

ICT in the Bulgarian Primary School

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Abstract

This report presents the development of the idea of introducing information technology in Bulgarian schools in its complexity and its realization in the sphere of primary education. It describes its historical development over the past fifteen years. ICT in Bulgarian schools is a separate discipline with its own curriculum and teaching time. The new medium makes possible a project oriented approach with an emphasis on creativity. How this is achieved is described.

Keywords

ICT, national curriculum, primary school, creativity, history, outcomes

INTRODUCTION

This report presents the development of the idea of introducing information technology in the Bulgarian schools in its complexity and its realization in the sphere of primary education.

The development of ICT in Bulgarian primary schools may be contrasted with the English approach. In that jurisdiction ICT has been taught, or caught (Cartwright & Hammond, 2007) within the existing curriculum framework by using computers in the classroom. English practice has been well documented since 1988 when, for the first time in a hundred years, a national curriculum was introduced. The place of ICT has been uncertain. There was debate as to whether it should be a subject (Graham & Tyler 1992) or not. The classroom integration approach was the result. This was maintained in the 1999 Millennium revision (QCA 1999) and that of 2010 (QCA 2010). By this stage considerable controversy had arisen over the status of ICT in school. Alexander (2010) had focused on information and communication and saw it a part of the language curriculum. Rose (2009) viewed it as a skill for life and learning. Furber (2012) argued for rigorous computer science from the end of primary school. In response (DfE 2012) the government released primary schools from ICT programmes of study and allowed them to develop their own curriculum.

In the 2013 draft proposals for the English national curriculum (DfE 2013) the Furber recommendations have been adopted and Computing is introduced as a subject for children of all ages. There are implications in these proposals for competency in the use of 'the computer' as a medium. The attainment targets are not achievable in the absence of reasonable mastery of the computer as a medium. Competence with a keyboard is nowhere specified, neither is the use of any of the common tools. The curriculum for the English language, for instance, only requires handwriting. That for mathematics specifically refers to pencil and paper columnar addition and treats the computer very circumspectly, leaving its use optional once children have memorized number facts. Capability with the computer as a medium is

implied but systematic teaching to achieve this not specified. This contrasts with the detailed prescription in traditional areas where practice, as the introduction to the mathematics curriculum states, has developed over the centuries and method is well established. For the new medium, where tradition does not exist and guidance is necessary, help for teachers and children is conspicuous by its absence.

The Bulgarian approach has been very different.

THE BULGARIAN NATIONAL CURRICULUM

In 1998 the first national strategy for ICT in schools was devised. It was decided that all students, by the end of school, must have a general knowledge about computers and skills in using ICT. It was felt that this would help to:

1. Provide better professional opportunities.
2. Improve teaching in other school disciplines by using ICT in the lessons.
3. Develop the ability to think independently, work in a team, and critically evaluate the outcome of their activity.

Analysis of the situation at this time showed that there were qualified teachers and computers only in the Gymnasium. Only the students from the 9th to the 11th grade had an official ICT curriculum with regular, organised lessons. Most schools do not have a permanent, free, Internet connection. From this point of view much needed to be improved in the school system.

The recommendations for the next 6 years were:

1. To make more special ICT computer rooms in the schools
2. To provide permanent, free Internet connection for schools
3. To train teachers to teach ICT in all school levels
4. To make a curriculum framework for the lower school levels
5. To support the curriculum with textbooks and software resources
6. Within the curriculum framework the schools will be free to choose how to teach ICT in the primary and secondary levels

Primary school needed the greatest attention. The strategy recommended that ICT teaching must begin from the 1st grade and continue without break to the 11th grade. To make this possible the Ministry of Education would organise the writing of a curriculum framework, with textbooks and software for primary school. This was undertaken by the author, a primary school teacher with experience of teaching ICT, and a secondary colleague with a computer science background. Both had experience with Logo.

First primary school ICT curriculum 1998

Information technology teaching in the primary school aims at making the children aware of the computer culture which is now forming a significant part of the modern person's technical culture. Such teaching should provide for the children's safe, flawless and reasonable introduction to modern technologies.

Its key objectives are:

- forming a positive emotional attitude and cognitive interest towards the new technologies;
- acquiring basic knowledge of and skills to work with computer systems;
- learning the basic IT operations;
- developing habits for the correct use and algorithm to work with the computer equipment;
- familiarizing with the rich opportunities and various fields of application of the modern technologies.

ICT education offers the children a new untraditional environment inducing their knowledge, skills and imagination with its numerous tools for various activities, for the realization of any projects, testing options, exploring different strategies and solutions.

