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Internationalization of Higher Education at Home. An Initiative for Teaching Informatics

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Abstract

There is an increasing trend towards internationalization of the Romanian universities, as an expression of the possibilities arisen by globalization. In this context and within the framework of a project developed together with Università della Svizzera italiana from Lugano, “Vasile Alecsandri” University of Bacău aims to improve its study programmes in Informatics, a field with an important role in the sustainable economic growth. An important perspective in teaching Informatics is related to the collaboration and communication skills that students need to acquire. Because nowadays, most of the work teams are international, we consider providing our students a double-degree master’s programme. In order to determine the opportunity of such an initiative, we have explored the profile of the graduates in Informatics from “Vasile Alecsandri” University of Bacău, as well as the interests of the final year students. The study allowed us to envisage the topics that the students are interested in, therefore, to design the most appropriate curricula for the double master’s degree.

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1. Introduction and context: joining experiences for better education

The process of defining the concept of internationalization of higher education is still in progress. Therefore, the specialty literature brings out plenty of facets of it (De Wit, 2011). These can be ordered in an array of terms which is limited by two acceptances. The restricted meaning targets the international integration of the content and of the

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epistemological perspectives only, for each academic discipline. The broad meaning refers to the integration of all the intercultural processes which are involved in teaching and research, as well as in the services that support the specific processes in universities (Kreber, 2009). Given these wide perspectives, the analyses made upon the phenomenon of internationalization of higher education are becoming more and more complex (Kehm & Teichler, 2007). The internationalization at home collocation conveys a species-concept according to which “the majority of students (and staff) are not mobile and thus, the opportunities for developing cultural capability will not be gained by travelling to other countries for study or work” (Trahar & Hyland, 2011).

For higher education, the internationalization (as it evolves in the globalization era) gives a real opening towards the exchange of best practices. These may lead to new and fertile opportunities for both the teaching process (including design and implementation of new study programmes) and the research process. The following list includes some of the most convenient internationalization modalities, often used in higher education institutions: mobility (both for students and for academic staff); international cooperation in education and research through international consortia (Kreber, 2009; Trahar & Hyland, 2011; Kehm & Teichler, 2007); cooperative programmes, joint universities (Gide & all, 2010).

It becomes more than obvious that the expected and accomplished effects are beneficial for most of those who are connected (directly or indirectly) with the internationalization process: students, higher education institutions and labour market. The nature of these benefits is equally professional, financial, social, and cultural (Gide & all, 2010), determining a strong effect related to sustainable development (Wright, 2009).

At the same time, the process generates an inevitable series of challenges (Kreber, 2009; Wright, 2009; Trahar & Hyland, 2011; De Wit, 2011; Altbach & Knight, 2007), such as: pedagogical – on curriculum, didactic strategies, specific to the teaching process of every country; psychological, social, and cultural differences in learning needs between home and international students, intercultural communication competencies and teamwork abilities within the teams of international students technical (Cantwell & Maldonado-Maldonado, 2009), regarding quality assurance and recognition; economical and juridical.

In a recent survey performed by the European University Association (2013) together with representatives of higher education institutions from 24 EU member states, including Romania, the importance and the increasing trend of the internationalization phenomenon are underlined: 99% of the institutions either have an internationalization strategy in force (56%), intend to develop one (13%), or have considered internationalization in other strategies (30%) (European University Association, 2013). The same study shows that internationalization at home represents the sixth position in a top of universities’ priorities regarding this dimension.

“Vasile Alecsandri” University of Bacău (hereinafter VAUB) already has a good tradition with respect to internationalization. Since 1998, VAUB has participated in international programmes financed by the European Union. In 2013, VAUB applied for and was awarded the new Erasmus+ Charter (ECHE) for 2014-2020. At the beginning of 2013, the international student population at VAUB was above 4.7% of the total students enrolled, while the rate of those who studied abroad for at least one semester during the academic year 2012-2013 was 1.13%. The openness of VAUB towards internationalization has led to 100 partnerships with institutions in 28 countries worldwide, 103 Erasmus inter-institutional agreements with 71 universities from the European countries and Turkey (during 2013), more and more students studying and staff teaching abroad. According to the EUA report (delivered in December 2013), VAUB was recognized as “a driver of regional development and an institution of high national and international standing.” (European University Association, 2014, p. 24).

In this context and within the framework of a project developed together with Universität della Svizzera italiana from Lugano, Switzerland (hereinafter USI), VAUB aims to improve its study programme in Informatics, a field with an important role at present. The project implemented in a partnership between USI and VAUB is called “Bacău and Lugano – Teaching Informatics for a Sustainable Society” and focuses on issues and trends regarding all aspects of Informatics: education, research, funding, career development, and specific policies. With the support of knowledge and expertise provided by USI in this area, VAUB will improve its capacity to provide graduates with the skills nowadays required on the labour market and enhance the visibility of the Romanian researchers in the European research space. Moreover, the collaboration between the two universities will allow researchers and students to approach issues related to sustainable development, equality of chances and social inclusion.

