

## ICT - based Approaches for Entrepreneurship Education

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**Abstract** – Businesses are organised or operated by an entrepreneur. It implies creativity, innovation, risk taking and the competence to plan and manage projects in order to achieve objectives. The role of entrepreneurship education is to offer students the tools to be creative, to solve problems efficiently, to analyse a business idea objectively, and to communicate, cooperate, lead, develop and evaluate projects. Approaches like mentoring and Information and Communication Technologies (ICT) supported forms of learning like Problem Based Learning (PBL), could be used in entrepreneurship education. Mentoring supports professional development and increases the mentees opportunities. PBL is suitable for entrepreneurship education i.e., by presenting properly real problems like “starting a business” and creates motivation in the students. ICT could improve the efficiency of PBL, but this aspect was not taken into consideration until now. Mentoring, ICT and PBL are used in the on-going European project Erasmus+ “Supporting PBL in entrepreneurial education and in Small and Medium sized Enterprises (SMEs) through ICT facilitated mentoring – Archimedes”. The authors developed an ICT platform in frame of this project to support PBL, which has been tested with SMEs and is shortly described in this paper.

**Keywords:** *ICT; Entrepreneur; Entrepreneurship education; Mentor; Problem Based Learning; Platforms; TikiWiki.*

### I. ENTREPRENEURSHIP EDUCATION

Entrepreneur usually means an individual who organises or operates businesses. Entrepreneurship is the art of being entrepreneur, so to be able to turn ideas into action. This implies creativity, innovation and risk taking, and the competence to plan and manage projects in order to achieve objectives [1] [2].

Some of the qualities of entrepreneurs (<http://under30ceo.com/10-qualities-of-a-successful-entrepreneur/>) should be:

- Discipline to follow the business steps of the established strategy to achieve the proposed objectives and eliminate obstacles.
- Confidence in own ability
- Open minded for new ideas
- Competitive.
- Creative and problem solving identifying solutions
- Determination, not believing that something cannot be done.
- Communication skills to motivate people to work and to sell products.
- Passion, loving work to be done.

Entrepreneurship education programmes should offer students the tools to be creative, to solve problems efficiently, to analyse a business idea objectively, and to communicate, cooperate, lead, develop and evaluate projects. Students can learn to set up their own businesses if they can test their ideas in an educational, supportive environment. Many European countries included entrepreneurship in the national curricula for vocational education training (VET) programmes and they are very different. Reports show that there are some gaps in most of these programmes [3] i.e., teaching methods are ineffective, student participation is limited, teachers are not fully competent, business people are not involved, the practical element is missing, entrepreneurship is not linked to specific training subjects or professions, education is not linked with labour market demands. It is important that entrepreneurship education takes these gaps into consideration.

Mentoring within entrepreneurship education can address some of these gaps as it brings in expertise from business; it is practical and can assist in linking the training to particular professions and labour market demands [4].

Mentoring is a human resource development approach and a vital aspect of knowledge management which needs to be looked by all organizations and education institutions wishing to improve their efficiency [5]. Educators and practitioners have noted the importance of mentorship in promoting leader development and career opportunities [6].

According to Kram's mentor role theory [5], mentors provide career development in order to integrate and prosper within the organization, and social advancement, contributing to the mentee personal growth and their professional development. The literature has found that receiving mentorship has been associated with positive career outcomes [6].

The functions of the mentoring, career advancement for beginners, professional development and social integration (particularly of mentees with special needs) increase the mentees opportunities. Many of these methods can be used for mentoring in entrepreneurial education. For example, experienced entrepreneur-mentors could help their mentees to understand that a failed business is an important part of their entrepreneurial training and that they can continue a successful career.

Mentorship from an entrepreneur can provide students with a greater level of security and inspiration. It can help students to know how a business was developed directly from its founder, and can be more effective than being mentored by an employee or an investor in this case. Also the story of an unsuccessful business venture is useful for students, particularly if it was a courageous idea, or the entrepreneur would like to create other interesting ventures.

For mentors supporting young /future entrepreneurs (19-25 years), it is important to focus on developing life plans and passion for a career, helping these young mentees to keep their vision in sight and to reflect what is happening [7]. Softer skills such as listening, communicating as well as some including the review of business plans and meeting objectives are necessary. Mentors should increase mentees motivation, encouraging them to try to implement their ideas.

Particularly supporting students/starters in small and new business creates a contribution to the local community, more jobs and a more attractive place to do business. Mentors could gain a better understanding of challenges facing small business which could enhance their working life or their retirement period.

Another aspect is that many education institutions and companies offer diversity initiatives to support collaboration, understanding and the use of different competences and cultures, but most diversity initiatives, which are important in a global environment, do not go far enough to promote real diversity and improve firm's competitiveness. Particularly within vocational education such initiatives are missing.

