Replicating enterprise environment using Office 365 to enhance graduates’ employability

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Abstract. The need of faster insertion of graduates into labor market and enhancing professional and soft skills of graduates required by employees, conduct to new learning method necessity. Starting from stated foreseen of Europe 2020 strategy, creativity, entrepreneurship and intensive use of ICT should be enhanced soon to all academic levels. Also, the entrepreneurs require that graduates to have strong organizational knowledge, to quickly integrate into company’ business processes. The traditional assessment of students implies an individual form, team assessment being avoided to be sure of each individual contribution. Also, the future Industry 4.0 implementations will ask for interdisciplinary skills regarding ICT use and specific digital workflows. The proposed enterprise environment replication uses ERP as backbone of IT infrastructure and Office 365 as business workflow tool management. The experience in using ERP as laboratory IT infrastructure for multiple subjects of academic curriculum of the same academic program showed that graduates could focus on internal business process and documents flow rather than learning how to use the software. The Office 365 is used to experience internal workflow of companies, implemented on existent tenants. To enhance the entrepreneurship and innovation, the learning method is completed with simulated enterprise specific activities.

1 Introduction

Recent studies [1] highlight the importance of graduates’ employability readiness and soft skill awareness. In this context, one response could be foreseen by developing a clear roadmap of skills and competencies [2] on national scale. In Europe, a document signed [3] by 47 Ministries of European Higher Education Area reveals the significance of transversal, multidisciplinary and innovation skills. The document states also the aim of signatory parties to enhance the employability and personal and professional development of graduates. The Europe 2020 strategy [4] was conceived as a response to the economic crisis. It covers also some aspects regarding labor market and skills development. The strategy is built around

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seven flagship initiatives. From this paper perspective, the most important aims of this strategy are:
- Increasing the employability rate of 20-64 aged population, from 69% in 2010, to 75% in 2020,
- Targeting of investing 3% of GDP in R&D,
- Reduce the early school leavers drop rate from 15% in 2010, to 10% in 2020 and rise of share of population aged 30-34 graduating tertiary education, from 31% to at least 40% in 2020.

Furthermore, the Europe 2020 strategy, through flagship initiatives, the European Commission envisages various aspects, like agenda modernization of higher education and promotion of entrepreneurship, in “Youth on the move”, enlarging access to ICT, in “A Digital Agenda for Europe” and modernizing labor markets, in “An Agenda for new skills and jobs”.

Having the view defined from above statements and studies, it could be emphasized a series of requirements for graduates, soon:
- Demonstrate strong professional skills, adapted to a continuous changing structure of jobs,
- Have an enhanced entrepreneurial thinking, conducting to new businesses establishment,
- Use extensively ICT in working environment, as communication tools or problems-solving situations,
- Develop innovation and innovative ways of processes approach, regarding new forms of businesses, technological aspects etc.

Regarding Higher Education, also using the same premises, a set of needed measures might be enlisted:
- Sustaining the creativity and creative thinking through learning process,
- Boost the entrepreneurial skills, by opposing students to various forms of learning activities,
- Develop learning methods of enhancing student soft skills.

Regarding these issues, several proposals were made, concerning the learning process [5] and learning environment and teaching materials [6]. The first study proposes the concept of creative classroom. This concept is defined by authors as “innovative learning environments that fully embed the potential ICT to innovate and modernize learning and teaching practices”. Furthermore, creativity is conceived as “innovation and modernization of learning and teaching practices through technologies (collaboration, personalization, active learning and entrepreneurship)”. The second one debates the creative problem solving fostered by creative learning environments supported by ICT. Another interesting approach [7], proposes virtual internships as an innovative learning technique. The paper emphasizes also the concept and implications of this form of internship and, more important, a communication guideline between the internship hosting companies’ representatives and “virtual interns”.

To summarize the above-mentioned requirements for graduates and possible teaching methods used to meet those requirements, therefore are underlined some preliminary conditions:
- Learning environment and teaching method should enhance, both individual and group performance, conducting to positive impact of professional and personal skills acquirement,
Creativity and innovation must be the primary key of learning, assessed through disruptive ways of problem-solving and technological and business processes approach.

Entrepreneurship, highly requested by employers, should be enforced, through various teaching activities, seeking for entrepreneurial attitude, knowledge of entrepreneurship and entrepreneur skills enhancement.

