Innovative Approach to Education Improvement via Enterprise-Education Collaboration

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ABSTRACT

Purpose: The enterprise-education collaboration is a win-win situation. This paper describes how should be used commonly used LMS for enrichment the education process by collaboration students with companies participating on company's practical problems.

Methodology/Approach: We began with a review of literature and official European documents concerned on Europe 2020 strategy, education innovation and analysis of shortcomings of higher education graduates' skills that are required by companies acting on the labour market. Then was applied pilot test and case study approach to evaluate the usability of designed SP4CE platform.

Findings: Within the paper, we identified most missing skills of newly employed graduated, tested the developed SP4CE platform and find out that using this tool is supportive on the development of skills mainly required by employers.

Research Limitation/implication: The results of pilot tests and single case study as a research strategy cannot be generalised as universal recommendations for any educational needs. It is important to involve into the platform and its functionality, sustainability assessment for more enterprises and not only collaboration effects but also impact of organizational and personal factors need to be evaluated.

Originality/Value of paper: The paper presents an innovative approach to enterprise-education collaboration and its benefits not only to directly concerned participants but also its impact to whole society.

Category: Case study

Keywords: labour market; HR development; collaborative learning; education innovation

1   INTRODUCTION

Globalization, demographic changes (like migration to cities, the ageing population, and the shifts in family size and social norms) and technological changes most influence the Europe's knowledge system. New technologies appear in very fast pace and changes our everyday lives, and significantly influence the way we live. To stay competitive, it seems to be crucial to have an effective education system able to respond dynamically to changes in the company and the labour market (Šafránková and Šikýř, 2016).

As is stated in (European Commission, 2015), there is a need for new skills, new capacity to cope with rapid changes for whole human life. Higher education plays important role in the growth of human capital and creation of a better educated, more qualified and skilled work force (Bauk and Jusufranic, 2014). There are different actions of the European Commission (EC) presented to reach the EUROPE2020 strategy goals (European Commission, 2017a). One of them is the ERASMUS+ Programme under which was project SP4CE (Strategic Partnership for Creativity and Entrepreneurship) developed. The project SP4CE promoted take-up of innovative practices in education, training by supporting personalized learning approaches, collaborative learning and critical thinking using of Information and Communication Technologies (ICT), Open Educational Resources (OER), open and flexible learning, virtual mobility and other innovative learning methods (like MOOC and gamification).

The purpose of this paper is to point out the current state at the field of human resources development in EU and activities needed to be done or actually under realization. Based on the official documents research, the analysis of the basic concept of the developed platform and its practical use, use-case study and pilot testing realization and evaluation is presented.

2   LITERATURE REVIEW AND PURPOSES FOR DEVELOPMENT THE SP4CE PROJECT

Economic and social progress stands on three pillars – research, innovation and higher education system, known as "Knowledge Triangle". European Commission (2015) states that education, research and innovation; universities, laboratories and companies; academics, researchers and entrepreneurs are part of an engine that, if is well managed, creates wealth, jobs, growth and social progress. Connectivity and cooperation among all parts of the knowledge triangle shapes ability to face challenges and secure welfare, security and well-being of EU citizens and allows adapt to changes.

One of the indicators of EU development is innovation. However, no one of pillars of the "Knowledge triangle" could exist separately. Due to the diversity of member countries, it is a huge variation in innovation performance across EU (Figure 1).
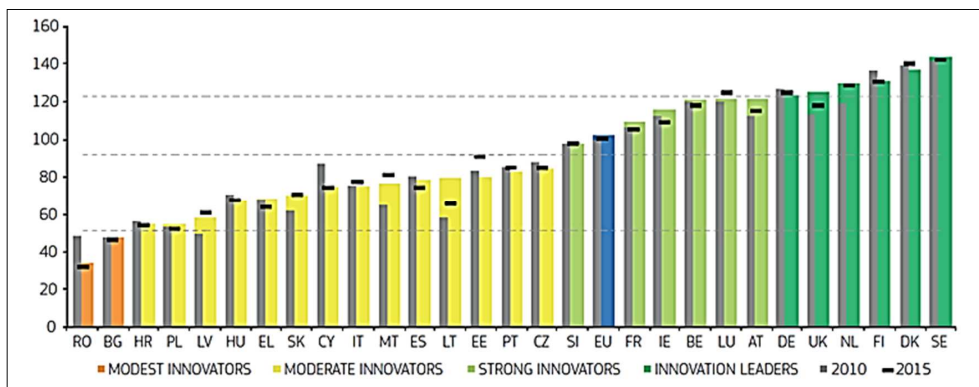
Figure 1 – Performance of EU Member States' Innovation System
(Source: European Commission, 2017b)

