

Realization of Trends in the Use of the Internet Network in Development of Research Potential of High School Students in Russia

Galina. V. Makotrova, Valentina N. Kormakov, Natalia L. Shekhovskaya,
Arkadiy I. Uman, Tatiana V. Perutskaya and Nadezda G. Tarasenko
Belgorod State University, 85 Pobeda Street, 308015 Belgorod, Russia

Abstract: The research presents theoretical and experimental grounds of the tendencies of the internet network use in development of high school student's research potential in conditions of subject oriented education in a Russian school.

Key words: Tendencies, research potential, internet network, high school students, experiment, theoretical grounding

INTRODUCTION

Now a days the main task is to develop personal qualities which reflect meaningful value of research, value of creation and use of situations of uncertainty. In a situation of uncertainty the following abilities are required: the ability to build more complex hierarchical structures of their own activity in complicated multifactorial environments, ability to combine, ability to argue in terms of causal nets, ability to forecast nonlinear dynamics, ability to build optimal management strategies in real time mode and etc. Therefore high school student's research potential is one of the guidelines for development of Russian school.

MATERIALS AND METHODS

Use of information and communication technologies is a tool of dramatic improvement of educational process management and a powerful factor of intensification of research potential development processes of high school student's personality in Russian schools (Andreev, 2003). With the help of measurement of individual research potential manifestations we suggest evaluation of tendencies of use of the internet in cognitive activity. Research potential of high school students is characterized here by a number of criteria, the sum of which reflects the unity of developed inborn properties including intellect, sensitivity to situations novelty, research activity, communicativeness as well as the system of scientific knowledge about the modern world and an individual in it, ability to carry out cognition, axiological attitude to its results. Hereto we relate motivation to research, creative activity, scientific style of thinking and technological readiness to receive new knowledge.

In the search for tendencies we proceeded from the of "tendency", the set of requirements to the leading tendency formulated by Postaliuk (1993) (leading tendency should determine all other, more specific tendencies; define common structure of theoretical basis, its categorical structure; determine techniques and methods of research; preserve integrity of pedagogical activity) (Branch, 2003).

Search for tendencies in the internet use in development of high school student's research potential was carried out on the basis of different combinations of the complex of leading tendencies in individual research potential development which were defined by Isaeva N.I. (humanization, congruence with culture and nature) (Falk and Blumenreich, 2005) adding to leading tendencies in development of high school student's research potential signified for subject-oriented education (professionalization and democratization) and leading tendencies in the internet use in order to define those which correspond at most to the purpose of high school student's research potential. Definition of leading tendencies in individual research potential development (humanization, congruity with culture and nature) is related to the fact that in theory and in practice of Russian education there is a gradual change from technocratic paradigm of rationalism to humanistic, anthropogenic paradigm of congruity with culture and culture creativity. Now a days, the educational guideline is development of the personality, its potential which is directed to the future and alongside with solution of actual problems of social and professional objective reality of a person it is targeted at a person's life perspective, defines his/her ability to creative perception and creative solution of newly occurring vital tasks, prepares future transformations of his/her personality. Tendency of humanization lies in orientation of any

research activity on development and self-development of the personality, in admission of its self-esteem, in creation of conditions for its self-realization. Humanization in process of individual research potential development confirms polysubjective nature of educational process while the research culture of an individual becomes the substance of it.

Tendency of congruity with culture is that the process of the individual research potential development is usually proceeded through comprehension of other cultures and is regarded as exposure of an individual to different values of society's culture and civilization in the whole. Tendency of congruity with culture is realized in the contents of individual research potential development in conditions of formation of environment of science-based congruity with culture and culture creativity that provides everybody with an opportunity to apply their forces, creative abilities; to meet their interests; to find an appealing atmosphere for communication, humanist attitude on the part of adults and peers.

Tendency of congruity with nature in development of the individual research potential makes oneself evident in the fact that development process of the individual research potential is considered in accordance with general laws of development of nature and a human being. Now a days, emerging technologies of the individual research potential development are coherent with learner's possibilities to conduct research activities with their age peculiarities, their physical condition as well as with social and cultural conditions nowadays. In theory and practice of research potential development congruity with nature is also considered as preservation of psychic and physical health of learners and their emotional wellbeing.