The competency term is seen in the literature “as dispositions to self-organization, comprising different psycho-social components, existing in a context-overlapping manner, and realizing themselves context-specifically” [10] or as a compound of talents, skills and capabilities of HE graduates that contribute to multi-factor productivity gains [11]. A full description of competency concept, etymology and use in Higher Education as competencies-oriented learning is also debated into the literature [12]. The professional competencies target more the ability of the graduate to solve a specific field problem, being technical knowledge. Regarding transversal competencies are more generic, available to major fields of study and more related to group competencies (e.g. communication, teamwork, creative thinking etc.).

2 Academic programs and cloud collaborative tools

Starting from enterprise environment replication, as a base for the teaching method, there are inquired the actual enterprise information system. The backbone of the simulated enterprise system is represented by the ERP (Enterprise Resource Planning). In this case, ERP is a software platform which integrates all business processes and optimize the usage of available resources at enterprise level [13]. The ERP system manages the information flow (products data, customers, suppliers etc.), material flow (inputs and outputs of raw materials, goods, assets etc.) and financial flow (between company and suppliers, customers, third parties etc.).

Previous efforts to replicate the company environment into learning purposes were made using simplified solutions. For instance, Central Training Firms Network / Simulate Enterprises in Romania (ROCT) offers a dedicated software solution regarding company environment replication, being used largely by high school students. The solution is failing to reveal details regarding transactions, internal resource planning and consumption (only wages are registered) and a student activity history. Other initiatives [14] solve partially the student activity history issue but having reduced features in terms of business activity. What is relevant regarding the initiatives presented above, learning methodology development using a company as center of case studies.

Regarding collaborative tools/environment, virtualization comes under various forms. In literature, the collaborative environment is mentioned in terms of virtual teams [15], collaborative tools or collaborative environment [16]. Charting those concepts, in this paper perspective, the collaborative environment it is a set of software components used to facilitate sharing information regarding business and technical processes inside the enterprise.

In the following are presented the academic programs used by both of universities and that might be used in the proposed learning method. The first academic program, which is Microsoft Dynamics Academic Alliance [17] enables student and teachers access to ERP and CRM software license, service and support, access to Microsoft Dynamics Curriculum and training materials and student certificate programs. Both universities deliver subjects regarding ERP, as a system, or, furthermore, is used as infrastructure for various others (accounting, logistics, SCM, retail etc.). The used Dynamics 365 infrastructure is part of Office 365 suite, being delivered as Software as a Service. The second program, oriented to collaboration tool delivery is Microsoft Imagine [18], that offers free software access, training resources and certifications. It is important for this framework, by offering a public cloud infrastructure for Office 365 and SharePoint, which integrates also Dynamics 365. Office 365 deployment has an Active Directory service that might be used for users’ identification and group creation.
3 Enterprise-centric learning method

In the beginning, it should be stated the objective of the learning method. Having in mind facts and actions revealed in the first section, the enterprise-centric learning method proposes to enhance individual and group skills, creativity and entrepreneurship using as central case the enterprise, replicated using ERP and collaborative tools. To achieve those objectives, it is very important to train students not only as individuals but also as part of groups. Other challenge is to focus the student training towards creativity and entrepreneurship, enhancing competition as positive context.

Furthermore, the learning method is described, using four perspectives: learning scenario, learning environment, and software infrastructure and method integration in the actual curriculum.

3.1 Learning scenario – adoption of cloud technologies

The learning scenario starts with an initial evaluation of students. The objective of this evaluation is to determine if the student is more fitted to employee or entrepreneur. This evaluation is made using vocational and personality test and is completed an interview with the university counsellor. After this initial evaluation, the student has the first image of his psychological profile, what kind of jobs are more suitable for him and what skills should enhance during his university activity. After the initial evaluation, students might choose between employee and entrepreneur position. For the entrepreneurs, the learning scenario continues with the first phase of the enterprise lifecycle: the establishment. This procedure replicates entirely the real enterprise registration, comprising activity field definition using CAEN codes, initial association contract signed by entrepreneurs, initial capital and for didactical reasons, all enterprises act in the beginning as Limited Liability Company. If, in the future, the enterprise results allow, the organization form of the enterprise might evolve to joint-stock company. Students-entrepreneurs having teachers support and forwarded to Enterprise Central Register for approval and registration fill in the documents. This phase enhances the creativity of business approach, giving the possibility to students to test their business ideas¹. Part of registration documents and procedures are developed in several forms [19]. The enterprise used for teaching reasons it is named simulated enterprise, training firm or virtual enterprise.

