Chapter 21

WHAT DO WE NEED FOR QUALITY EDUCATION:
The introduction of collective reasoning into the educational process and pedagogy of the future

Alla Vasilievna Guseva[1], Ekaterina Kozina[2], & Olga Nikolaevna Kapelko[3]
[1] *MIREA, Department of Artificial Intellect, Russia*
[2] *EU Research Office, UCD Research and Innovation, University College Dublin, Ireland*
[3] *RANEPA under the President of Russian Federation, Department Project Management, Russia*

ABSTRACT
The pedagogy needs to realize a strategic goal of the education of human being. If we pose a question – is a person just a small part of a social mechanism that has to be equipped with the necessary special competencies to conform to its place or; should the personality be in harmony with his/her abilities when using their abilities and skills for the benefit of the society? The answer to this question lies in the understanding of the ways of a progress of pedagogical process. We argue that the progress of the development of educational systems is possible through the understanding of how individuals reason and think. We are using special model of thinking created to help to develop the educational process. At the basis of the argument, pedagogy has always been and will be a socially-relevant science. Physiological, psychological and intellectual parts are always interlinked in the upbringing, formation and education of the student. These experiences collectively lead to the development of an intellectual activity and assist a better societal socialization and adaptation. Today the evolution of the humanity happens so rapidly that with each year's new complex demands are being placed on graduating students to obtain new qualities: constant readiness for change, lifelong-learning skills, the ability to adapt quickly to the changing environment and some degree of professional experience.

Keywords: quality of education, personality model, quality of educational process, pedagogy, development of students' cognition, informational code of thinking/reasoning.

1. INTRODUCTION

For in-depth understanding of the opportunities for effective teaching and learning we are using a newly developed model of brain/mind in its functioning during the education process in the classroom. The idea of such model goes back to Plato according to his concept of a three parts of human soul. According to Plato in the *Timaeus*, reason or thinking soul is located in the head, spirit or emotional soul located in the top third of the torso and, the appetite or acting soul id located in the torso down to the navel. The division of the abilities of a human on mental, emotional and physical parts was quite a common practice at times of Neoplatonism. Using the same idea of division abilities in three parts and adding introvert and extravert behaviour as an activity and reflection gives us 6 main types of personality of students (in terms of ability to perceive information during the learning process). It provides us with the different abilities of individual learning styles as we can continue this process and develop and adopt different educational strategies for various types of students in regard to how they comprehend educational material (Guseva, 2011).

The quality of the education then can be assessed by methods and models of educational approaches which are used in practice. The use of this idea let us increased the quality of education, we also utilised a number of complex systems of monitoring the educational process and testing results and outcomes of studying and learning with special tests of personality/ability to comprehend the information. In practice for effective monitoring of educational process these tests can be conducted twice a year. According to our model of human mind every student (and individual) has his natural information code of thinking. But the question we can pose is – how this principle can be applied within the educational context?

2. BACKGROUND

In our research project we have studied education from the perspective that education is one of the fundamental parts of the processes of dynamics of the social processes in the world. The research project was entitled: Interdisciplinary investigation of the global processes of social foundations and of new paths for finding solutions to the global problems of Russian Foundation for Basic Research. Our research attempts to answer a global challenge that demands an increase in the quality of education.

2.1. Methods

The tools that have been used in our research work included: extensive review and analysis of social and educational policy documents, the data and findings of the mathematical modeling of global processes, and mathematical modeling of educational processes in specific situations, as well as developing teaching and learning methods and strategies for the different types of personality and students' cognition. At the basis of our work is our developed theory of students' thinking and ability to comprehend information. We have developed and employed individual learning styles for our students according their type of thinking. The empirical work on which the study is based was carried out in two schools in Moscow (both at primary and second level classrooms) as part of the pedagogical experiment.

This work was carried out in two schools in Moscow in the period from 2007-2011 with a number of classes. The research used specifically designed questionnaires through which the type of thinking/informational structure of the brain of each participating pupil was identified. The analysis of collected data was carried out and special recommendations in relation to the development of individual learning plans were given to pupils, teachers and parents. As a result of students' participation in research the attainment levels of students have improved, while their communication skills have also advanced.

2.2. General aims

Our aim was to explore the possibility of the creation in pedagogy and education of such approaches to teaching and learning which would optimally correspond to the informational structure of the active brain of the student and, as such, allow optimising all processes of education in primary and secondary school.

The focus of our research was to assess the extent of the development of students' cognition at any point of time by a specially designed questionnaire. We then also suggested a number of individually tailored techniques to advance students' cognitive development.