The project-oriented approach was chosen as a basic approach in the primary school teaching process. Through it the schoolchildren's work is organized around a topic and includes the implementation of various curricular activities. Normally the result of a given task is a tangible product and it is achievable within one or a few class hours. The project themes are based on the personal experience and important events of the children's lives or related to the teaching in some of the fundamental subjects. Learning to apply the specific set of tools and the acquisition of specific skills to handle the computer equipment is always related to the topic and performed in the context of particular activities related to it. The practical tasks to be completed by the schoolchildren in their work on a topic are consistent with their age and cognitive level, and also with their current level of knowledge and skills acquired in working with computer systems.

The curriculum stated that ICT was to be a separate school discipline, as a free elective subject. There would be regular lessons in the computer room – 1 or 2 each week. The curriculum consisted of 11 modules, 6 obligatory and 5 optional. It was to be implemented only when the school had resources. It was not obligatory for teaching to be continuous through all the school years. The outcomes were recommended, not obligatory. There was no formal assessment. The curriculum was formulated in this way to give schools time to organise the resources needed. Support was provided as follows:

A Logo-based children's software package "ToolKid" for introducing ICT (Ilieva & Ivanov 1999) was developed (Figure 1). The "ToolKid" software was developed by the author and written in Comenius Logo by her colleague. It was designed to be used from 1st to 4th grade. It consisted of 48 small microworlds divided into 7 groups to assist the children in learning to: handle the mouse and the keyboard; use the tools for processing various types of information – graphics, text, sound, animation and video – individually and in combination; use the computer to realize their own ideas. Each microworld was evaluated in her classroom with her children and revised before being included. These microworlds were designed as a preparation to use universal software. Microsoft software - Paint, Word, PowerPoint, Windows Explorer, Internet Explorer and some subject specific software was recommended for ICT lessons in the 3rd and 4th grade.

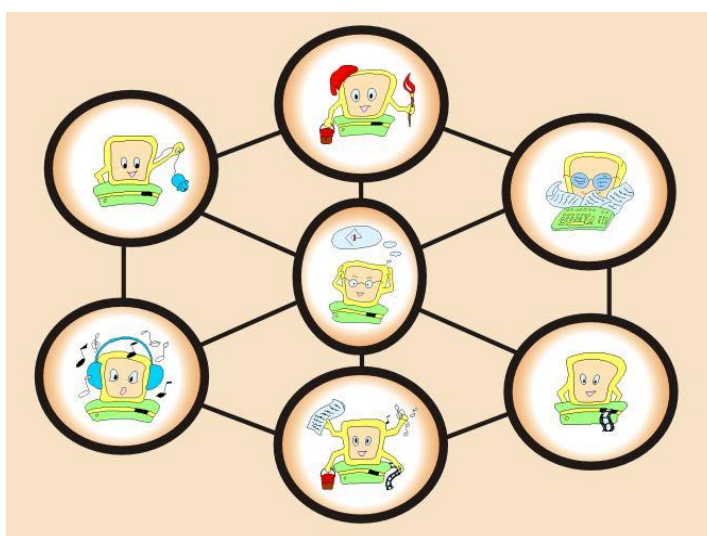


Figure 1: The "ToolKid" software splash page

ICT teacher training courses for primary school teachers were organised by the Faculty of Mathematics and Informatics of Sofia University. The course was taught by the author and her colleague. The course was 120 hours long. It included teaching computer basics, working with the "ToolKid" software, an introduction to the uni-

versal software, and the methodology of using both in lessons - making different projects with the children.

The first teacher's books with introductory teaching methodology (Ilieva & Ivanov 2001, 2005) were written to complement the course (and to save teachers from having to write copious notes). The five books introduce the 7 groups of the "ToolKid" software and the method of their use with children. Each has three sections. The first is an introduction to the software, its interface and products. The second section deals with technical issues that the teacher and children need to address. The third section describes the methodology through example projects.

National Strategy for Introducing ICT in Bulgarian Schools - 2005

In 2005 a revision of the national strategy proposed that: All schools be given one or two computer rooms with new computers, internet connection, presentation system and a colour printer. Schools receive financial support for teacher training and the package of educational software. National standards for ICT education at all school levels are developed.

The outcome for the primary level was that national standards for ICT were written. A new curriculum was developed. All schools received "ToolKid" and MS Office free. Money was provided for ICT training of primary school teachers. And the Ministry of Education ran a competition for student textbooks in ICT.