The second phase of the enterprise lifecycle is enterprise setup. After the core business coordinates are established, the entrepreneurs decide the organizational chart, the major business and technological flows. With those details uncovered, they start to hire personnel for key positions in the enterprise: CEO, CEF and HR Chief of Department. Having those positions occupied, further candidates are seeking to fill the rest of position described in the organizational chart. In the same time the Steering Committee (key management positions) redacts the Internal Regulation Policy, Job Description for all position, employment and all documents which further define the internal environment of the enterprise. The next phase is given by enterprise operation, corresponding to ordinary activity of the enterprise. The enterprise setup and operation is registered into ERP systems, in terms of goods offered, product manufactured, production system etc. The role of the teacher in all enterprise phases is limited to mentoring, all decision being made by students, giving them the possibility to encounter success or failing, depending on their decision made. If the employee path is chosen, then the student follows the carrier guidance actions, where they are guided on how to write a Letter of intent, CV and how to apply for job. The end of this path is the employing stage, when the students are employed, by already established enterprises. The object of the employing contract that occur between enterprise and student-employee might be the outcome of teaching projects delivered to various subjects. Is very important to keep the
enterprise close to traditional learning path. In terms of assessment, the enterprise-centric learning method combines individual scoring, for each student activity at the end of the academic semester, judging its activity as entrepreneur or employee, with peer assessment from “employers” part. Therefore, the rest of enterprise staff should manifest their appreciation regarding a student activity. This assessment should measure specific activity features, like creativity, entrepreneurship attitude, teamwork, leadership etc., all being expressed during group activity inside the enterprise.

After acting as entrepreneur or employees inside of an enterprise, students could change sides, experiencing as many positions as they can during their university activity. In fact, job rotation is highly recommended, giving the opportunity to students to experiment various position, to see how it fits to its personal skills and competencies.

At the end of academic cycle, the student activity is re-evaluated, taking into consideration the performances obtained and positions occupied. Together with professional individual scores registered at regular exams, the guidance counsellor could advice the student what kind of job is more suitable for him or what internship is closer to his profile.

### 3.2 Enterprise-centric learning environment

The learning environment has the enterprise as center. However, the enterprise cannot work as an individual and it needs a higher and more complex framework. In this case, the market is recreated by the totality of enterprises established at university level. Replicating the real world, the enterprises could form alliances under the form of clusters, in their pursuit of conquering new markets, to establish monopole positions or to share the operational risk. The missing link into the supply chain is replicated using external environmental, as express business opportunities, given by the tutor environment, in such way that each enterprise to have a least a weekly registered commercial act.

The learning environment replicates the external business environment by guidance teachers, which can impose temporal rules for conducting businesses. In addition, the general framework could imply the application of law or business national frameworks changes (changing of VAT, rules for SME etc.). The learning environment supposes the following actors:
- Creativity and innovation must be the primary key of learning, assessed through disruptive ways of problem-solving and technological and business processes approach,
- Students, acting as entrepreneurs or employees,
- Vocational counsellors, to establish the psychological profile and initial skills pulls,
- Tutor of each enterprise that oversees the overall activity,
- Guidance counsellor, for student final evaluation based on entire student academic activity.

### 4 Office 365 deployment

The software infrastructure needed to operate the enterprise-centric learning method is emphasized in Fig. 1. The internal enterprise environment is replicated using ERP system. In this case, for each enterprise established one instance is created using the same initial setups as in real implementations, meaning importing chart of accounts, creating roles for users, defining production lines, warehouses, locations etc. If cluster organization is chosen (e.g. holding), the Intra-Company feature could be used to consolidate the financial results, stocks of goods, available resources. The students are identified using Microsoft Imagine accounts, created after admission. The tested implementation was done using tenant student.rau.ro of Romanian-American University Office 365 implementation. The deployed tenant has already defined all students in Active Directory, learning facilities are defined as resources and
Calendar function is already implemented for learning activities. Using this experience, a complete company lifecycle was tested in Office 365 environment.

