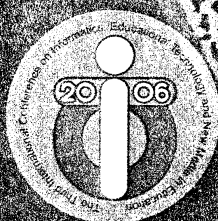


UNIVERSITY IN NOVI SAD  
FACULTY OF EDUCATION IN SOMBOR



**THE THIRD INTERNATIONAL  
CONFERENCE ON INFORMATICS,  
EDUCATIONAL TECHNOLOGY  
AND NEW MEDIA IN EDUCATION**



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TATJANA ATANASOVA-PACHEMSKA

## CURRICULUM REVISION AND ICT INTEGRATION

**Summary:** In this paper we will present the possibilities for revision and development of the curriculum of "Math Teaching Methods" related to Child-centered methodology and ICT integration.

This paper is a result of the projects: "Teacher, Technology and young learners" and "Child-centered methodology Curriculum Development" supported by USAID and World Learning.

**Key words:** ICT integration, curriculum development, math teaching methods...

## INTRODUCTION

We live in a time when every citizen uses a computer and communication technology, regardless of their walk of life; a time when the Internet is an information tool used by any geographer, chemist, historian, businessman, student, minister, worker... Rapid progress together with a frequent use of information technology in every field of human activity have been some of the basic features of the last few decades of the previous century. With a wide, planetary range, and applications for all forms of human activity, the progress of the information industry, and especially computer technology progress, highlight the question of promotion of information literacy, to a large extent, as one of the key competencies young people and adults should possess.

The Republic of Macedonia in its development plans, should define not only the implementation of new information technology in all fields of activity, but also an increase in the IT potential of the country, a reinforcement of IT education and training in all professional sectors, functional training or spreading computer literacy among young people and adults for the sectors that implement the new information technology, promotion of information education in compulsory and post-compulsory education, and implementation of ICT with the purpose of raising the efficiency of the education system. In this sense, knowing and using ICT is an essential part of the competencies of young people and adults and a condition for their efficient activity in the sphere of labor and social life.

Use of IT as a tool for teaching across the curricula is not currently valued in Macedonia. In fact, "Informatics" is not taught as a subject in primary school education until after grade 4 and is never well connected to other subjects in the school. While computers and Internet technology are being provided to schools through the E-school projects, Macedonia Connects and others, many teachers in these schools do not know how to use this technology. Little is being done, however, to insure that future teachers at teacher training institutes learn how to use and integrate IT into their classes before they start work.

The Pedagogical faculty "Goce Delcev" in Stip, in accordance with the needs of the modern education, is faced with the challenge of redesigning the existing curricula and the development of new ones at a higher level of ICT integration.

One of the first curricula that is being revised, developed and designed in the direction of ICT integration and student-centered methodology curriculum development is the curriculum for Math teaching methods in pre-school institutions

The revision of this curriculum is results from the Curriculum revision final report by the author of this paper who took part in the project "Technology, Teachers and Young Learners" provided by USAID and realized by professors from George Mason University in Virginia, USA.

## **THE CURRENT STATE IN TEACHING METHODS FOR MATH EDUCATION**

Analysis of the teaching and learning processes shows a series of inconsistencies which hinder efforts at modernization or slow down initiatives for their creation and are typical of all the educational subsystems. The way educational syllabuses and programmes are set favors encyclopedic learning and facts - knowledge as opposed to skill. Subject teachers are focused on the programme aims and tasks, i.e. their attention is drawn to the realization of previously adopted contents which are then transformed into aims and tasks. Thus a teacher is focused on a certain syllabus and its contents, not on the students. The teacher's attention is drawn to the way he/she can realize a teaching unit, not to the way the teaching unit influences the students or what effects it has on them with regard to the acquisition of knowledge, skills-development and attitude-building, nor to how students acquire new knowledge and skills, or which activities they undertake for their acquisition. Minimal attention is drawn to the way in which students put the acquired knowledge, skills and attitudes into practice in real life situations. To date interventions have only incidentally or partially created changes in teaching and learning. As processes of realization they have remained almost unchanged: a domination of lecturing when working with students, the cultivation and encouragement of memorization instead of learning through understanding or learning by problem-solving, obedience instead of critical thinking, passivity instead of creativity, teacher-centered work instead of interaction, insufficient use of modern teaching aids, insufficient use of information systems and technology, etc.

The system of evaluation of the work of teachers and students is responsible for the above-mentioned situation. A subject teacher and his/her work are assessed only on the basis of a realized syllabus, normatively, without paying attention to whether the teacher has succeeded in realizing its aims and initiated certain changes with students, i.e. without paying attention to how much knowledge and skill have been acquired and what effects this knowledge and these skills have had on the students. Teacher success is measured by students' achievements. The evaluation system only cares about the skill and ability of students to "reproduce" the content of a syllabus and it depends on the individual judgment of the teacher. This approach brings about a state in which the ability of students to implement their acquired knowledge in new real educa-

tional situations is insufficiently monitored, checked and assessed. The skills, interests, attitudes, beliefs and other features of a student's personality are rarely taken into account. Thus, the whole assessment of students' achievements is reduced to a mere realization of the material task of the teaching, and the functional and pedagogical sides are neglected.

This is the reason why I think that the first and the main places where pupils should acquire basic knowledge of the area of informatics are preschool institutions, primary and secondary schools, the curricula of which should follow the trend of the development of information technology.

Some changes should be introduced into the curricula for other subjects not dealing with informatics in primary education concerning their realization using ICT. This requires another approach of material presentation for particular topics, first and foremost the usage of educational software for the respective area/theme.