Based on European Commission (2017b), the innovation performance gaps among EU countries still remain wide, but to positives could be included that EU members are making a good progress in fields like education and research, in broadband infrastructure and ICT training. The innovation leaders (i.e. Denmark, Finland, Germany, the Netherlands, Sweden, and the United Kingdom) have a balanced national research, higher education and innovation system that performs well. They have many and varied innovation ecosystems, in which people have incentives to connect, learn, adapt and change – across the conventional boundaries of the laboratory, factory and classroom. Universities can act as a catalyst for innovation arise (European Commission, 2015).

From Human capital theory (Schultz, 1961; Becker, 1964) follows that education increases individuals' productivity, what immediately has an impact on increase in job performance. Highly educated people are more successful in the labour market, because education provides marketable skills and abilities required by job (Cai, 2013). Benefits of higher education for the private part of life are employment prospects, higher salaries, and a greater ability to save and invest, which is connected to the public ones - higher earnings raise tax revenues for governments and ease demands on state finances, also translate into greater consumption, which benefits producers from all educational backgrounds (Bloom, Canning and Chan, 2006).

From that point of view, universities have become organizations that have an objective to operate more efficiently in relation to transformations to sustainability. They, together with employers, should take specific steps in order to intensify the cooperation in producing sustainability informed professional who will be able to engage with the economic and social dimensions of sustainability (Zuzeviciute et. al., 2017). Nowadays, seems to be crucial to harmonize learning provided by educational institutions with industry provided continuing professional learning. Both types of institutions focus on different targets of education. Universities are focused on educating people, creating new knowledge, and excelling at execution of existing knowledge, while companies

are concentrated on mastering the challenges of a competitive environment and striving for market success. The industry approach is based on the needs of acquiring, developing and retaining a skilled workforce. Universities co-working with industry may benefit from the knowledge, ideas and practices of working life outside the academy and could better fit currently provided education approaches to the practice needs (Slotte and Tynjälä, 2010; Brijs, 2017).

Creation of new partnerships between education and practice will provide the opportunity to develop and implement new models for sharing the expertise, resources, and power in each organization. Careful development, delivery and evaluation are important in collaborative education, especially clear definition of particular roles of the participants. For most educators, collaborative teaching is new and challenging experience. Research indicates that higher education is more effective when: principles of adult learning are used (e.g. problem-based learning and action learning sets), learning methods reflect the real world practice experiences of students (Zgodavová and Horvath, 2015). Participation on such kind of education gives those benefits in the fields of teamwork, roles and responsibilities, communication and learning and critical thinking (D'Amour and Oandasan, 2005; Rochelle and Teasdale, 1995).

In response to the needs on innovation education in way to improve students' employability higher education institutions had implemented work-integrated learning programs (Hardman and Averweg, 2011; Zgodavová, Kosc and Kekäle, 2001). As is stated in "Exploring 21st Century Skills" (Clarity innovation, 2013), collaboration becomes essential in teaching 21st Century Skills, because students who collaborate also increase their skills in problem-solving, creativity, and interpersonal relationships.

