ORIGINAL PAPER

ENRICHING THE ICT COMPETENCES OF UNIVERSITY STUDENTS - A KEY FACTOR FOR THEIR SUCCESS AS FUTURE TEACHERS

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Abstract. *The actual EU Digital Agenda - as one of the seven pillars of the Europe 2020 Strategy - suggests to exploit in a better way the massive potential offered by ICTs, with the view to promote innovation, economic growth and progress. In this respect, it stipulates to consolidate the European citizens' ICT competences and skills, by improving the long-term implementation of both digital literacy and e-skills policies for the labour market. It is more than obvious that for the university students, ICT is playing an important role, enabling them to acquire the necessary competences and skills required in their studies and/or for the nowadays digital world, targeting also on helping them to be easily inserted in the labour market after finishing their studies.*

In this respect, in the frame of the Romanian Sectoral Operational Program for Human Resources Development 2007-2013, Valahia University Targoviste proposed the project entitled "EduWeb - New Competences Related to the Using of Multimedia, Web 2.0 and Virtual Instrumentation Applications - A Guarantee of University Degrees Quality", which tried to provide to students extensive learning opportunities and specific competences, by promoting new and innovative courses in the field of multimedia and Web 2.0 applications, answering to their needs related to introducing in the curricula more ICT based disciplines or updating the contents of the existed ones, with the view to include information and activities that exploit open-source multimedia technologies and Web 2.0 tools.

The paper tries to analyse the extent to which ICTs in general, and multimedia and web 2.0 tools in particular, are perceived by the university students as reliable keys for their success, but also as appropriate factors for acquiring new competences and skills that make them to be prepared for the labour market.

Keywords: *ICT; Multimedia; Web 2.0; students' competences; EduWeb project.*

1. INTRODUCTION

Living in an increasing digital world, in the times when the Internet becomes the most important mean for information and communication, it cannot be thought working anymore without using a computer or different other sophisticated and miniatured devices. In this context, the low level of digital skills can decrease the people's general life chances and employability.

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Performing a major study at the level of European citizens, the European Union revealed that many of them have limited abilities on exploiting the full potential of digital technologies in their everyday life. Due to this result, European Commission proposed the *European Digital Competence Framework for Citizens* - known as *DigComp* - which identifies 21 competences in five key areas (Fig. 1).

DigComp was first published in 2013 [1], being a reference for many digital competence initiatives at both European and Member State levels. *DigComp 2.0* represents the phase 1 of the updated framework, being focused on the conceptual reference model, new vocabulary and streamlined descriptors [2]. *DigComp 2.1* is considered a new development (based on *DigComp 2.0* conceptual model), which illustrates eight proficiency levels and examples of use, applied to the learning and employment field [3].

