E-TEACHER IN INCLUSIVE E-EDUCATION FOR STUDENTS WITH LEARNING DISABILITIES

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Abstract-- The concepts of e-learning and e-teaching play important roles in educational technology applied in different educational contexts. E-learning technology can promote the inclusion of students with various disabilities in education. We considered roles of e-teacher which are useful in e-education of students with disabilities. Usefulness of assistive technology and e-learning technology are also considered. The examples of implementation of e-learning/e-teaching components in education of students with specific learning disabilities supported perspectives of inclusive e-education and importance of teachers' competence of e-teaching in inclusive education.

Key words: inclusive education, e-learning, e-teacher, students with disabilities.

1. INTRODUCTION

Precise meaning of the term electronic teaching includes the system of learner activities and teacher activities in the instruction supported and shaped by the information-communication technology and electronic engineering solutions. Nowadays the concepts of e-learning and e-teaching play important roles in educational technology applied by teachers at all levels of education and in different educational context. Encountered with new generations of students whose familiar environment is, more and more often, enriched with the computer as the medium used by all members of the family, teachers should be ready to use positive aspects of spontaneous informatics and computer literacy of the students with whom they work. While most students are "digital natives", most teachers are just "digital immigrants" (Prensky, 2001). Hence the teachers' duty is also to intensively acquire and improve knowledge and skills of teaching electronically-enhanced courses and of guiding students' learning (Anderson and Weert, 2002).

At the same time, the teachers have to teach in inclusive educational context. The inclusion movement offers a variety of positive academic, social, and behavioural opportunities for students with special needs (Bond &Castagnera, 2006). Inclusive education policy considers different subgroups with special educational needs (SEN). However, some subgroups of SEN students do not receive enough attention. One of the most vulnerable subgroup is students with disabilities whose educational needs are often being neglected. The increased use of information and communication technologies in everyday life and development of adaptive hardware and software have allowed individuals with disabilities to do things that were difficult or impossible for them to do in the past (Fichten et al., 2009).

Although the technical support is expanded, integration of the support with learning procedures and adaptation to educational needs of students with disabilities are not directed to all subgroups. One of the reasons is lack of the teamwork in creating e-learning technology-supported processes and teaching for students with disabilities. Simplifications of psychological knowledge of the characteristics of students with learning disabilities, and lack of valid and methodologically competent research on psychological effects of e-learning procedures adapted to students with disabilities are also common problems. However, e-learning technology can promote the inclusion of students with various disabilities (Fichten et al., 2009).

II. TEACHERS' ROLES IN E-EDUCATION

Pre-requisites of teacher professional activities are defined by the professional standards. E-education and e-teaching are based on some technological standards of teachers' professional dealing standards. Some standards (Awouters et al. 2008;

Technology standards for All Illinois Teacher; UNESCO, 2008) are described as the general teachers' competence in the application of ICT, and some standards are described as specific e-competencies for special e-education system modelling (e-learning, e-teaching, etc.). There are three dimensions of the teachers' ICT-competencies (Awouters et al. 2008): (a) the teacher knows what learning activities ICT can be used in teaching (ICT awareness), (b) the teacher has the necessary skills for using hardware and software (ICT readiness), and (c) the teacher knows the pedagogical-didactical elements of ICT (ICT drill and practice). ICT integration in everyday teaching and learning system is defined by three key components (Mishra and Koehler, according to Jimoyiannis&Komis, 2007: 153): knowledge of pedagogy that is applicable to the specific content; knowledge of how subject matter is transformed by the application of technology; knowledge of how technology can support pedagogical goals.

Teachers can be in a position of the creator of e-teaching process or the user of the e-teaching/e-learning attainment. Teacher activities in e-teaching scenarios can be broken into two major tasks: providing the content for the students and supporting communication between students and tutors (Schertler&Bodendorf, 2003). Both tasks pose problems to teachers who have been used to follow more traditional teaching methods so far. Therefore, modern teachers and e-teachers should be able to organize different types of e-learning and e-teaching scenarios.

According to new demands in the teachers' professional activities and e-teaching context, teachers' e-teaching competencies are the complex system of special roles and competencies. In this paper, the term e-teacher is used to describe the teachers in the school systems who teach by applying ICT according to e-learning principles (Bjekic et al., 2010). Salmon (2007) emphasizes the importance of e-moderation in different teaching situations supported by the ICT. Thus, e-moderator is one of the teachers' roles in e-teaching, especially in the inclusive e-teaching. Denis et al. (2004) described some central and some peripheral roles of e-teachers as e-tutors/e-moderators in e-learning:

- *Central roles: content facilitator, metacognition facilitator, process facilitator, advisor (counselor), assessor (formative and summative), technologist, resource provider;*
- *Peripheral roles: manager and administrator, designer, co-learner, researcher.*

III. E-SUPPORT TO INCLUSIVE EDUCATION

The European disability policy is expressed in the Madrid Declaration written by the European Disability Forum for the European Year of People with Disabilities. It is focused on disability as a human rights issue. People with disabilities are entitled to the same human rights as all other European citizens. In general, in most European countries, people with special educational needs usually include the following subgroups: (1) people with specific learning disabilities, (2) persons with visual impairments, (3) persons with hearing impairments, (4) people with slower cognitive functioning, (5) autistic people, (6) people with neurological and other diseases, (7) people with complex cognitive, emotional and social difficulties, (8) people with multiple difficulties, and (9) people with speech and language disorders.