Entrepreneurship learning does not relate to a single occupation; it covers a variety of occupational skills and learners. Students engaged in entrepreneurship education should acquire different competences according to the focus of their learning [8].

The implementation of efficient entrepreneurship teaching and learning methods, particularly in schools and VET, requires structural changes in most countries. In many institutions of higher education and VET, where learning approaches are not driven by national policy, introduction of entrepreneurial teaching and learning depends on the institution which should also make a cultural change including diversity approaches. Knowledge about diversity as well practical training should be offered in entrepreneurial education and these will be more efficient than large, abstract diversity lectures. The main objectives of such training include awareness, education and positive recognition of the differences among people in the workforce.

Information and Communication Technologies (ICT) affects the entrepreneurship education because new technologies support the development of new entrepreneurship forms. ICT have the potential to improve student competences and skills, to motivate and engage students, to help them to link school knowledge to

work practices. ICT contribute to change and improve VET practices. Technology becomes quickly obsolete requiring new skills and knowledge and also changes in entrepreneurship education.

In the following we describe shortly Problem Based Learning (PBL) as a suitable form for Entrepreneurial education and an approach for ICT support developed by the authors.

## II. PROBLEM BASED LEARNING

Problem Based Learning (PBL) has been proven to develop higher order thinking and critical thinking skills. There are many different approaches to PBL [9], however little research has been done into the most effective methods in terms of learner success [10]. PBL should be adopted outside academic contexts i.e., as an excellent method of training for SMEs, because the staff learns solving real problems. It allows the learner to develop skills relevant to the needs of the company, it is conducted in a work based environment, it provides them with the skills to sustain the company beyond the initial training, it is low cost and it directly solves problems for the SME providing an immediate return [11]. Donnelly [12] highlighted that little is known about the use of technology in PBL. However after conducting a study in an academic context of the use of Communities of Practice (CoPs) [13] [14] for PBL it was found that CoPs provide an opportunity to enhance collaboration and extend face to face time with mentors and peers. In a business environment PBL, mentoring, CoPs and social media can be used to provide an opportunity for the communication between the mentor and mentee and to work with peers (or experts inside and outside the company) to find potential solutions to the problem or approaches to solve the problem.

PBL is suitable for entrepreneurship education i.e., by presenting properly real problems like "starting a business". It creates motivation in the students.

It is important to have a structured way in PBL, because at the beginning the students feel like they know nothing but after a short introduction and the guidance from the trainer/teacher they realise that they themselves can be the drivers in creating their own business.

In the following list we present steps which could be used by teaching PBL, based on methods described in PBL step by step [16]:

- Clarifying the task – The purpose of the first step is to explain the task, to agree on the meaning of the various words and terms and on the situation described in the problem
- Defining the problem
- Brainstorming - This should result in ideas to structure the problem. Each individual may express his or her ideas free and without immediate discussion
- Rating of Brainstorming outcomes
- Formulating learning objectives to cover knowledge deficits

- Self-study
- Rating of possible solutions and working out a final solution
- Reflection.

III. EXAMPLE

The European Erasmus+ project “Supporting PBL in entrepreneurial education and in small and medium sized enterprises (SMEs) through ICT facilitated mentoring – Archimedes” will develop a framework for organisational problem-based learning and supports the use of this form of learning. It is expected that these approaches will be widely adopted in entrepreneurial education and SMEs.

PBL will be supported by an ICT platform taking into consideration the PBL steps described above. The platform should help the tutor and the participants during the PBL seminars. Figure 1 describes a Flow Chart for platform.