Tendency of professionalization in student's research potential development in conditions of subject-oriented education implicates connection between academic researches and production as well as conditions of obtaining technology intensive professions and student's professional orientations; connection with scientific centers (while carrying out complicated academic and scientific researches), democratization-widening and deepening of student's researches which reflect life of society, solution of social problems; development of cooperation in conditions of cognition. Criterion of distinguishing the tendencies of the internet use in individual research potential development were developing didactic properties of the internet defined by Andreev A.A. (publications of learning and teaching materials in hypermedia variant; pedagogical communication between subjects and objects of a teaching situation in real and postponed time; open in time and space remote access to information resources)

(Julien and Barker, 2009). well as components of a high school student's research potential (motivation to research, technological readiness to research, scientific style of thinking, creative activity) (Makotrova, 2012).

RESULTS AND DISCUSSION

Analysis of combination of leading tendencies of the internet use in education including subject oriented education and leading tendencies of a student's research potential development enabled us to define the following tendencies of the internet use in high school student's research potential development: cooperation and collaboration in research activities; information support of solution of research problems; teaching what methods and technologies to use to carry out research; granting freedom in research; pedagogical support of research (Makotrova, 2012).

Distinguished tendencies of the internet use in high school student's research potential development are reflected in results of our experimental researches. Thus, on the basis of the analysis of the survey of school officials of 21 general education institutions, of the results of experimental work in the municipal educational institution "Secondary school with enhanced studying of particular subjects" in Graivoron, of the materials of other psychological and pedagogical researches we acquired dataset which allows to evaluate the objectivity of the defined tendencies of the internet use in high school student's research potential development.

Results of school official's rating of the degree of manifestation of the internet use tendencies in high school student's research potential development showed that the degree of manifestation of the distinguished tendencies of the internet use expressed in the ranks value, in teacher's opinion, is as follows: pedagogical support of researches with the help of the internet (3.5 points), teaching what methods and technologies to use to carry out research (3.4 points), information support of solution of research problems (2.9 points), granting freedom in research (2.7 points).

Study of dynamics of the internet use in development of research potential by high school students also allowed justifying the defined tendencies experimentally. Existence of tendency of cooperation and collaboration in research activity was proved by positive dynamics (25-50%) for the period of 2005-2010 of the following manifestations of indicators of teacher's scientific and methodological readiness to use the internet in high school student's research potential development: organization of student's reflection in research work,

preparing students for working in the internet, provision of opportunity for students to choose a text on the basis of which problematic situation will be build, forecasting support of students in research planning and its carrying out with due regard to the internet capacities, teaching methods of cognition in course of research with due regard to the internet capacities.

Existence of tendency of information support of research problems solution proves high level of positive dynamics (30-60%) for the period 2005-2010 of the internet use by teachers of the experimental school while planning cognitive tasks and questions on the basis of the internet materials, while collecting information about conferences, contests and grants, during systematic work with information on issues chosen by students in course of advanced study of subjects.

Increase in the internet use while teaching what research methods to apply, including the use of program internet complexes which allow practicing methods and techniques of research conducting as a tendency of the internet use in high school student's research potential development has no such high rate of development. But the data of the survey of the experimental school teachers show the increase in the internet programs use by 10-30% for the period of 2005-2010 which provides modeling processes, animation images making, didactic games which enable to control dynamics of processes being studied, to build algorithms of research conduction.

Tendency of granting freedom in research activity is represented here by quantitative and qualitative results of high school student's participation in research with the help of the internet. Thus, from 2005-2010 in the experimental school MEI "Secondary school with enhanced studying of particular subjects" in Graivoron as a result of active use of the internet in research activity there was a growth of cognitive needs specter among education process participants in the internet use while solving creative cognitive tasks from 16-76%. In 2004-2005 academic year the number of all-Russian competitions and Olympiads winners made up 1.2% of total number of students including distant Olympiads 0.9%, in 2009-2010 academic year the number of international academic competitions was 7.6% of total number of students, all-Russian competitions and distant Olympiads winners -4.7% of total number of students, regional competitions winners -1.7%, all-Russian distant Olympiads and subjects competitions -7.4%. The fact that this dynamics is going to grow is supported by the data on the internet use in different competitions and Olympiads by secondary school students and primary school students in 2009-2010 academic year: 26.1% of

students of total number of secondary school students participated in international competition in Maths "Kenguru", 7.2% students of total number of secondary school students participated in all-Russian competition in Russian language "Ruskiy medvezhonok"; 26% of students of total number of secondary school students participated in International Olympiad in Foundations of Sciences, 10.5% of total students number of secondary school students participated in Moscow International Forum "Odarennyye deti", 9.5% of students of total number of secondary school students participated in all-Russian competition "Poznaniei Tvorchestvo", 50.4% students of total number of primary school students participated in International competition in different subjects of primary school "Erudite-student's marathon"

Results of related researches also showed the existence of the defined leading tendencies of the internet use in high school student's research potential development. Thus, tendency of information support of solution of research problems is proved by the following data of Conception of Federal Target Program of Education Development for the period of 2011-2015: number of visits of web portal of Federal Center of Informative and Educational Resources increased from 47.000 per month in 2008-173.000 in 2009; since 2006 over 52.000 Russian schools have obtained access to the internet.