What is the framework of e-environment for students with disabilities? The distinction is made between assistive technology and e-learning/e-teaching for students with disabilities as parts of e-environment for them (Bjekiü et al. 2012). Assistive technology is any mean, hardware or software, used to increase, improve or maintain capabilities of persons with disabilities (Bouraoui et al., 2007). Assistive technology enables people with disabilities to execute tasks that are sometimes difficult or impossible to do without technical aid, and helps them to achieve their scholar, professional and social inclusion. Computer is only one component of assistive technology for students with disabilities.

The concept of constructivism and socio-constructivism is the basic frame of different types of inclusive teaching. Simultaneously, these concepts are the base of current e-learning technologies. Therefore, integration of e-learning/e-teaching as supported technologies in teaching students with disabilities is useful. Since learning is a social activity and understanding is socially constructed, e-learning should be designed to promote participation, allowing all students to take part in all subjects and activities, enhancing cooperative learning, offering powerful opportunities (Guglielman, 2010). Today, e-education (e-learning/e-teaching is the central part of e-education) of students with disabilities is already widespread (Barrett, 2011). The most creative e-learning solutions, content and processes are in this field.

A wide range of Web 2.0 tools are used to support inclusion (ETTAD) – some relatively "low tech" technical solutions (based primary on discussion platforms), and new sophisticated technical platforms (immersive technologies and games in combinations with tools like podcasts, blogs and social networking). Current Web 2.0 technology (and the other advanced technologies) provides e-learning based on interactivity and higher cognitive processes activation. E-learning is viewed as a system of activities that reinforces students' cognitive domain. The planning of learning activities and the development of scenarios (not design of learning materials) are emphasized, especially in the field of education of students with disabilities. In recent years the social dimension has been the main focus of the e-teaching/e-learning process. Therefore, the concept of "distance" learning acquired new dimensions based on the technology development and new communication and interaction opportunities (Fedeli, 2012).

Guglielman (2010) emphasized necessity of interdisciplinary approach to developing e-learning environment for students with disabilities (educational technology, learning theories, e-learning models and approaches, e-inclusion, universal design, participatory design). Psychological fundaments of e-courses design for students with disabilities are as follows (Bjekic et al. 2012): integration of different media opportunities and involvement of different perceptual processes; transformation of information into different representatives (students with disabilities, especially students with specific learning difficulties, learn better if the learning content are presented to them both verbally and graphically; then they can form a parallel mental models and engage multiple perceptual system reception); using some gestalt psychological principles of stimuli organization in multimedia e-learning support (Mayer, 2001).

The major benefits of developing e-learning courses for students with disabilities, positive effects of e-learning and education in e-environment on them and accessibility are (Klomp, 2004; ETTAD; Bjekic et al., 2012): peer support by using computer mediated communication tools and possibilities for peer-to-peer collaboration and to avoid social isolation; web-based education enables users – students with disabilities to be proactive and self-reliant, rather than reactive and dependent; controllability of learning; flexibility in time and space afforded by distance education modalities can address the special educational needs of students, it allows students to progress at their own pace; multimodal communication, or wide range of e-learning communication tools allows presentation of information in the way adaptable to specific disability; individual student-teacher communications can take place efficiently and easily; asynchronous communications is the benefit for students with disabilities; the ability to work at home and to arrange physical environment; hardware devices and software are adapted to the special needs of students with disabilities, etc. It derives barriers, too, but only few of them are psychological barriers: missing of guidance how to use e-learning content, failure to relate to the real world experience of the user, course developers do not know enough about learning disabilities, adaptation to the learning disabilities is not enough, teachers do not develop relevant e-teaching competencies, etc.

Cullen et al. (2009) recognized advantages of Web 2.0 technologies to support education of students with disabilities and developed Learning 2.0 tools. These tools: can be used to create learning environments which open up spaces to develop creativity and collaboration and which are appealing to learners who have problems in conventional learning/teaching environments; support inclusion through promoting empowerment, self-esteem and confidence-building; can expand learning horizons and engage learners in rich content environments; improve teacher-learner relationships by more collaborative role (for example, teachers become mentors or learning companions who facilitate independent learning and peer assessment, while learners take control of their learning processes). Key mediating factors of realization of successful learning and inclusion outcomes by using e-learning technologies (Learning 2.0) comprise (Cullen et al., 2009): existing levels of basic digital literacy; the cultural and social mix of participating learners; and the presence and quality of support available from other sources, for example, referent social groups (family, peers, classmates) and group interaction and social support.

