnected, initiated both by governmental (including educational) institutions and funds, and non-governmental. Teaching mathematics to modern learners includes also actualization of axiological motives of actions in learners, understanding of their own potential abilities, actualization and development of self-fulfillment resources as the process and the result of giftedness potential fulfillment. In this regard, the most important social task for the psychology of education today is the development of a system of network psycho-educational provision of continuity and succession of cooperation between various educational institutions prioritizing development of giftedness in children, adolescents and young adults [3]. One of the most promising options of such kind of network cooperation aimed at the development of giftedness in children and adolescents, according to the authors, is the specialized portal, created in the Department of Psychology at Tomsk State University, that provides psychological and educational support of gifted children and adolescents (including those with prominent mathematical aptitude).

References