As is stated in Europe2020 strategy document, Europe faces with lack of people adapted to information society needs. Agenda "Education and Training 2020" (Danish Technological Institute, Directorate-General for Education, Youth, Sport and Culture (Shapiro et al., 2016)) set as targets that at least 40% of those aged 30 to 34 should have completed some form of higher education. Despite all official EU and governmental activities and linking practice with education, about 40% of employers continue to report dissatisfaction with the skills and competencies of graduates (Halvorsen, and Ibsen, 2017; Manpower Group, 2017). Based on survey realized in 2015 (Manpower Group, 2017) the employers report following barriers: lack of available applicants (24%), lack of hard skills – technical competencies (19%), lack of experience (19%), looking for more pay than is offered (14%) and lack of soft skills – workplace competencies (11%). The result of the survey realized among employers by Gallup Organization (2010) listed the ability to work in team, computer literacy and foreign language skills as very or rather important (Figure 2).
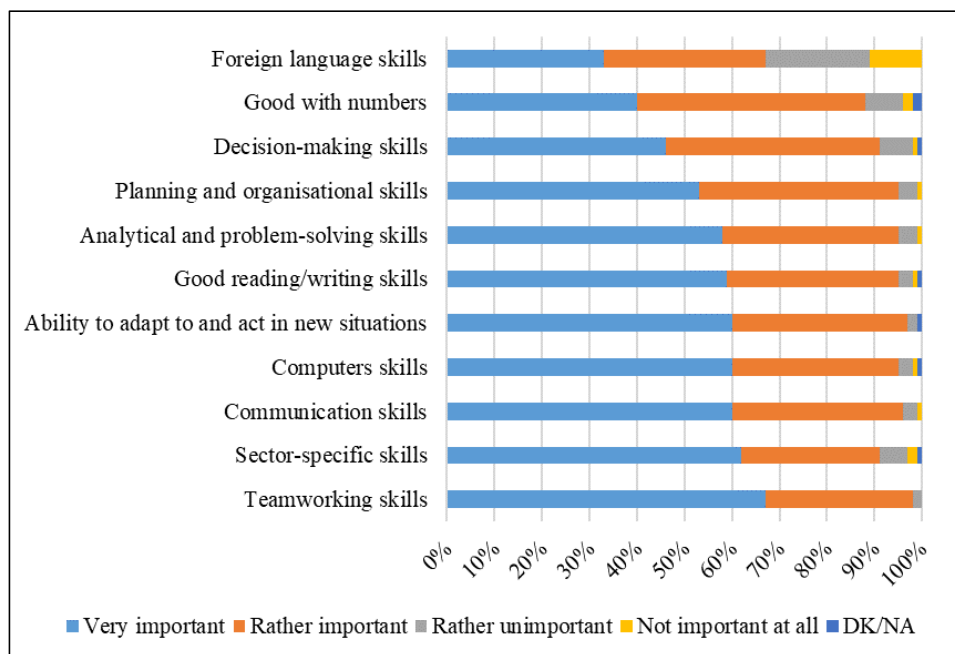
Figure 2 – Importance of Skills and Capabilities for Employers when Recruiting Higher Education Graduates - Percent of Employers Surveyed, 2010 (Source: Own, based on the Gallup Organization, 2010)

Thus, the most important abilities are included teamwork, communication skills, computers skills and ability to adapt-to and act in new situations. The project SP4CE was immediate reaction to this situation. Within the project, the partnership developed innovative tool for collaboration between universities and companies. This, low cost, solution employees well-known LMS Moodle courses as Learning Rooms, where students and companies should collaborate on various problem-solving. Using this platform, students have possibility to work in teams and solve the practical problems under the supervision of a person from the company. From previous follows, that collaboration is essential in teaching 21st Century Skills. Students who collaborate also increase their skills in problem-solving, creativity, and interpersonal relationships. From that point of view, the innovative approach is represented by using well-known education tool not only for educational purposes.

2.1 Enterprise-education Collaboration

Any collaboration is based on the objective of being a win-win situation. The European Commission (2017c) defined the collaboration as mutual engagement of participants on a coordinated effort to solve the problem together. Nowadays, collaboration is considered as an effective tool in education (Clarity innovations, 2013), because of its impact on students' motivation, problem-solving, relationships and creativity. There are various types of work-integrated learning