![Office 365 platform](image)

**Fig. 1.** Office 365 platform.

The company lifecycle, presented in figure 2, shows the correspondence between company life stages, technologies used and software settings needed.

![Company lifecycle](image)

**Fig. 2.** Company lifecycle captured from Office 365 Planner for The Company group.
For the first stage, company establishment, the tutor sets a new Office 365 Group, in the above-mentioned example is The Company. After initial selection of the student, that will act as entrepreneur, the tutor sends an invitation using Office 365 Form to the entrepreneur. The entrepreneur fills the form about company establishment, and tutor verify the completeness.

Further, the tutor sets the entrepreneur account as group administrator. All the establishment documents filled using Office 365 Form, are stored into company group OneDrive. If OneNote Class Notebook is preferred, the documents are posted also in Content Library as reference for future company employees.

The second stage has as objective to develop a business plan and financing. The tested implementation used as Connector in group page, choosing what application is fitted to the company, related to company activity field. A complete list of Dynamics 365 apps is given [20]. If Dynamics 365 isn’t available for the region, a client-server instance of Microsoft NAV 2017 can be used. After budget setting in Dynamics by entrepreneur, it is validated by the tutor. The entrepreneur also fills several predefined forms to elaborate the business plan, using Office 365 Form. All documents are revised by a tutors’ committee and the virtual funding is approved.

The third stage envisages position design and students hiring. There are two sequential flows, management positions employment, students assigned to these positions will become also group administrators for Office 365 group and execution positions employment, where students assigned will become members only of this group. Job application can be done using Office 365 Form and the interview may have the support of Yammer or Skype. The assigned students for CEO, CEF and HR are participating to employment of execution positions.

Each settled department of the company uses the Office 365 Planner to plan future activities and assign tasks for execution employed position, monitoring the task accomplishment. Also, the decision flow is decided and implemented using Office 365 Flow. The execution positions receive via email notification and tasks are posted in Office 365 Planner personal section. The assignments are also posted into OneDrive as documents and in OneNote Class Student Notebook section or Collaboration Space if it is a shared task. Posting assignments in Student Notebook which is a private space accessed only by tutor and each individual student allows tutor to properly assess the student activity. The activity impact, depending on subject, is registered by each student into Dynamics 365, having a live status of company operations. Furthermore, all students may use Calendar to make appointments, being integrated with education activities calendar and resources, so if an activity is planned to a specific room, the organizer can check the resource availability in real time.

At the end of semester, the entrepreneur and management positions report the state of the company, using Dynamics features. This is a global perspective of company efficiency, being enhanced with peer assessment (made by all employees) and individual assessment (made by tutor). The assessment is deployed using Office 365 Form.

4 Conclusions and proposals

The enterprise-centric learning method enhance the student individual and group skills and competencies. It allows that students to experience the personal success and failure without the fear of direct negative results. The inquired method conducts to a better enhancement of creativity, entrepreneurship and using collaborative tools, objective stated by European Commission.

The method does not replace the traditional learning method, being complementary. It is suited for either engineering or business major field of study. By acting in the role of an entrepreneur or employee, students learn faster the fact that any decision made reflects on enterprise level, affecting the entire activity. By using this feeling of ownership, the students
are stimulated to obtained better results, by solving theoretical and practical issues, not for a certain enterprise as a case study, they are finding solution for their enterprise. Job rotation assure a broad experience, very useful when the real employment time comes. The method implies the activity of various categories of actors: students, vocational and guidance counsellors, enterprise tutors, and teachers, combining individual scores with peer assessment. The software infrastructure, even it seems to be very complicated at the first sight, replicate the real enterprise environment. University POLITEHNICA of Bucharest uses Dynamics NAV intensively as laboratory IT support, for Industrial Logistics bachelor program. The Romanian-American University is on the third-year experience using enterprise-centric learning method, organizing various activities (including Virtual Enterprise Fair in 2017 with ten exhibitors, with 100 students as audience). Enlarging this activity requires process automation. After successful implementation of Office 365 platform, it is expected that starting from next academic year the enterprise-centered learning method to be fully automated using presented sections. The process automation will reduce the time of filling various documents and provides a collaboration environment. Binding these initiatives may conduct to common enterprise-centric activities where engineers collaborates with IT specialist and economist, as in real companies.

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