Tendency of cooperation and collaboration is supported by positive dynamics of high school student's participation in different internet programs which enable to create collective cognitive products. In 2006 there were 1358 participants in creation of hypertext encyclopedia Letopisi.ru among students, in 2011- 46460 participants.

Tendency of pedagogical support of research conducted with the help of the internet may be proved by the example of visiting Center of Virtual Education "Eidos". In 2001 daily number of visits to this center was 1027, in 2011-over 4000 visits per day. On website of this center we can observe the dynamics of variety of ways of pedagogical support of research. It is also known that the number of teacher's personal sites is growing day by day and some of them reflect teacher's pedagogical support of educational research.

Tendencies of teaching what methods and technologies to use to carry out research including the use of programmed internet complexes which enable to practice methods and techniques of research conduction has no quick growth rate yet. But it is proved by positive dynamics of introduction of interactive resources of high complexity which enables to implement different

methods of search activities. Contents of the above mentioned processes are represented in the researches of Ivanovskiy R.I., Karpov Y.G., Tormozov V.T., Traynev I.V., Khristochevskiy S.A.

Tendency of freedom in research is illustrated by a great number of educational websites which provide students with an opportunity to implement educational search in different ways including the one under supervision of leading scientists. Among them we distinguished websites in the form of scientific magazines for young people, nonfiction websites, "Global School Laboratory" website, websites of leading higher education institutions and others. Dynamics of their use is reflected in works of Kondakov A.M., Semenov A.L., Fialkov T.A., Stanchenko N.S.

Realization of a number of the distinguish is his tendencies in the internet use in high school student's research potential development is reflected in works of foreign authors. Tendency of cooperation and collaboration in research activity; tendency of information support of solution of research problems (Makotrova, 2012) tendencies of teaching what methods and technologies to use to carry out research. Tendency of granting freedom in research work [10]; tendency of pedagogical support (Purcell *et al.*, 2012) are considered.

CONCLUSION

Thus, all the defined leading tendencies of the internet use in development of individual research potential (cooperation and collaboration in research activities; information support of research problems solution; teaching what methods and technologies to use to carry out research; granting freedom in research activity; pedagogical support of research work) were grounded theoretically and experimentally.

In the course of the study we theoretically substantiated and experimentally confirmed the following leading tendencies in the use of the internet in development of research potential of high school

student's personality: cooperation and collaboration in research activities; information support of research problems solutions; teaching methods and technologies to be used to carry out research; providing freedom in research work; pedagogical support of research work. Knowing the tendencies in the use of the internet in development of high school student's research potential it is possible to foresee, design and adjust various phenomena and processes of its development.

Theoretical and experimental validation of the internet in individual research potential enables to consider hereafter the manifestations of cause-and-effect relationships reflecting the impact of the internet use on the development of separate components of a high school student's research potential, to distinguish the effect of the use of the tendencies in various pedagogical practices of teaching, didactic and educational systems, to develop the pedagogical principles of the internet use in the development of high school student's research potential for the most optimal and effective implementation of the appropriate educational technologies.

REFERENCES

- Branch, J.L., 2003. Instructional intervention is the key: Supporting adolescent information seeking. *School Libraries Worldwide*, 9: 47-61.
- Falk, B. and M. Blumenreich, 2005. *The Power of Questions: A Guide to Teacher and Student Research*. Heinemann Company, UK.,.
- Julien, H. and S. Barker, 2009. How high-school students find and evaluate scientific information: A basis for information literacy skills development. *Library Inf. Sci. Res.*, 31: 12-17.
- Makotrova, G.V., 2012. *Use of the Internet Network in High School Student's Cognitive Activity: Culturological Approach*. Publishing House, Belgorod, Russia, Pages: 312.
- Postaliuk, N., 1993. *Didactic system of development of creative style of student's activity*. DS Thesis, Kazan Federal University, Kazan, Russia.
- Purcell, K., L. Rainie, A. Heaps, J. Buchanan and L. Friedrich et al., 2012. *How teens do research in the digital world*. Pew Internet & American Life Project, USA.