in higher education, including field experience, mandatory professional practice, co-operative education placements, internships, applied research, project learning and service learning. One of ways, which is the most preferable, that external experts from companies are paid for external teaching at the faculties. However, there are available other opportunities to reach market knowledge and practice and involve it to education for example blended learning. Employing ICT in collaborative learning, the academics and employers have a wide range of various collaboration tools, for example, standard internet tools and services (forum, blog, wiki, cloud-based text editors, spreadsheets, presentations, etc.) or specialized learning environments (e.g. LMS Moodle) with much more functionality. In case of more complex enterprise-education collaboration use of the LMSs seems to be the best choice, because the LMSs provide almost all necessary tools from mentioned eight categories, except visual and audio creation. In addition, use the LMS provide another one benefit, students work with an environment known to them because almost 64% of university students use one of LMS (LMS Moodle, Blackboard and Sakai) on regular basis (Fabuš and Fabušová, 2015).

2.2 Project SP4CE

SP4CE (Strategic Partnership for Creativity and Entrepreneurship) was a project funded by the European Commission under the ERASMUS+ Programme (SP4CE project consortium, 2015). The project SP4CE addresses the aims and needs identified in Bruges Communiqué on enhanced European cooperation in vocational education and training, especially that one "improving the quality and efficiency of Vocational Education and Training (VET) and enhancing its attractiveness and relevance" and "enhancing creativity, innovation and entrepreneurship" (European Commission, 2010). The main purpose of the project was to design innovative common e-learning tools for collaboration between students, enterprises and teachers. It is concentrated on identifying users' needs and supports the development of relations between them by mentoring and consulting activities. Those tools are available as ICT solution with web interface designed for three main target groups: Coaches (HR staff from enterprises), Mentors (teachers at vocational schools, universities and high schools) and Students (mostly young people who want to enter the labour market). Final product (the SP4CE platform) supports establishment and keeping the collaboration between students, enterprises and schools.

2.3 SP4CE Platform

The SP4CE platform proposes low cost, resp. no-additional cost solution to these problems. Anybody interested in cooperation can read general information about the SP4CE project and via challenge "Send us your project proposal" published on the portal, can anyone call for the help. After publishing challenge, the university teacher replies on the challenge. Via discussion tool at the portal company describes the requirement in more details and discussed it with the

teacher. Since both sides of communication agree on fact, that there is need for materials that cannot be published public, HR manager asks portal administrator to open a new Learning Room (LR) for newly formatted group and collaboration is established and using particular LR could be maintained (Figure 3).
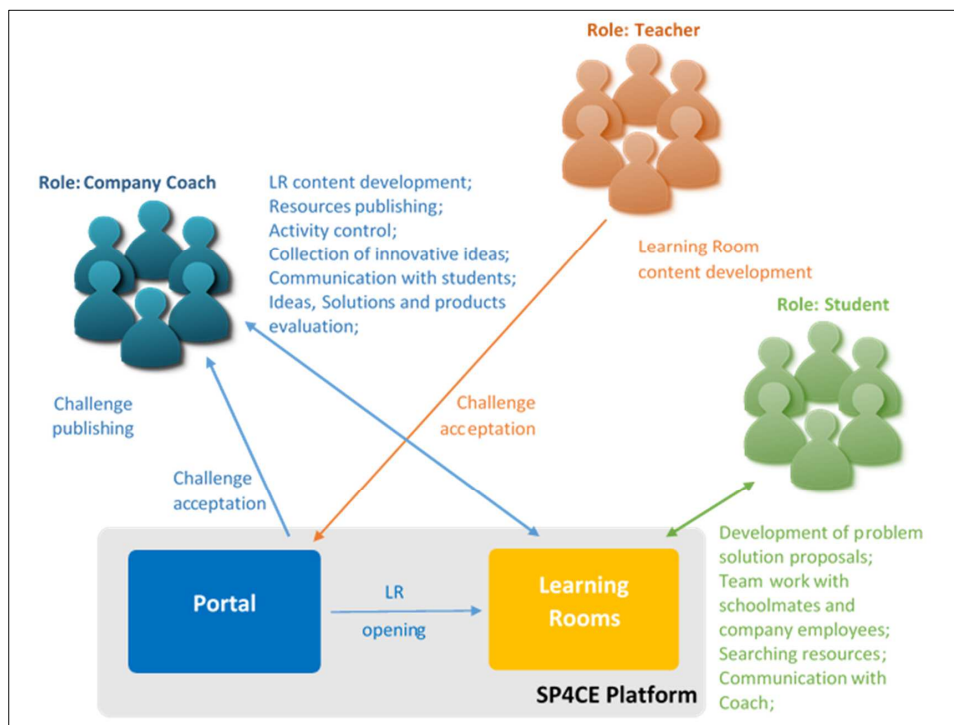