Bulgarian National ICT Curriculum for Primary School - 2006

This curriculum was based on the first curriculum. It stated that ICT lessons in the primary school are the first stage of school ICT education and give basic technical skills in using computers. They teach children to use all the possibilities of the computer as a medium, set in the context of normal activities for the children's age, using a project-oriented approach.

ICT lessons should provide: facilities accessible, understandable and attractive to the child; a great variety of activities with a permanently active role for the child in the learning process; the opportunity to work on topics which are directly related to children's real life experience; the creation of a final product that is important from the child's point of view, and that is able to show invested skills and efforts.

ICT now became an obligatory elective subject. There was to be one lesson per week in a computer room in a continuous programme of lessons through all school years from 1st to 4th grade. National Standards were set for outcomes for each school year. Final formal assessment every year was introduced.

In support, a set of student's books were written (Ilieva & Ivailov 2005). This consists of 4 books – one for each class for 1st to 4th grade, with 32 lessons in a book. Each lesson includes: the topic, an illustration of the final product, instructions on the software to use, and the steps to follow.

PRODUCTS – ASSESSMENT – CREATIVITY

Since the introduction of ICT in the school program in 2006 there is already one generation of alumni who have completed the full four-year course in this subject. Experience shows that the knowledge and skills foreseen at school program level are quite achievable as is this part focused on the development of cognitive interest and positive attitude for the new technologies and their creative use in the realization of own ideas and projects.

At the end of the teaching cycle all the schoolchildren have a good general knowledge of the basic elements and peripheral devices of a computer system, they know their purpose and are able to use them. They feel comfortable in using the mouse and the keyboard as devices of communication with a computer; they know and master the use of various external carriers of information. They know and use the principal options and tools of the graphics, text, animation and multimedia soft-

ware. They use internet as a medium to search for information and communicate, they are aware of and respect the netiquette.

The teaching results can be clearly seen in the projects implemented by the schools over the four-year period. For the projects implying the acquisition of new knowledge they use the manual where the final results they have to obtain are illustrated. By means of the manual guidelines and the teacher's instructions they are becoming acquainted with the new tools, the way they function, their method of operation and their performance. The achievement of a finished product close to the original idea becomes a material fulfillment of the schoolchildren's efforts and shows to what extent each one of them has understood and managed to successfully apply the new information. Nevertheless the creative projects remain our main instrument to weight the results of the teaching. The best and most reliable way to find the level, steadiness and quality of the knowledge and skills acquired by the kids in a specific area are the creative tasks. These offer a path to follow and the means to be applied to realize an idea whilst maintaining independence in taking decisions on the way. They ensure freedom of imagination and strong personal motivation to work.

The assignment of such tasks is starting even from the first grade and continues through the whole four-year cycle of education, by taking principal place for the third and fourth grade pupils.

This is illustrated by presenting the creative projects in various areas of children of different ages. Working with computer graphics (Figure 2) begins with the colouring in of shapes, using painting tools. Constructing images and pictures with shapes and colouring them follows. The next step is to add freehand details. Finally children paint everything freehand. In the textbook we give the topic, the algorithm, and an example. But we want children to move quickly from reproducing a model to creating their own product.

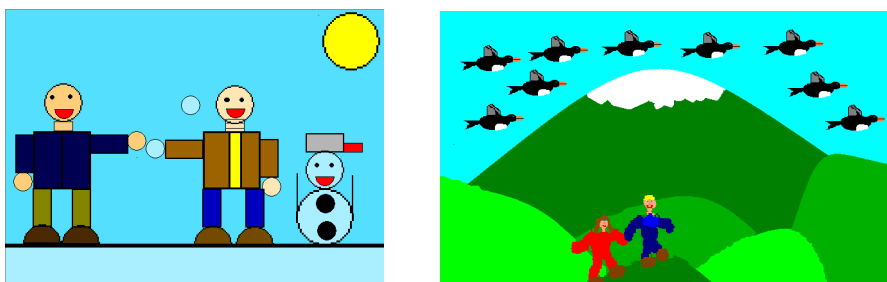


Figure 2: Working with graphics: from shapes to freehand

In working with text, children begin by typing letters and words to learn the Bulgarian keyboard. Step two is to typing sentences to learn to use the "spacebar", Shift, and punctuation marks and rules. This is followed by typing small texts to learn paragraphing. Formatting the text – changing the colour, size, style and font - is the final stage (Figure 3). Children begin by copying stories and illustrating them and move on to composing a story and illustrating it.

