

TEACHER OF TECHNOLOGY AND COMPUTER SCIENCE EDUCATION

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Abstract

Studies on specialization “technology and computer science education” consists of two levels. Students can graduate either pedagogical or technical course. This specialization was formed at the Technical University of Radom 21 years ago. Students can increase their employment chances by undergoing well organized teaching practices and attending IT Local Academy and IT Academy Essential programmes.

Key words: education, teacher, technology and computer science education.

1 Introduction

A teacher is now a person professionally prepared to do his/her job. To make them able to do his/her work well, improvements in educational conception of to-be educator at universities are necessary. Development of science and technology entails changes in work quality. Requirements towards teachers are higher and higher. The similar trend is to observe on specialization “technology and computer science education” at the Technical University of Radom. In this paper the author presents the history of education and present guidelines and prospects of education at Technical University of Radom.

2 Historical background of education on ETI (Technology and Computer Science Education) specialization at Technical University of Radom

Specialization of technical education (technology and computer science education now) was formed in 1988 at the Faculty of Mechanics. The studies lasted 5 years and graduates attained master degree in education with specialization of computer science. There were also 3,5 year non resident studies for graduates of teacher college. In 1992 technical education was transferred to Faculty of Education. Stationary and non-resident studies lasted 5 years and ended with attaining master of education degree with specialization of computer science. In 2002 the name of specialization was changed – from technical education to technology and computer science education. Studies are conducted in two-level system now, in harmony with educational standard of Ministry of Education (MEN).

3 Assumptions of studies on ETI specialization

Bachelor degree studies lasts not less than 6 semesters. Number of teaching hours should exceed 2100. Amount of ECTS credit points (European Credit Transfer System) should not be lower than 180. After finishing the first level studies students qualify as teachers of computer science and technology in primary and grammar schools.

Second level studies last not less than 4 semesters. Amount of teaching hours should exceed 1000. Amount of ECTS credit points should not be lower than 120. Second level studies gives students qualifications to teach in secondary schools.

Graduates can also work as web administrators and programmers. Apart from computer science preparation students gain technical knowledge which enables them to work in the industry.

4 Teachers' substantial preparation

Professional preparation of to-be teacher consists of substantial and methodological preparation. Universities are free to choose curricula. However they have to fulfill the programme minimum which is included in educational standards. Substantial part of curriculum are directional subjects. While developing standards different approaches are taken into consideration. Learning effects result not only from differences in curricula content (which are the consequence of university mission differentiation, their resources, staff etc.) but also differences in applied teaching techniques and methodology. [3].

In terms of rudimentary subjects most of them keep the curricula minimum. Amount of teaching hours of physics, which is helpful for other directional subjects as well as amount of maths teaching hours, which make students a lot of learning difficulties was increased. The difficulties are the reason why 30% of students abandon studies after the first year at the university. Placing additional leveling lectures of maths in the curriculum decreased the number of students erased from the students-list.

Directional subjects make up a significant part in studies curriculum. The table below contains the detailed data on the amount of teaching hours falling on each subject.

A. Specialization subjects group		
1.	Materials science	90
2.	Production engineering	90
3.	Technical mechanics and materials resistance	90
4.	Technical graphics	30
5.	Rudiments of machinery construction and operation	60
6.	Computer science and systems	60
7.	Programming and computer applications	90
8.	Multimedia techniques	60
9.	Computer networks and network applications	60
10.	Computer back-up in technology and the latest information technologies	90
11.	Computer technology application in technology and information sciences	45
12.	Electrical engineering and electronics	45
13.	Technical thermodynamics	30
14.	Data bases design	30
15.	Technology and design engineering workshop	60
Total		930

Table 1: Specialization subjects group.

Nowadays, when we can observe the rapid development of technology, graduates opened to further education and prepared to participate in life long education are needed. Continuing education is a consequence of dynamic development in each sphere of human life [1]. Distant learning in technical education is a domain of great potential. [9, 5, 4]

5 Teachers' methodological preparation

Students on specialization "Technology and computer science education" at the Technical University of Radom, apart from rudimentary and directional subjects, attend also pedagogical subjects. At the Technical University of Radom teaching model is based on simultaneous model. It means, that teaching on technology and computer science, which are included in A and B block, is accomplished in line with educational subjects.

Reasonableness of such solution was confirmed by I. Zawłocki and E. Nieroba in their publication. Such teaching model for the purposes of vocational education is optimal. [10] Preparation of students of "technology and computer science education" to the job of a teacher is connected with meeting the standard of teacher education [7]. Second level studies must contain at least 150 teaching hours on teachers' education. Lectures are usually conducted over 4 semesters and include at least 400 didactic teaching hours on the first level studies, which comprises psychology, education, objective methodology of teaching as well as complementary subjects e.g voice emission[7].

Curriculum of the first level studies of ETI developed by Technical University of Radom assumes 475 teaching hours of pedagogical subjects. They include: psychology (75 teaching hours), pedagogics (75 teaching hours), methodology of teaching in technology (90 teaching hours), methodology of teaching in computer science (75 teaching hours), voice emission (30 teaching hours), regional education (30 teaching hours), pedagogics of work (30 teaching hours), elements of educational law (15 teaching hours), selected issues of contemporary education (30 teaching hours).