Figure 3 – SP4CE Platform (Source: Own Contribution)

The main idea of the SP4CE platform is to provide the list of Learning Rooms (LRs) concerned on specific problem that company face and publishable sources to help students understand the problem itself. Teacher/Mentor help coach to provide materials that are useful for students, to prepare place for discussion, interactive cooperation, new solution proposals and evaluation. At the same time, mentors (teachers) by using this system help students to establish successful cooperation with coaches from companies. Afterwards, students in connection to coach and teacher try to find out solution to provided problem. The platform this way involves users from different departments/organizations/companies working together in teams on specific project and tasks. This approach helps to make the most of all students' talents and abilities and enables functions to work together more effectively. That procedure could be a preparation of students for their work-life and may possibly result in the employment in this company in the future.

The SP4CE LRs are based on LMS Moodle, which is well-known Learning Management System (LMS). The LMS provides a wide range of not only

authoring tools, but features support the learner needs (social activities, resource and learning management, activity controlling, and personal publishing). SP4CE platform distinguishes four different roles – local administrator, coach, teacher and student – with a range of activities depending on the role of the user.

To reach this effect environment of LR provides following features for publishing information sources (eBook, file, label, page, external URL), for three level of activities concerned on individual work (assignment, lesson, quiz), on communication (survey, choice, chat) and for collaborative work of LR participants (glossary, dataBase, Forum, Wiki, Workshop)[1]. Coaches and teachers manage all specific tasks needed to be done during the problem solution. LR users' team consists of members with their own specialism and expertise, knowledge related to the problem, which needed to be solved. Using this collaborative environment takes students out of their usual studying to co-work with other with different ideas and knowledge and at not least with people from real companies. Everybody can use own competencies and skills to reach the best result.

3   RESULTS

3.1   Case Study: Using SP4CE-based Collaboration Between T-systems Company and Technical University of Kosice

T-Systems operates information and communication technology (ICT) systems for multinational corporations and public sector institutions. This company actively participates on the educational process at our faculty (Faculty of Economics, TUKE) through practical lectures, exercises and specialized subjects concerned on using specialized software and the company's processes, via internships of our students directly in the company or via various student competitions and the labour supplies. Quite often form of cooperation is work on real projects, resp. participation on the solution of the different problems through bachelor's and master's thesis. Searching for students for such kind of work is not easy. At present, this process is carried out following: the company offers a problem/cooperation to faculty management. Then the teacher that is interested in such work is searched using faculty's mailing list. Afterwards, the teacher tries to find the students. This process takes a long time (app. few weeks) when neither knows whether it will be a demand from the students' side for such a project/cooperation. In many cases, the result is, that companies stop propose such kind of cooperation to universities despite of interest from the side of universities. Despite the fact that on both sides of the process is interest in cooperation, collaboration often does not occur because, possible participants are not informed sufficiently and on time.

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[1] The description of particular features used in LRs is available at https://docs.moodle.org.

The above-mentioned problem should be solved by using SP4CE platform by following: T-Systems published the challenge for design new projects (development of project proposals) about possibilities to develop Slovak regions using IT and EU funding. The technical university responded to the challenge and initiated the "Project Design and Management" LR and its integration into a course taught at the Faculty of Economics. Prior to the launch of LR, T-Systems' representatives and the subject teachers prepared LR content together, i.e. supporting materials for project design phase (project proposal development), roles within the project management and realization, methods of project realization in practice. Subsequently, participating students used not only prepared materials but also used various tools available in the LR environment for collaboration and communication within the course and among all work-team members. Through the LR, they became a part of real work-teams and their schedules and they actively could participate during the preparation of the project proposal. The interim results of the teams were uploaded to the LR, and were visible to the others and subsequently discussed in case of some problems arisen. Coach and mentor continuously commented these results, to allow remove mistakes by students' teams on time. Finally, coach, who evaluated the practical benefits of the project from the challenge point of view and the whole process of the project proposal design, evaluated every team project. Referring to the sub-competencies of employment and sustainability, we may state that this form of collaboration between the enterprises and universities provides an array of opportunities to educate students in almost all the sub-competencies of sustainability: transformative, communicative, and cross-cultural.