E-learning can offer great opportunities to students with disabilities. Teacher preparation for e-teaching students with disabilities is one of the most important segments of developing e-learning environment for them. All over Europe, teachers and teachers who are teaching people with specific training needs acquire knowledge in this field during undergraduate studies. The form of knowledge acquisition in different countries is different - even within the same country it may vary from faculty to faculty, the internal legal regulations (Bjekic et al., 2012b).

IV. EXAMPLES OF E-LEARNING/E-TEACHING OF STUDENTS WITH SPECIFIC LEARNING DISABILITIES

Students with the most profound reading difficulties are eligible for special education services and supplemental academic supports such as assistive technology (e.g., text-to-speech, speech-to-text, and spell check software). Dyslexia is learning disability that impairs a person's fluency or comprehension accuracy in being able to read, and which can manifest itself as a difficulty with phonological awareness, phonological decoding, processing speed, orthographic coding, auditory short-term memory and language skills/verbal comprehension (some of them are manifested in some languages). One of the important international projects regarding dyslexia in recent years is European funded TEMPUS project ISHEDS (Identification and Support in Higher Education for Dyslexic Students, Golubovic&Golubovic, 2010) whose main objective was to create a system for the identification and support of dyslexic students in higher education, including self-help e-learning tools. Also, the Project aimed to make an impact on policy and legislation in partner countries (Bosnia-Herzegovina, Hungary, Romania, Croatia and Serbia). Many useful products that are available online emerged from this project, such as Guidelines for teaching students with dyslexia and design for e-course for students with dyslexia using Moodle e-learning platform (Sekovanovic&Podbojec, 2012). In the UK there is, also, e-learning course called Dyslexia Action Virtual Learning Environment. Besides these comprehensive examples of e-learning, students with dyslexia can also get benefits in various useful e-applications designed to provide support for reading and writing.Learning a foreign language is a particularly challenging activity for students with dyslexia even in e-teaching/e-learning context since most interaction takes place through reading, even more in the area of web 2.0;

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we read by surfing the internet, by exchanging messages on the mobile phones, we write participating in chat rooms or posting on our blog. The most widespread and successful Internet synchronous and asynchronous communication technologies are based on reading and writing skills. A specific contribution in the field of learning English as a foreign language is given by the European project ICT Bell where ICT is applied in English Language Teaching and Learning in support of the dyslexic students (Gyaramathy et al., 2009). The project outcome ICT integrated Business English language learning e-content, the testing of the methodology and online tutoring handbook for trainers, the building of an open sources based Virtual learning environment (VLE) and the development of a website integrated with a virtual collaborative environment (VCE). The e-learning method provides an opportunity for dyslexic students to receive support in learning new words and the correct pronunciation. Since, according to the data obtained in the project, personal contact is extremely important for students, it is worth using materials that facilitate and incite communication. Project methodology recommendations include: on-line dictionary with audible pronunciation, using automatic correction, assistive technology (imTranslator, ReadPlease), mind mapping, interactive tasks, role-play games, multisensory teaching, repetitions, music. Other positive example of e-support for students with dyslexia refers to e-learning various foreign languages (French, German, Dutch, Russian, Japanese, English as a foreign language, at University of Hall, the United Kingdom) offering on-line resources, on-line dictionaries and tutor support.

Dysgraphia is a learning disability that affects writing, which requires a complex set of motor and information processing skills. There are problems of sign orientations, with specific symptoms (deletion, addition, omission, transliteration, transposition of symbols and punctuation of signs). E-support for students with dysgraphia can include various application such as speech-to-text, voice-recorded notes, simultaneous recording and typing or handwritten notes, therapeutic hand exercises (not games) that improve fine motor skills in children.

Dyscalculia is a specific learning disability involving difficulty in learning or comprehending arithmetic. In some researches, the particular form of pedagogical intervention relies on digital technologies rather than teacher–student small group instruction for learners with special needs (Butterworth &Laurillard, 2010). Digital intervention programs specially designed for learners with dyscalculia and low numeracy offer distinctive benefits for learners (practice-oriented, age-independent, needs-oriented, private) and teachers (customizable, shareable, personalized, motivating). A pioneering adaptive digital method for strengthening the sense of number, called the Number Race, has been available for 4 years in pioneering research by Wilson, Dehaene et al. (according to Butterworth &Laurillard, 2010). This software trains number sense with single digit numbers, one-to-one correspondence, numerical comparison, reading Arabic digits, enumeration, counting, and simple (1-digit) addition and subtraction. Nowadays there are more and more programs developed as support for students with dyscalculia and useful guidelines can be found at online sites (such as Learning Mathematics with Virtual Manipulatives).

V. CONCLUSION

Inclusive teaching means recognizing, accommodating and meeting the learning needs of all students. It means acknowledging that students with disabilities have a range of individual learning needs and that they are members of diverse communities. Realization of goals of students with disabilities education is based on the differentiation and individualization of teaching. ICT is important supportive technology for education of students with disabilities. The framework of e-environment for students with specific learning disabilities includes assistive technology and e-learning/e-teaching technology. Teachers have specific position in e-environment for student with disabilities. They have to apply new teaching elements and roles (active facilitation, coordination, management, tutoring), and new teaching assistive technology and e-learning technology.

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