Developing Creativity and Large Mental Outlook in the Computer Age: 
Introduction to the Special Issue

Vladimir A. Fomichov
Professor of Computer Science and Cognitive Science
Department of Information Technologies
K.E.Tsiolkovsky Russian State Technological University
Orshanskaya str. 3, 121552 Moscow, Russia

In August 2000, the First International Workshop "Developing Creativity and Large Mental Outlook in the Computer Age - CLMO'2000" was held in Bergen, Norway. The workshop was a part of the 7th Conference of the International Society for the Study of European Ideas (ISSEI2000) "Approaching a New Millennium: Lessons from the Past, Prospects for the Future" (The University of Bergen, Norway, August 14-18, 2000; Website http://www.uib.no/issei2000). The conference ISSEI2000 was attended by over eight hundred scholars.

This Special Issue contains eleven articles being modified and extended versions of the papers presented at the Workshop CLMO'2000. These articles were selected after a rigorous reviewing process with the participation of the experts throughout the world; the published final versions were prepared with respect to received constructive comments of the reviewers. The initial versions of all articles from this Special Issue are published by the HIT Centre of the University of Bergen in the ISSEI2000 CD-ROM Proceedings.

The purpose of the workshop was to contribute to the progress of education in the world by means of creating a new synergy between the specialists on Cognitive Science, Philosophy, Education Theory and Practice, Artificial Intelligence, modern Computer and Information Communication Technology.

The Workshop CLMO2000 evoked a large response in the world. As a result, 25 interesting presentations from Australia, Belgium, Canada, France, Greece, Italy, Jamaica, Japan, New Zealand, Norway, Romania, Russia, United Kingdom, U.S.A. were included into the Preliminary Programme of CLMO2000 (Workshop 511, Section V on European Education of ISSEI2000). 21 papers and one videofilm about a new approach to positive developing children's intelligence and creativity were presented at the workshop (Australia, Canada, France, Italy, Japan, Norway, Romania, Russia, United Kingdom, U.S.A).

This Special Issue is opened by the article 'Addizionario: a Pupil's Innovative Tool for Language Learning' prepared by G. Turrini, L. Cignoni, A. Paccosi (Pisa, Italy). The subject of this article is the development, the activation of children's linguistic skills with the help of a hypermedia linguistic laboratory called "Addizionario" and aimed at the study of Italian either as the mother tongue or as a foreign language. The system "Addizionario" is destined for (a) the pupils of primary schools, who can study language in a pleasant and appealing manner; (b) their teachers, who receive the possibility to prepare didactic materials, and (c) lexicographers, who can use the material produced by children for creating better and more attractive young learners' dictionaries.

In the paper 'Fostering Cartoon-style Creativity with Sensitive Agent Support in Tomorrow's Classroom', B. Cooper and P. Brna (Leeds, England) describe some aspects of an international project (Portugal, Germany, England) aimed, in particular, at encouraging literacy and creative writing by means of marrying cooperative technologies with intelligent ones, such as "anthropomorphic" agents. Children are being taught to share and jointly create multimedia stories, exchange ideas, text pictures and sound. A particular accent is made on developing the abilities to create cartoon-style stories using picture, sound and text with the help of an agent.

O.S. Fomichova (Moscow, Russia) in the article 'A Principal Cognitive Precondition of Successful Child - Computer Interactions in the Information Society' highlights some negative aspects of too early, intense, not restricted interaction of children with computers; the principal standpoint is cognitive preconditions for the complete realization of children's creative potential. The first central idea is that the systematic development of children's reasoning abilities, teaching children to appreciate the work of their own brains has much in common with successful (in the long-run perspective) introducing children to computers. A hypothesis about what is the principal cognitive precondition of introducing children to work with computers is put forward. For this, the notion of 'Thought-Producing Self' of the child is introduced. It is stated that the System of Emotional-Imaginative Teaching based on the 'Theory of Dynamic Conceptual Mappings allows for realizing the 'Thought-Producing Self' of each normal child between the ages of seven and nine.
In the second part of the article it is described how the new system of teaching helps to make easier for children their social adaptation. This part deepens the popular recent theory of J. Searle, one of the creators of the speech acts theory, about the construction of social reality by means of symbols (the role of symbols is played by words and various conventions). The final part of the article contains the idea of designing computer games of a new class: those supporting and developing in children the love to the nature, the understanding of the nature, the desire to communicate with the nature.