3.2   Outcomes, Lessons Learned

As has been mentioned, the SP4CE platform represents a low-cost solution, allowing simple, fast implementation, by using a user-friendly environment, simply scalable and supportive of the company's needs by its variety of plug-ins. There were established new contacts among educational institutions and companies. Even though mentioned positives, from the sustainability point of view there has been arisen some shortages of it, which are caused not only environment itself, but by the users: lack of motivation to use the system (especially from the bachelor study level students), which was caused by misunderstanding the main principles and objectives of the SP4CE platform. Adding more often and students' activity demanding tasks was this problem solved. More involved were students of master study level, because they are interested in participation on practical problem solving and for them it was a challenge to be part of real company work-team. The usage of other communication channels for work-team (e-mail, Skype), was the second problem arisen during pilot testing. It resulted into time delays, misunderstandings and inconsistencies in project solving schedule. Among other critical success factors should be concluded also dissemination of platform existence on both – education and companies – parts (for example at Slovakia took part on pilot

testing and following use only T-Systems company, but at Poland was the platform used more often, also for organizing the international conferences and workshops).
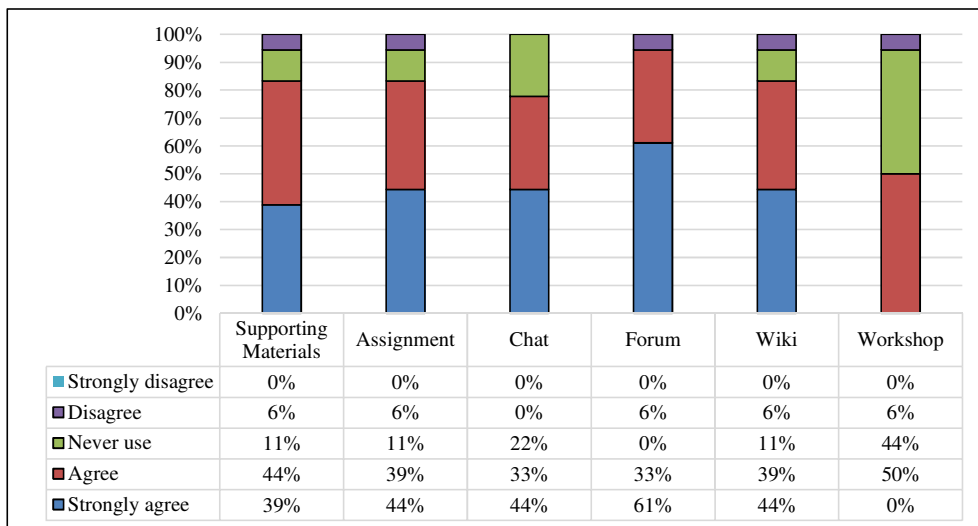
Based on pilot testing results and case study analysis, the LR effect should be generalized following: Companies have access to different interesting, innovating and untraditional solutions of the problems that they have to face and the SP4CE provides way to find innovative approaches and young and creative people, their potential future employees. The platform provides a possibility to find solution also via diploma thesis, where the student has more time to get into the more complex problem, into an enterprise environment and processes and provide more scientific approach. Via connection and collaboration with education institutions, they achieve the possibility to affect the content and style of education at educational institutions and get more precise information about a real knowledge and skills of students. Using platform, teachers should get access to contacts to people from external companies, what should lead to possible future cooperation not only via SP4CE but on projects, company education etc. Thanks to collaboration with practice, they could reach overview to marketplace requirements and find the way how to connect education with practical life and improve the education content and style. And finally – students – achieve free of charge possibility to reach different practical skills and knowledge in real company environment and possibility to check collaboration work style with different kind of people (nation, specialization, etc.) before their participation on the labour market.