6 Teacher and professional practice

In the curricula of universities model of teachers' education assumes association the theory and practice. It comprises the range of knowledge that student should obtain, in the other hand the practical abilities to accomplish didactical, educational and caring tasks in school. *There are known two orientations in this issue: the first one attributes the key role to scientific knowledge as a "spine" of teacher vocational qualifications while the latter assumes that a student should above all master the practical abilities standard during his/her studies enabling proper accomplishment of vocational roles, tasks and functions.* [6].

Practice of pedagogics, beside the didactical goals, fulfills also educational objectives, teaches how to work in a team and responsibility for entrusted tasks to do. All educators stress its significance. *Practical learning belongs to the key determinant of students' vocational development. It consists in delivering a professional knowledge and then using it in vocational activity.*[8] Pedagogical practice enables to-be teacher to gain experience in work with children, but also delivers many occasions to extend their knowledge and abilities.

In Poland universities are free to decide on their own on the plan of studies and practical education, nevertheless they are obliged to fulfill the requirements in the stan-

dard, which describe the conditions, that should be met by the students to qualify for profession of a teacher.

The main task of teaching practice included in curricula is to extend the acquired knowledge and abilities, which provide the better preparation for the teacher's job. They enable:

- *Trying out own didactical and educational abilities (gaining ability to plan and conduct classes) gained in the previous education at the university and improving these abilities in the real conditions of work in school.*
- *Getting familiar with the totality of pedagogical work in school.*
- *Shaping the suitable professional attitude – which is the basics of to-be teacher and educator.*
- *Attaining abilities to analyze own work and its results as well as to assess students attainments.*
- *Attaining abilities to make the observations during lessons and document the records. [2]*

Students of stationary first level studies on specialization „Technology and computer science education” hold teaching practice four times per studies:

- a) overall teaching practice after the first year of studies (30 hours). Students complete teaching practice in primary or grammar school.
- b) Continuous didactical practice after the second year of studies (50 hours), during which a student is present in educational post day by day.
- c) Teaching practice during the academic year after the fifth semester completed in the primary school (50 hours).
- d) Teaching practice during the academic year after sixth semester in the grammar school (50 hours).

Teaching practice in the second level studies is completed in secondary schools (50 hours). During the practice every student have to keep practice register, where he/she places the detailed schedule of teaching practice. Once the teaching practice is completed students pass on the schedule and summaries of the classes to the appointed by the university supervisor, who makes the assessment. While studies students are obliged to complete a practice, which aims at assisting students in their preparations to do the job through association of theory and professional practice.

Students of stationary studies on specialization “Technology and computer science education” must complete 4-week teaching practice after the forth semester, which they pass within fifth semester. Practices are held during the holiday break, in August.

7 Prospects of education on „Technology and computer science education” specialization

Teaching model described above is in force. Students can learn on first and second level studies and are free to choose between bachelor or engineer degree and then complete master degree. Bachelor degree studies prepare to teaching technical and computer science subjects in primary and grammar schools – after graduating teachers' specialization – administering and serving school systems of information, serving systems of information in small and medium enterprises as well as educational, local and national institutions. Graduate with engineer degree acquired knowledge on human resources management in a number of industries, economic and scientific institutions and have abilities to manage teams and working groups, which have certain tasks to do, es-

establish small and medium enterprises and administer them. Graduate of the specialization is prepared to administer and serve systems of information in industry, economical, local and public institutions, banking and educational institutions; serve specialist software. He/she is also able to design engineering works in industry and manage human resources.

Graduate of second level education is prepared i.a. to creative operation in engineering of production, engineering of materials, machinery construction and computer science as well as computer assisted engineering works, didactical activity and human resources management. He/she is also able to work in designing and advisory offices, institutions creating and exploiting computer systems of information, industries, small and medium businesses, educational, local, national and economic institutions.

Student, who graduates specialization „Technology and computer science” has possibilities of employment in a wide range of workplaces, which is connected with his/her rich qualifications. However, crisis on the labour market make them sometimes unable to find employment. Graduates are open to start post-graduate studies giving them additional qualifications. They can see the chances in teaching practice. Last year Technical University of Radom has signed an agreement with the Ministry of Finance. Some students have been just practicing, which gives them chance for attractive employment in the future. In a few years Data Processing Centre in Radom will be established, which is going to serve significant area of Poland. Graduates of specialization “Technology and computer science education” will be able to find employment there, especially when they had practiced before.

In 2007 Faculty of Education at Technical University of Radom accessed to MSDN AA programme (MSDN Academic Alliance). This initiative will facilitate accessibility to the newest Microsoft software and will provide automated, effective system of its distribution. Owing to this system students as well as employees will be able to use the latest software in their work at the university and at home. The next steps was taken in 2008, when the university signed with Microsoft two agreements on participation of the Technical University of Radom in IT Local Academy and IT Academy Essential programmes. Microsoft IT Academy is a global educational system enabling universities to support their students in educational and vocational achievements through high quality training programmes for Microsoft technologies. Students attending classes conducted within IT Academy programme, can complete a training and gain certificate recognized all over the world and be excused from some examinations. Thanks to the training they will gain knowledge.

To conclude, students have prospects to find an attractive employment. Great chances have graduates of engineering degree.

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