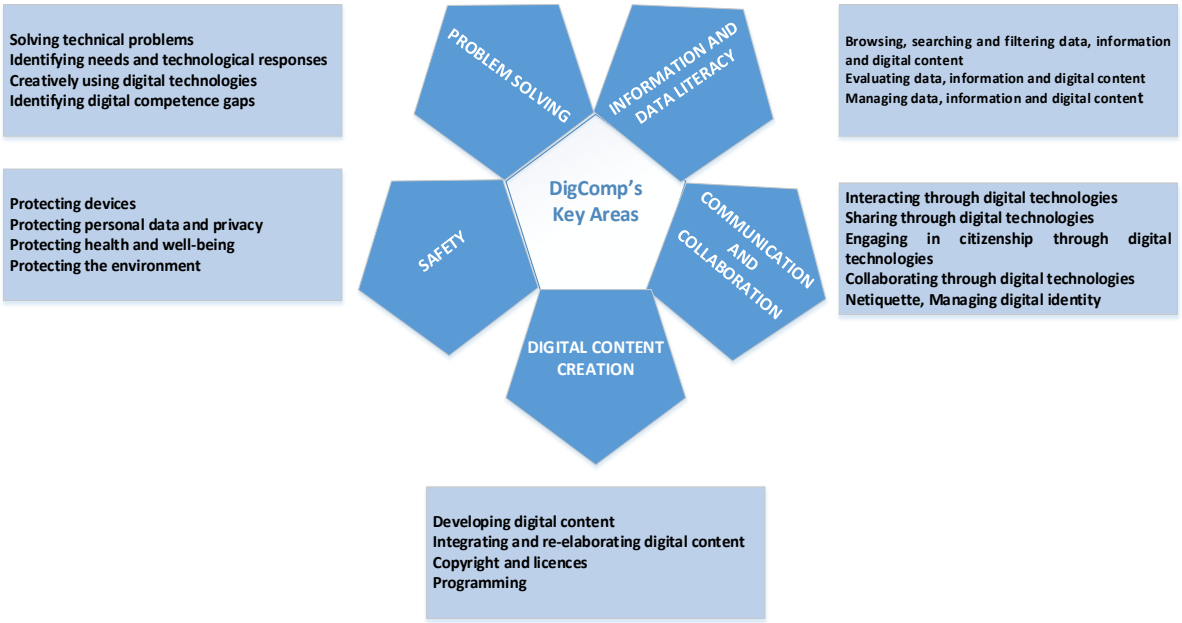

Figure 1. *DigComp*'s five key areas and 21 competences.

Since learning and related learning skills represent key aspects for the actual society that passes through the globalisation and technological progress, a fundamental transformation of education and training is required, in order to deliver the needed knowledge and skills for the societal development, employment and involvement in the society issues. Those aspects are foreseen in the *Europe 2020 Agenda* and in its various flagships and policy initiatives [4].

In this context, the express development of the European economy cannot be possible without an adapted education to the societal needs. This means that it becomes compulsory to have an education system that integrates new information technologies facilities, and to involve more and more teaching strategies and learning approaches that involve ICT tools. A qualitative education cannot be realised without the contribution of well trained teachers, which is critical for their success in the classroom.

In such conditions, the teacher's role becomes more and more complex, involving a continuous professional development process and even a multiple specialization of teachers, that comprises not only permanent improvement of the scientific knowledge, but also a deep psycho-pedagogical preparation and related knowledge concerning the use of new ICTs in the didactic approaches.

2. E-EDUCATION

We cannot deny that the use of computers and Internet totally changed the state of education over the past 20 years. Teachers started to use computers and ICT tools not only for coaching *Computer Science* lessons, but also to involve technology in the training process of other disciplines. More, the Internet brings a lot of information resources into each classroom and allows open and rapid communication between teachers and students.

According to a survey conducted by *Pearson Education*, 64% of the surveyed students reported a delay when purchasing course materials and books due to the incurred costs. This fact let them in a substantial disadvantage in their study process [5]. In those circumstances, using computers and Internet represent very powerful means for obtaining free alternative sources of information. In this way, the traditional teaching and learning strategies are completed (or even replaced) by new ones, which involve ICT tools and modern approaches, developing therefore the concept of *e-Education*.

It is obvious that the way in which people work and communicate is changed by the modern technologies, nowadays. In this respect, it becomes important and necessary - from the educational point of view - the transition from a traditional training, which is teacher-centred, to a modern student-centred training that involves new technologies in a massive amount. The advantage of using ICTs in education is major, the teaching-learning-evaluation process becoming very attractive for the students - it can be said that ICTs have the role of *changing agents* for education [6].

The e-learning concept fundamentally offers an efficient and convenient access to new information, new and efficient methods of teaching, learning and evaluation of knowledge. By the admission and development of *multimedia* and *Web 2.0* technologies in educational demarches, both challenges and conveniences have been brought [7]. Trying to enumerate the conveniences of using multimedia and Web 2.0 tools, we can emphasize - first - that many of them offer the convenience of cost, being free to use. Then, most of those tools offer convenience concerning the storage - websites retain the work, being easy to approach different topics or projects, since the content is saved in an "*Internet cloud*". Another key aspect is represented by the collaborative features offered by many Web 2.0 tools. Thus, the teacher can share the documents with students or colleagues, all of them being able to improve the content, due to the facilities of simultaneous editing of documents between two or more users.

Thinking in this way, it is important to redefine classroom activities based on the former teaching routines, being needed to rethink the training process through the perspective of correlation of the scientific content with daily life problems of our society and to involve ICTs in order to obtain more relevant and useful information and to introduce modern teaching methods to study a certain topic or solve a specific problem.