3.3   Pilot Testing and Discussion

The designed SP4CE platform was tested during the pilot testing phase in 2016 – 2017. All partners' institutions of the project did pilot testing. There was created 121 Learning Rooms for four participant countries – Poland, Greece, Hungary and Slovakia with 476 registered users from 22 European countries. From the point of view of roles in the SP4CE platform, there are 5 Local (Country) Administrators, 48 Mentors, 23 Consultants (Coaches) and 409 Students in total. To support the pilot testers, the short videos about the functionality and types of services in Learning Rooms were developed and uploaded to YouTube. All pilot tests were realized following the goal – to check whether using the SP4CE platform is possible to fulfil the main project goal, to develop a tool enhancing collaboration between enterprises and universities. Every pilot was realized following the same scenario mentioned in the previous case study.

In order to carry out the evaluation of the platform functionality, a dedicated Learning Room (named "SP4CE - Evaluation") was opened. The pilot tests participants with different roles were asked to answer an interview concerned on the utility and functionality assessment of the SP4CE platform, as well as opinions on the tools they use in particular study rooms.

From the realized interviews follows, that vast majority of participants consider layout and form of the SP4CE platform (83.3%) and LR concept (94.4%) as clear and easy to use. Sixteen participants (88.8%) confirmed that the exemplary learning room and training videos created for testing the platform were very useful. The evaluators were also asked to sign the most frequently used Moodle tools and to indicate the ones they consider the best which best fit their needs, so which tool was most often used during the platform and learning room testing (Figure 4).

	Supporting Materials	Assignment	Chat	Forum	Wiki	Workshop
■ Strongly disagree	0%	0%	0%	0%	0%	0%
■ Disagree	6%	6%	0%	6%	6%	6%
■ Never use	11%	11%	22%	0%	11%	44%
■ Agree	44%	39%	33%	33%	39%	50%
■ Strongly agree	39%	44%	44%	61%	44%	0%

*Figure 4 – Satisfaction with Mainly Used Tools in SP4CE Learning Rooms
(Source: Own Contribution Based on SP4CE Project Data)*

From Figure 4 follows, that not only tools that help collaboration are important to the participant, but also the appropriate supporting materials and assignments are really important for their future progress in the LR' topic. Because the project itself was concentrated on development and support collaboration between educational institutions and companies, we were interested in what is the pilot test participant' opinion about the best collaborative tool. From this point of view as the best tool was considered the forum tool (29%), followed by supporting materials (23%) and wiki sections (18%).

4   CONCLUSION

The prerequisite of the practice is to define the schedule of modern education and the curriculum, centred on the demand of the enterprises and enhancing the students' practical ability, and preceding from the practical situation. In order to enable universities to prepare students for practice, it is necessary to involve practice into education actively. Both large and small companies can no longer rely solely on their human resources, but the network of specialists working in

the different spheres of human life. Companies extensively encourage, explore and use external, or exchange internal, ideas to advance their technology – they operate in innovation ecosystems', where suppliers, academics, government programmes, individual consumers can take part. As a result of these innovation alliances, collaborative undergraduate, postgraduate and doctoral study programmes with placements, joint training and supervision, have become important recruitment routes allowing small companies to grow and expand.

The project SP4CE and its LRs represent innovative approach based on well-known LMS Moodle, for establishing contact between education and practice, what fulfils one of headline target of (European Commission, 2010). Using platform familiar to students and teachers is one of the pros of provided solution. It involves users from different departments/organizations/companies working together in teams on specific project and tasks. This approach helps to make the most of all students' talents and abilities and enables functions to work together more effectively. Realization of LR is a win-win solution – enterprises achieve new channel to find appropriate future employees and prepare them during their university study and universities should improve and innovate their curricula to fit better to the labour market and Industry 4.0 society needs. Based on the success of the SP4CE platform, the partnership of the project continues in their effort and project SP4CE is followed by new ERASMUS+ project, where the dedicated Learning Rooms will be established and used by new audience (e.g. SPADE).

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