In the paper 'ICT to Train Students towards Creative Thinking', M. Allegro, A. Chifari, S. Ottaviano (Palermo, Italy) analyze the experience of stimulating creative thinking of secondary school students through the use of Information Communication technologies integrated into the curricular activities. In particular, it is described how multimedia systems and online resources are used for creative writing. The article 'Genetic Algorithms as an Aid to Learning the Art of Melodic Composition' by M.Towsey, A.Brown, S.Wright, and J.Diederich (Brisbane, Australia) pertains to the field of computer-assisted music composition; it sets forth the use of genetic algorithms for developing the creativity of secondary school students by means of helping them to extend musical melodies.

E.Morreale (Pisa, Italy) in the paper 'Integration of External and Internal School Activities: Support from New Technologies’ describes an interesting way of using new technologies for integrating external activities of school studies (e.g., visiting museums or national parks) and traditional school activities. The analyzed experience was obtained on a broad spectrum of applications (historic buildings and architectures, on one hand, and natural fauna and paleontology on the other).

The qualification of the teacher, his/her acquaintance with modern methods of teaching and educational technologies has a key significance for the success of teaching/learning process. The article ‘A Distance Ecological Model for Individual and Collaborative-learning Support’ by T.Okamoto and A.Cristea (Tokyo, Japan) describes a new framework for teachers' education in the coming computer age. The paper gives an outline of a Distance Educational Model called RAPSODY and helping teachers to acquire computer communication literacy. This model is implemented as a networked virtual learning environment based on a three-dimensional representation, with the axes pertaining to: (a) subject-contents, e.g., “information”, (b) teaching knowledge and evaluation methods, and (c) learning and teaching media (forms). The system rationale is shown, and the architecture of the 3D-representation model training system is explained.

G.Marshall (London, England) in the paper 'Creativity, Imagination, and the World-Wide Web' builds a conceptual bridge between the new, very quickly progressing field of Electronic Commerce (E-commerce) and Web-based education. The main idea is the creative use of the Web for the design of various environments for education. The article 'A Knowledge Based Navigation System with a Semantic Map Approach for Exploratory Learning in Hyperspace' by M.Kayma and T.Okamoto (Tokyo, Japan) just describes a framework which seems to be useful for the realization of some ideas stated in the preceding paper. This framework is destined for supporting exploratory learning based on the knowledge on semantic similarities of the nodes of a hyperspace.

A.Cristea and T.Okamoto (Tokyo, Japan) in the paper 'Object-Oriented Collaborative Course Authoring Environment Supported by Concept Mapping in MyEnglishTeacher' set forth the principles of constructing an authoring environment for upgrading courses of the English language; this environment is destined for multiple authors collaborating via a distance education system. The authoring is supported by the concept mapping paradigm, it allows for extracting the concepts from the keywords of the individual course building bricks (or subjects). The mapping of concepts involves their manual and automatic linking.

The final paper 'Old and Current Techniques in Secondary School Teaching: the Eratosthene's Measure' by G.Tropiano, L.Caiani (Montecatini Terme, Italy), A.Gailhanou (Bayonne, France), and S.Skogvang (Oslo, Norway) describes an interesting international project. The essence of this project consists in reproducing the famous experiment of Eratosthenes, who measured the terrestrial meridian more than 2200 years ago; wonderfully, the distinction between his results and modern results is only 0.8 percent. This project convincingly shows that in developing creativity and broad mental outlook of the young generation, computers are to be considered only as useful assistants, and a lot of fruitful work can be fulfilled even under the condition that a school has not so much computers or these computers are not so up-to-date as it would be desirable: the primary thing is the creativity of people working with children.

Both the Guest Editor and the authors of the papers thank the anonymous reviewers for their time and work in ensuring the quality of this special issue.