As a major component of e-Education, the *on-line education* offers the possibility to automatize the processes that in traditional training had to be assumed and performed by the teacher**.** This means that the instruction has a strong *individualisation* character, proposing methods which are typically applicable for group work as well, starting from listening to lectures, reading articles, watching presentations, simulations, demonstrations or experiments, and finishing with virtual journeys in museums or finding and analysing information from different sources independently [8].

According to the general policies and objectives of education, provided at European level and assumed by Romania, the following directions regarding the use of ICT in education are:

- ICT in curricular activities of educational system;
- ICT in extra-curricular activities of educational system;
- ICT in programs dedicated to teachers' continuous professional development.

When using ICT in the teaching-learning process, five specific levels are recognised:

- occasional use of ICT tools (hardware: video projector, interactive table etc.; software: word processing applications, presentations etc.);
- adaptation of ICT tools and its assimilation in traditional teaching demarches;
- redefinition of teaching methods by considering the role and importance of computer assisted instruction;
- changes in the philosophy of designing the educational demarches, through reconsidering the role of the teacher in conjunction to the use of ICT tools;
- curricular projection of the instructive-educational process, starting from its objectives - needed to be adapted to the actual societal requirements.

In this respect, the *EduWeb* project: "*New Competences related to the Using of Multimedia, Web 2.0 and Virtual Instrumentation Applications - A Guarantee of University Degree Quality*" (POSDRU/156/G/137464, http://eduweb.ssai.valahia.ro/) aimed to provide students with extensive learning opportunities and specific competences adapted to the needs of the actual information society. In the frame of the project, the students (most of them future teachers) have the possibility to be enrolled in new-designed courses which promoted the use of multimedia applications and virtual simulations. More, the *EduWeb* project team developed activities having in view the reorganization and improvement of the quality of the educational demarches, by adapting a part of the curricula to the labour market requests. At the same time, there were taken into consideration the extension of the opportunities for students to learn particular aspects related to the implementation of ICTs in education, in order to obtain new competences, suitable for the nowadays information society.

3. METHODOLOGY

The research tried to find an answer to the measure in which digital competences were achieved by the students who participated to the project course entitled "*Multimedia Systems and Web 2.0 Applications in Education*". The course objective was to make students to gather knowledge, competences and abilities related to the use of multimedia technologies and Web 2.0 applications in the educational process, but also to improve and even to design multimedia and Web 2.0 applications, according to the actual educational criteria. The main target group who participated to the research consisted of 120 students involved in the dedicated study programmes proposed by the Teacher Training Department from Valahia University Targoviste, Romania.

The applied questionnaire included: (a) two items with pre-coded answers, structured on a Likert scale with five steps, preconfigured as follows: *to a very great extent*, *to a great extent*, *to some extent*, *to a low extent* and *to a very low extent*; (b) two items with closed answers, defined on a scale from 10 (*total agreement*) to 1 (*total disagreement*), built to emphasize the students' opinion concerning the achievement of the digital competences related to the efficiency/advantage of a training activity based on ICTs usage.

The questionnaires have been accomplished by the students in conditions of confidentiality, the resulted data being processed using statistical-mathematics analysis.

4. RESULTS AND DISCUSSION

The use of the new information and communication technologies in the teaching process can be achieved through numerous alternatives, close-fitted by the fundamental didactical assignment, but also taking into consideration the teacher's creativity. For example, during a lecture, the computer can be used by the teacher to simulate a scientifically model or to initiate an interactive debate. Also, a group of students can use the computer to obtain useful information for the process of obtaining an assignment on the Internet, to discuss, to debate, to collect information and to show the data. According to those considerations, Fig. 2 shows the students' opinions who have been questioned, emphasizing that, in a great majority (80%), they considered ICT to be very necessary in their pedagogical formation (as future teachers).