The new medium opens up new possibilities. When creating combined documents children learn to combine: graphics and animation; graphics, animation and sound; graphics and text; text and graphics; graphics, text and sound. They make multimedia cards, comics (Figure 4), animations, movies, and presentations.

Every time, at the end of the lesson, we have a product in which children express their learning. We need this final product: to assess how much the children know; where the problems are; what help we can offer; when they can do more than the curriculum says.

Apart from being an evaluation tool the creative projects are also valuable because in the course of work they generate situations inducing wishes and questions that enable the teacher to provide further information and enrich the children's knowledge.

methodology encourages creativity based on sound knowledge. The result is the children have skills, knowledge and imagination to use in other disciplines from the second grade onward. They have a rounded appreciation of the possibilities of the medium and the knowledge of how to use it productively.

There is, however, a caveat. The Bulgarian curriculum is “obligatory elective,” which means that schools are not compelled to teach it. Moreover, as in England, teaching remains tied to printed text and student workbooks. There is also a perception that the higher quality of work produced by children in ICT lessons is somehow lessened by the use of the new medium. The Bulgarian curriculum leads to all round capability in a medium that increasingly dominates social and working lives at all levels but which educationalists continue to find problematical.

REFERENCES

- Alexander, R. (Ed.) (2010). *Children, their World, their Education: Final report and recommendations of the Cambridge Primary Review*. London: Routledge
- Cartwright, V. & Hammond, M. (2007). 'Fitting it in': a study exploring ICT use in a UK primary school. *Australasian Journal of Educational Technology (Online Edition)* 23 3 390-407. <http://www.ascilite.org.au/ajet/ajet23/cartwright.html>
- DfE (2012). *The School Curriculum: Primary curriculum subjects*. <http://www.education.gov.uk/schools/teachingandlearning/curriculum/primary> [14/12/2012].
- DfE (2013). *Draft National Curriculum programmes of study*. London: DfE. Online at <https://www.education.gov.uk/schools/teachingandlearning/curriculum/nationalcurriculum2014/b00220600/draft-national-curriculum-programmes-of-study> [20/03/2013]
- Graham, D. & Tytler, D. (1992). *A Lesson for Us All: The Making of the National Curriculum*. London: Routledge.
- Furber, S., (Ed.) (2012). *Shut down or Restart? The way forward for computing in schools*. London: The Royal Society.
- Ilieva, V. & Ivanov, I. (1999). *Informatics and Information Technologies in Primary School – based LOGO Environment*. In Proceedings of EuroLogo 1999. Edited by R. Nikolov, E. Sendova, I. Nikolova, I. Derzhanski. Sofia, August. 227–234.
- Ilieva, V. & Ivanov, I. (2001). *Informatics and Information Technologies in Primary Schools in Bulgaria*, In Book of abstracts, Networking the Learner WCCE2001, Seventh IFIP World Conference on Computers in Education, 139.
- Ilieva, V. (2010). *LEGO and LOGO in the primary school – a simple way for learning through creation*. In: Clayson, E. & J. Kalaš, I. (Eds.), Proceedings of Constructionism 2010 – 12th European Logo Conference. Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava.
- Ivanov, I. & Ilieva, V. (2005). *ToolKID – Logo language based software package for children*. In: Proceedings of EuroLogo 2005. Edited by G. Gredorczyk, A. Walat, W. Kranas, M. Borowiecki. Warsaw, August. 390–397.
- QCA (1999). *The National Curriculum: Handbook for primary teachers in England*. London: Qualifications and Curriculum Agency.
- QCA (2010). *The National Curriculum: Primary Handbook*. London: Qualifications and Curriculum Agency.
- Rose J. (2009). *Independent Review of the Primary Curriculum: Final Report*. <https://www.education.gov.uk/publications/standard/publicationDetail/Page1/DCSF-00499-2009>. [20.07.2011]

Biographies



Vessela Ilieva is a primary school teacher in Sofia, Bulgaria. With a colleague she wrote the first Bulgarian primary school national curriculum in IT and was part of the team that wrote the second. She authored teacher's and children's books in support of them. She remains a primary school teacher committed to creativity in ICT. To this end she teaches teachers to teach ICT in this way. She is working in her school with LEGO construction and robotics with children from first to fourth grade as well.



Mike Doyle is a primary school teacher who has had a long involvement with computers in school. He is former Chair of the British Logo User Group and a founder of the EuroLogo series of conferences (now Constructionism). As an ICT and technology coordinator with a psychology background, he has an interest in the human capacity for technology. A former local politician and school governor, he has observed the difficulty educationalists have with ICT. He teaches design & technology using LEGO.

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