USI is a young, but very dynamic university, located in the Canton Ticino, committed to bring its contribution to the local economic growth and preservation of the Italian component of Switzerland, as well as the national
progress. It is unique in the Swiss higher education system: 65% of its 3000 students are international, coming from more than 100 countries. The courses are taught in Italian and English. USI’s mission statement - “International, interdisciplinary, innovative” - is reflected in its activity: a multicultural environment, where courses and research are highly original and modern, promoting creativity and excellence.

2. Informatics at Università della Svizzera italiana and the Romanian perspective on teaching Informatics

Despite being young (it was established in 2004), the Faculty of Informatics at USI is known today as one of Switzerland’s major poles for teaching and research in Informatics. Moreover, it has gained an international reputation. Having a small group of professors and hosting researchers from all over the world, the faculty offers study programmes at bachelor’s, master’s and PhD levels and implements important national and international research projects.

The strategy that brought USI’s Faculty of Informatics to this performance was shaped by a broad vision on Informatics (as a discipline that interferes with all the intellectual and societal domains of our world) and by the need to prepare experts that would be able to face challenging jobs and careers. An analysis of the teaching and research processes, as these evolve at USI, reveals the following strengths: a curriculum based on the fundamentals of Informatics at bachelor’s level, but driven by a project-based approach in order to foster system thinking; in-depth study of theoretical knowledge combined with a practical approach at master’s level, on four very actual master’s degrees; the constant concern to develop in students: abstract thinking and generalizations skills, problem-solving, communication, and collaboration skills, project-management and teamwork abilities; an interdisciplinary approach to Informatics: the topics addressed by both students and researchers are connected to various areas, such as earth sciences, medicine, social issues, communication, sports, etc.; contexts in which problems can be analysed, and solutions can be designed and implemented; an environment promoting active, enthusiastic life through a wide range of activities for the whole community of students, researchers and professors.

The Romanian approach on preparing specialists in Informatics has been designed, at the national level, with the support of the universities (including the technical ones) with a long tradition in this field of education (Bucharest, Iași, and Cluj Napoca). In this regard, a general perspective is given in Postolica et al. (2014), in connection with the related field of Mathematics. The Romanian government has constantly supported the development in teaching and research infrastructures dedicated to this area. Nevertheless, the progress in Informatics is known to be the most accelerated among the other domains of human knowledge. Therefore, the academic staff and the management of higher education institutions had to come up with various modalities meant to offer the students in Informatics the best training, so they can face the challenges and requirements on the job market.

“Vasile Alecsandri” University of Bacău offers two study programmes at bachelor’s level in the field of Informatics: Information Technology (4 years) at the Faculty of Engineering and Informatics (3 years) at the Faculty of Sciences. While the first is more hardware-oriented, the second is based on a strong theoretical background. Both programmes are relatively young (each one having produced, so far, four series of graduates). There is only one master’s study programme in Applied Informatics, at the Faculty of Sciences. Erasmus mobilities abroad have been available since 2008; therefore, the best students have been given the chance to be engaged in multicultural study-groups and environments. The theoretical background provided by the courses is doubled by practical activities (mostly laboratories) and practice in companies. Besides these traditional forms of education, there is a strong collaboration between students and professors, due to the (relatively) small number of students. During the last years, several IT&C companies located in Bacău have employed students from Informatics. Graduates are also successfully working in banks, administration or have developed their own businesses.

3. Research design and methods

Considering the need of professionals in Romania and the educational offer of the Romanian higher education institutions in Informatics, “Vasile Alecsandri” University of Bacău together with Università della Svizzera italiana of Lugano framed the project “BLISS: Bacău and Lugano – Teaching Informatics for a Sustainable Society”. The main goal of this project, launched in September 2013, is to develop a joint master’s programme in Informatics,
designed to approach the content that covers issues regarding the sustainable development and the environment. In order to study the opportunity of this initiative, we have developed a research endeavour among graduates and students in their final year of the bachelor’s programmes, namely Informatics and Information Technology.

The defining aspects of the study are the following. **Aim of the research:** to substantiate the opportunity of developing a double master’s degree in Informatics, at VAUB; **hypotheses of research:** if the interests of the students relate to the actual environmental issues, then we can establish the most appropriate collaboration with USI with respect to a double master’s degree in Environmental Informatics; **objectives of research:** 1. to identify the areas in which the graduates in Informatics display their competencies; 2. to identify the fields of interest of the final year students towards master’s studies; **period of research:** October 2013 - March 2014; **investigated samples:** in order to reach our objective, we performed two exercises, on 172 respondents (out of the 241 who graduated in 2011, 2012 and 2013) from Informatics and Information Technology at VAUB, and on 105 students in their final year (graduating in 2014) of the same study programmes; **research methods:** statistical analysis of the databases with graduates, interviews and questionnaires with fixed and open items.