The greatest problem will arise during the realization of the programmes by the teachers, for which they will need additional training.

Thus, it is necessary to intervene in the initial training of the teaching staff at the pedagogical faculties, as well as in their professional improvement, meaning building in and enriching the contents that will enable them to successfully apply ICT in the educational work in preschool institutions and primary schools. The professional training can be provided by the Center for permanent education at the Pedagogical faculty in Stip.

## CURRICULUM DEVELOPMENT AND ICT INTEGRATION.

The beginning of the revision and redesigning of the curriculum for Math Teaching Methods was a great challenge for me. On one hand, I am aware that we will be facing the impossibility to realize the expected changes in teaching due to the poor technical equipment at our faculty and the fact that most of our students do not possess a personal computer at home and a constant Internet connection, and, on the other hand, there is a real and great need of the usage of various possibilities provided by ICT application in education. This would greatly enrich the teaching process. However, with the help of USAID we expect one workshop for teaching methods to be fully technically equipped, with constant Internet connection and access to a number of world libraries that will make possible the practical realization of the redesigned curriculum and the introduction of active-interactive teaching.

In the course of the redesigning of the curriculum for math teaching methods the following concepts are being respected:

- designing aim-oriented teaching syllabuses;
- clear differentiation of general and specific knowledge and information;
- specifying the competences and skills that students are expected to acquire within the framework of the syllabus. ( Entering, copying, saving various types of data; working with a text processor; adjusting working methods to each student; providing various learning sources by using ICT suitable to various learning stiles and approaches; creating conditions for learning through problem solving, continuous monitoring, recording and analyzing student progress; planning, recording, evaluating – teaching, extracurricular and off-school activities by using ICT; planning and developing programmes for students with special needs; browsing the Internet; using e- mail; good command of programme packages; planning types of technological support for learning and teaching processes; using various types of databases; planning the type and volume of student activities with ICT; planning strategies for achieving the goals set; using educational software for teaching needs; developing appropriate instruments for monitoring and assessing the effects of student work; designing active student research helping them set and solve problems; looking

- for information on the web; creating multimedia presentations; including in various video conferences; designing a website.) For this purpose all unnecessary repetition and irrelevant information, which additionally overload teachers and students, must be discarded;
- creating a suitable evaluation system with clearly defined assessment methods;
  - defining the specific activities used for registering the levels of student achievements (rubric for evaluation);
  - introducing a system for quality control of teaching and learning;
  - basing the educational process on the principles of interactive teaching, with a focus on creative learning, critical thinking, problem-solving and implementation of modern information technology;
  - introducing knowledge necessary for educational practice.

Such based concept will provide:

- a permanent and systematic process of curriculum redesign in relation to defined strategies and current requirements;
- established bases which will allow curricular and instructional transfer from teaching to learning (putting stress on the learning of content and skills by the students rather than on the teacher and his/her teaching, i.e. on „covering the material“);
- balance and successiveness of syllabuses;
- establishment of important connections between syllabuses with optimal reinforcement of the contents and skills in more than one subject, avoiding irrelevant material and repetition;
- a complex approach to the learning process on the part of the students;
- implementation of modern teaching and learning methods on the part of the teachers;
- an efficient preparation of students for quality of life and acquired skills and habits for lifelong education;
- opportunities for developing the skills for individual creative and critical thinking on the part of students;

The following technological and educational standards should be taken into account during redesigning the curriculum.

- Planning and designing learning environments and experiences;

Teacher plans and designs effective learning environments and experiences supported by technology. Teacher:

- Designs developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of students;
- Applies current research on teaching and learning with technology when planning learning environments and experiences;
- Identifies and locates technology resources and evaluates them for accuracy and suitability.
- Plans strategies to manage student learning in technology-enhanced environments.

## II. TEACHING, LEARNING AND THE CURRICULUM

Teacher implements curriculum plans that include methods and strategies for applying technology to maximize student learning. Teacher:

- Facilitates technology-enhanced experiences that address content standards and student technology standards;
- Uses technology to support learner-centered strategies that address the diverse needs of students;
- Applies technology to develop student's higher order skills and creativity.
- Manage student learning activities in a technology-enhanced environment.

### III. ASSESSMENT AND EVALUATION

Teacher applies technology to facilitate a variety of effective assessment and evaluation strategies. Teacher:

- Applies technology in assessing student learning of subject "Math teaching methods" using a variety of assessment techniques;
- Uses technology resources to collect and analyze data, interpret results and communicate findings to improve instructional practices and maximize student learning;

### IV. PRODUCTIVITY AND PROFESSIONAL PRACTICE

Teacher:

- Uses technology resources to engage in ongoing professional development and lifelong learning;
- Continually evaluates and reflects on professional practice to make informed decisions regarding the use of technology in support of student learning;
- Uses technology to communicate and collaborate with peers, parents and the larger community in order to improve student learning.

The revision and the redesign of the curriculum will be continually realized in the period between February 2006 and May 2006. The initial changes can be seen on the web page: <http://mason.gmu.edu/~pnorton/MK/onlineMK/Syllabi/tatijanastip.htm>

### CONCLUSION

There is an essential need for changes in curricula for all teaching subjects at the Pedagogical faculty in Stip if we want to be transformed into a modern faculty with a clearly defined strategy and vision of development. The European Credit Transfer System and the promotion of electronic and distance learning is a challenge for all of us. I do hope that the redesigning of the curriculum for Math teaching methods and the practical realization of activities in accordance with the changed curriculum for the school year 2006/2007 will contribute to the improvement of quality and competences of future educators in the contemporary European educational space.

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