3. COGNITIVE MODEL OF ACTIVE BRAIN

The three-dimensional model of the macrostructure of the active brain of a pupil according to its functions has been identified in the process of the research work carried out in two schools in Moscow in the period from 2007 to 2009. The functions of the brain were defined as following: perception (recognition) of the information, an estimation of the content of information and the response to this information. As such, the developed model accordingly represented three interrelated parts. Testing of each of the parts and estimation of their work is carried out with the help of specially developed questionnaires. It is believed that on the basis of such testing, the abilities and learning preferences of individual students can be identified. One of the benefits of this approach is opportunity to group and stream students according their abilities. It is recognised that students' development in school should be in harmony with his/her abilities and characteristics. So the developed approaches allow to observe the development of each of the parts of the informational brain of a student so that the 'part' which deemed to be behind the development appropriate to the age of a student, could receive as much attention as possible through assigning creative project work in the classroom or by getting involved in a group work. The paper discusses the ways in which the developed approaches can be beneficial to education at the school level (primary and secondary). Among those are: a better adaptability to changing settings of the classroom, all-round development of students at any stage of their learning without the dependency on the effects of their previous educational experience and their attainment levels (Guseva, 2011).

As such using the principle of student critical thinking, it is possible to implement a new approach to the styles and process of learning. This approach allows us to develop a collective mind in the classroom. In the process of self-education and in the collective search for truth which is based on the goals and objectives of the lesson, the students themselves can organize the collective thinking. The system of "student - teacher" becomes inner-direct, i.e. the collective sphere of thought and all the events that occur during each session will also be in a process of collective thinking. Thinking has its own laws and in the classroom students will work together to seek the truth as it makes everyone think individually. This method allows us to make the pedagogical process more natural.

Education is a process by means of which a teacher instructs "What is it?", "How to use it?" and "Why should I know it?" These are the major questions we ask ourselves during our lifetime and which are asked in our minds. These questions became the base for questionnaire we used for testing students (Guseva & Genin, 2010). The process of teaching and learning – in more general terms is the process of teaching of "what is this?", "what is this for?" and "for what do we need to know that?". These are also the main questions which we ask through all our life when learning about the wider environment and society. These are the main questions which our reasoning/intellect wants to know.

4. THE QUALITY OF EDUCATION

When defining the quality of education as a concept, an educator is guided by an ultimate aims of the education that is to contribute to the education of individual student and the formation of society as a whole.

It can be argued that any teaching and learning process has two aspects: First aspect refers to i) the content of teaching and learning and, the ii) level of teaching and learning (what teaching methods are used). Second aspect: we need to know how a student is able to

understand the material – both in relation to the content of the material (what he/she already knows) and the capabilities of his/her reasoning (informational thinking).

Conceptualising reasoning/thinking in that manner allows detecting individual thinking formula for each individual student. The information structure of human thinking allows determining a specific natural information code of thinking, because each student thinks individually. According to the nature of human mind every man has his natural information code of thinking, which may serve as the basis for the educational process.

The results of our research work indicate that the model of the mind of each student (and any individual in general) consists of three parts (in the informational sense). These three parts are interconnected (Guseva, 2002a):

- Firstly, this is the physical mind we inherit in a genetic sense;
- Secondly, this is also a mind we develop throughout our lifetime. This mind we can call our thinking mind or also an intellectual mind. It also consists of our memory. And it's macrostructure represented by three interrelated parts – reason, sense/meaning and will.
- Thirdly, this is consciousness, which represents a psycho–physical field, in which the process of reasoning/thinking takes place. The results of the processes in this field have the potential to change/develop.

According to our model each individual has his/her own natural 'thinking formula', which can be used in the teaching/learning process. Individual thinking formula (three dimensional), defines the nature of the individuality of the student more precisely than any other characteristics. The thinking formula can be defined by the specially designed questionnaire. It is not within the scope of this research paper to give more details on the questionnaire, but we are aiming at producing more publications in the future. Despite this, we would like to add that this questionnaire is a unique, tested methodological and distinct tool which has no connections with the psychology of individual. Psychology looks at the motivations behind the actions. Our particular approach defines a naturally developed formula of the informational thinking of an individual.

Further, to assist us in effectively managing/administering research work and knowledge, it is possible to build a student information page, which is a multifunction system of a student features, which should consist of individual fields. Each field will show individual information on the following indicators (Guseva, 2002b):

- Short summary of the student details (we this information the student fills in himself/herself);
- The information about the student by their parents (optional);
- The information about the student by his teachers (usually by 2-3 teachers);
- The definition of informational code of thinking/reasoning;
- Assessment of the student through psychological tests;
- Tips for a teacher: according to the tests - questionnaires; by psychologists; generalized recommendations;
- Tips for parents/guardians.

The task is very big and responsible and of course will require monitoring as part of psychologists, educators, IT-workers, and the students/pupils themselves, but importantly, time is required for this exploratory process. In order to get an overview of the development of students at different grades, we can obtain and compare the results across different classes in the same school. In effect, this will show us the scope and the extent of the development of students' thinking across different age groups and classes.