### 4. Findings

The alumni databases have been explored and revealed the following synthetic information for the graduates of 2011, 2012, and 2013: the employability degree is good (71.88%, 75.28% and 75.00%, respectively; the status was recorded six months after graduation) and among those employed, an important share are working in their field of expertise (73.91%, 58.21%, and 66.67%, respectively). The 172 respondents of the three series already graduated or were currently enrolled in master’s programmes, as follows: 37.50%, 47.19% and 38.64%, out of which 70.83%, 95.24% and 79.41% studied or were studying in the field of Informatics.

One of the open questions addressed to the graduates was designed to reveal what they considered to be the most useful experiences they have had during their bachelor’s studies, which helped them to comply with the requirements of their jobs. It appeared that, as students, they learned efficiently from: laboratories and other practical contexts; team work; a practically-oriented approach, meant to build solutions for daily problems; the diversity of the technologies, programming languages, and algorithms they learned to use; projects and challenges, regardless of their type. Moreover, they appreciated that they mostly used: knowledge (89% of them mentioned this category of acquisitions), practical skills (56%), attitudes (25%) and values (22%). Only 8% of the graduates moved to another town (most of them in Bucharest).

The answers provided by the students in their final year of the first Bologna cycle have revealed that: a) after graduation, 29.27% of them intend to enrol only in master’s studies, 36.83% intend to apply for a job, while both options are targeted by 29.02% and 4.88% declared another intention (such as leaving Romania in search for a job abroad); b) 68.29% consider the possibility of setting up their own business; c) 26.83% of the students consider that the priorities which the society should solve in order to progress are at the local level, 41.46% of them place these issues at the national level, and 31.71% at the European level; d) according to their opinion, these priorities can be solved by means of the perspective of a single field of science (14.63%), by means of a multi-disciplinary approach (26.84%), by means of an inter-disciplinary one (19.51%) and for the rest (39.02%), the best approach is transdisciplinary in nature; e) 87.80% of them consider that the work of a computer scientist needs creativity, while the rest (12.20%) think that anyone can learn and perform in Informatics, if he/she is sufficiently determined; f) the instruction offered in Romania in Informatics is considered by students to be: at the same level as in other European countries by 31.70% of them, at a higher level by 7.00% (the excellent results of the Romanian computer scientists were mentioned here), at a lower level than in other countries by 7.32%, while more than a half (53.98%) cannot appreciate the issue under discussion. Finally, only 2.85% of the students have ever heard of the double-degree programmes. An open item addressed the preferences of the students regarding the domains in which they would prefer to work. The list of their answers includes: banking, design, automotive industry, electronics, mechatronics, and medicine. In addition, we were also interested in what students would like to experience during their initial training. Among their requirements, we can enumerate study trips, courses with experts working in various fields, which could reveal them practical aspects of Informatics, internship stages, a better correlation between the competencies they acquire and what the market jobs require, meetings with the university’s graduates who have already been performing in successful jobs.
5. Discussions and conclusions

Nowadays, there is an increasing demand on organizations that have responsibilities concerning the environment to provide timely, accurate, accessible, and comprehensible information. Environmental Informatics is an interdisciplinary field that results from a blurring of the boundaries between the environmental, computing and information sciences, and a number of areas in the social sciences, dealing with research and development of systems that allow the creation, collection, storage, processing, modelling, interpretation, display, and dissemination of data and information coming from the environment. It is a field producing both innovative theoretical outputs and practical solutions. Environmental Informatics not only uses computational and analytical techniques to solve environmental problems, but it also addresses the societal issues behind these problems. The competencies that allow a specialist to work in this area - such as knowledge integration between various fields of science, use of big and complex data, specific management tools and services – cannot be acquired during regular courses. Moreover, the infrastructures that process this kind of information are not usually available in universities.

The above-presented study allows us to conclude that the envisaged double-degree master’s programme in Environmental Informatics at VAUB appears as a reliable development of the study programmes in Informatics and that it may have an important impact on the stakeholders in the region. Prior to the introduction of this master’s programme, the university has been engaged into some preparatory actions meant to improve the students’ professional and language skills, as well as their research competencies. This study has also proved that most of the students are aware of the environmental issues. The Students’ League and the Department of Professional Counselling have an important role in bringing them close to this perspective, since both structures have been implementing various projects on environment-related topics. By promoting a cutting-edge field, such as Environmental Informatics, the two higher education institutions from Romania and Switzerland have been joining their forces to support the priorities of mankind.

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