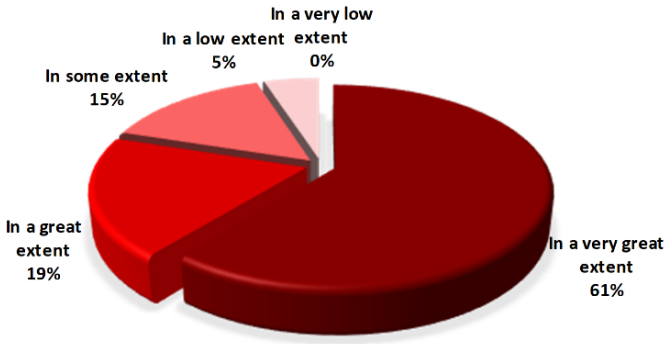

Figure 2. Students' feedback concerning the importance of ICT in their pedagogical formation.

In Fig. 3, it can be seen that 77% of the students expressed a great interest concerning the use of the multimedia and Web 2.0 applications in the classroom.

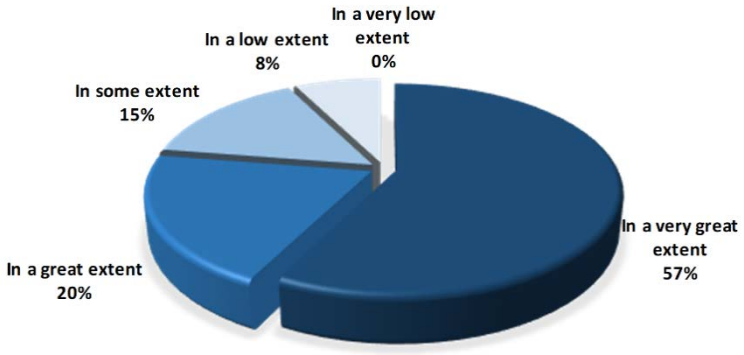

Figure 3. Expressed students' interest concerning the use of multimedia and Web 2.0 applications in the classroom.

Analysing the students' answers presented in Fig. 4, it can be emphasized that the majority of the respondents (67.5%) are successfully using the computer and Internet for educational purposes (approaches), being able to project a didactic scenario based on the use of ICT (52.5%). The development of ICT tools, in order to include them in didactic activities, also constitutes a fundament of the didactical demarches, 55% of the respondents accentuating on this aspect. Over 50% of the questioned students reiterated the fact that they can introduce in practice or are able to incorporate multimedia instruments (57.5%) and Web 2.0 applications (50%), but also educational software (52%), in didactic activities.

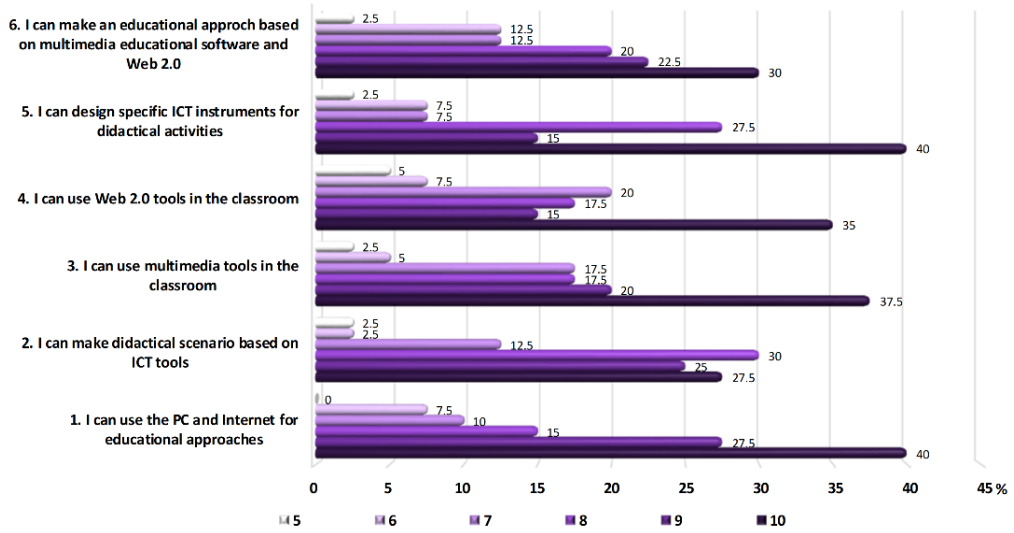

Figure 4. Students' feedback concerning their acquired digital competences.