5. FUTURE RESEARCH DIRECTIONS

On the basis of the techniques of the identification of the informational structure of the brain/thinking of each individual student/pupil, the abilities and learning preferences and styles of pupils can be better understood, while the appropriate curriculum content selected and individual learning plan can also be devised for the students. One of the benefits of this approach can be grouping and streaming of pupils according to their abilities, as well as a better understanding of the subject content and its meaning, and a better formulation of the ideas and questions by the students themselves.

These novel approaches also assist the educators to better the attainment of the students, increase students' motivation to and interest in school and learning in general, improve communication skills and better rapport with teachers and even their parents.

The new techniques and approaches to education can be useful in improving the understanding of the subject content and its meaning, and better formulation of the ideas and questions by the students themselves (Kapelko, 2009).

6. DISCUSSION/CONCLUSION

The chapter discussed the conceptual and theoretical foundations of the empirical work carried out in two schools in Moscow (both at primary and second level classrooms). According to our model of human mind every student has his/her natural information code of thinking, which may serve as the basis for the educational process. We are interested in this model of particular structure of human brain, as it can build a new pedagogical theory for the future which relates not only to the ordinary realities of social life but to any school, any institution and any educational establishment which corresponds with the cooperation among students and, which is most important, to the development of a student himself/herself. The individual natural information (triadic) code indicates the informational structure of his/her thinking and cognition more accurately than any other classification system.

We argued that in the first stage of human intellectual activity development, the active development of *reason* takes place. In the second stage of mental activity development, the *will* mainly develops. In the third stage of intellectual development, the all-round development of personality, *the sense making and understanding* mainly develop.

Our research work in the area shows that a new model of education provides for the designated purposes of education to introduce the definition of critical thinking activity of students (Kapelko, 2009; Kapelko & Malinetskii, 2014). It aims to help teachers to better understand their students and to produce the most impact of their discipline. According to the function of the structure of the active brain conceived tests - questionnaires, this will build macrostructure of the reasoning and informational code and structure of thinking.

The paper concluded with a number of suggestions for further research and the remark that the progress of any society is always reflected in the extent of development of its educational systems (primary, secondary and higher education).

In the conclusion we would like to add that the main task of the education for today is the education of students to become participating members of the future society, while the task of the schools and educational systems in general is to direct such development in a best way possible. Importantly, we would like to stress that the aim of any pedagogical process is the desired end result of education and orientation on the future. This has to be accompanied by the all-round development of an individual's intellect and personality.

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AUTHOR(S) INFORMATION

Full name: Alla Vasilievna Guseva
Institutional affiliation: MIREA Moscow Institute of Radioelektronic and Automatic (TU)
Institutional address: Prospect Vermadskogo street 78, Moscow, Russia
Biographical sketch: Dr. Alla Vasilievna Guseva has graduated from National Research Nuclear University MEPhI (Moscow Engineering Physics Institute) in 1961 and had postgraduate course from Moscow Institute of Publish Administration name after Sergo Ordgonicidze in 1967- 1973. Since 1980 she is working in the Moscow Institute of Radio Electronic and Automatic (MIREA). She has undertaken numerous projects focused on education and philosophy of education for more than 20 years.

Full name: Ekaterina Kozina
Institutional affiliation: AHSS (Arts, Humanities and Social Sciences) EU Facilitator, EU Research Office, UCD Research and Innovation, University College Dublin
Institutional address: Belfield, Dublin 4, Ireland
Biographical sketch: Dr. Ekaterina Kozina is an AHSS (Arts, Humanities and Social Sciences) EU Facilitator, in EU Research Office, UCD Research, University College Dublin, Ireland. She was previously a Senior Administrative Research Officer in the Graduate Studies Office (2013-2014), Dublin City University; and a Strategic Innovation Fund Postdoctoral Researcher (2011-2013) in Higher Education Research Centre, in DCU where she contributed to several research projects. She obtained her PhD from the School of Education in 2010 in Trinity College Dublin.

Full name: Olga Nikolaevna Kapelko
Institutional affiliation: RANEPA (Russian Academy of National Economy and Public Administration under the President of Russian Federation)
Institutional address: Prospect Vermadskogo street 82, 84 Moscow, Russia
Biographical sketch: Dr. Olga Nikolaevna Kapelko is Assistant Professor of Russian Academy of National Economy and Public Administration under the President of Russian Federation (RANEPA) and international expert of UNFPA UN Nations. She has graduated from Moscow Institute of Chemical Technologies named after D.I. Mendeleev in 1987 and had postgraduate course from Russian Academy of Publish Administration in 1996-1999. Since 1999 she is working in the Academy. She has took part in projects connect with making decisions in certain condition and educational researches.