The inclusion of the ICT resources in the teaching strategies constitutes a variable that favours the growth of the learning efficiency, having a positive impact on the student, but also on the teacher's activities. In order to catch up and maintain the students' interest, it is necessary to use a merge of teaching methods which include ICT instruments, comprising of a *lesson plan* well-structured and designed. A lesson which exploits the advantages of the Internet and multimedia technologies can be considered a format of a *virtual teacher*, showing a higher support through: previous lessons with multimedia support, practical activities assisted by the computer, evaluation instruments, and cooperative learning instruments.

The majority of the students (over 75%) appreciated the efficiency/advantages of a training demarche based on the ICT tools. At the same time, the students tried to identify the main advantages offered by the use of ICT tools in the educational process (Fig. 5). Here, there were stipulated: (a) increasing students' interest and motivation for learning; (b) capturing/maintaining the students' attention; (c) facilitating the transmission and assimilation of knowledge; (d) making connections between science and real life; (e) facilitating the evaluation and making it more relevant; (f) optimizing the teacher-student relationship.

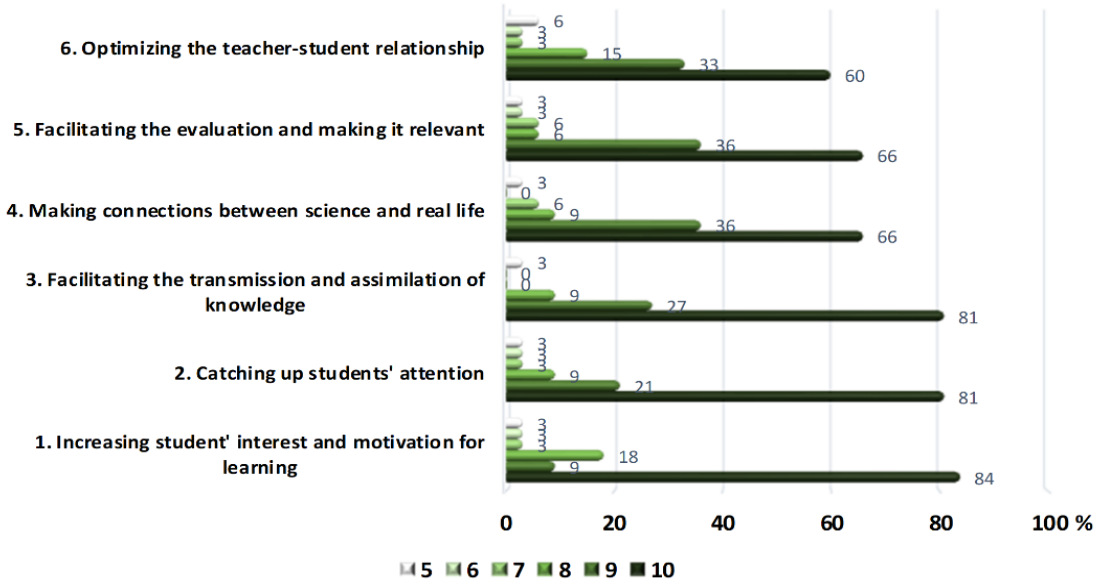

Figure 5. Students' feedback related to the advantages of using ICT instruments in the educational process

5. CONCLUSIONS

The European countries fully understood the role of ICT in education, its valences on mastering the students' basic competences and its important role and contribution on defining the core of education - the digital skills must stay in-line to reading, writing and numeracy. In this respect, the introduction of ICT in school, but also in out-of-class activities, contributes to a great extent on improving the student's learning results. ICTs can be adapted to the students' learning needs, but also to the teachers' teaching needs. The use of ICT in the teaching-learning processes make students more attentive to what is taught, increasing their receptivity and interactivity, stimulating their creativity. On the other hand, using ICT in the educational process helps to the development of digital skills (not just for students), to work collaboratively in projects and to solve problems faster and with great accuracy.

It is commendable that university students are aware concerning the positive impact that ICT has on teaching and learning, offering to them new possibilities, with positive results on students' performances and achievements. Their feedback - expressed at the end of the *EduWeb* project - illustrates that they know, understand and valorize the digital world, trying to successfully integrate and exploited it in their future careers, as teachers.

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