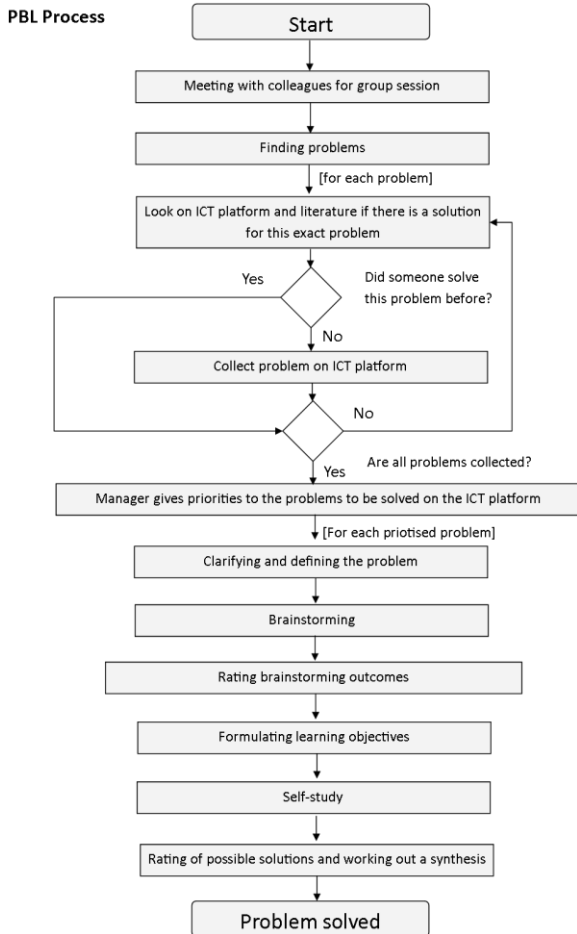


Figure 1. Flow chart Source: IAT

The platform is in development by using TikiWiki [17]. TikiWiki, also known as Tiki, is an open source Content Management System (CMS). It provides many rich features like websites, forum, chat, wiki, blogs, quiz,

calendar, document management, social software and many more. It is highly configurable and is mainly used in companies to organise tasks and to work collaboratively.

Tiki was used in some of our former project and has proven to be a good ICT solution for collaborative working and will be used to support PBL now. The following figures show screenshots of the Archimedes ICT platform supporting PBL.

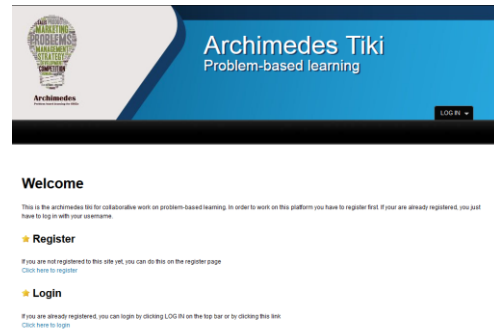


Figure 2. Homepage of the Archimedes ICT platform [18]

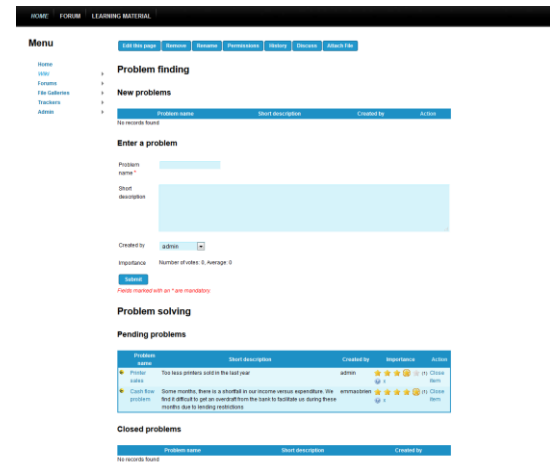


Figure 3. Problem overview on the ICT platform [18]

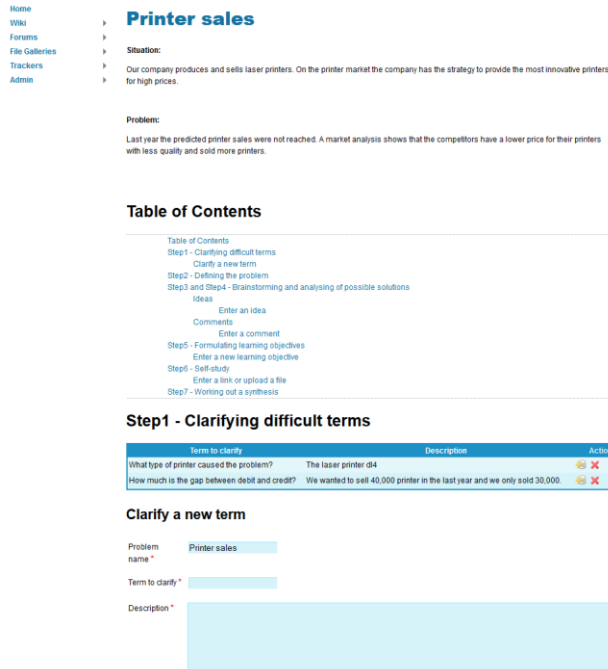


Figure 4. PBL steps visualised on the ICT platform [18]

The first version of the platform has been tested with students and staff from SMEs. The results are positive. Both students and SME staff consider PBL as a suitable form for learning and solving real problems. At two academic cooperation partners PBL has been introduced in the courses for entrepreneurs. Some SMEs would like to have its own platform (a copy of the Archimedes ICT platform for solving and saving own problems). The improvements, proposed by the users, are taken into consideration for further project developments.

### CONCLUSIONS

Development of entrepreneurial attitudes is a complex process, an important goal of education and requires cooperation of all actors involved. Within the project Archimedes Focus Group Discussions have been organised with education experts, students, entrepreneurs to discuss about suitable methods in education in order to achieve these goals. Intensive cooperation between companies, higher and VET institutions its one of the future activities of the authors.

Implementation of PBL requires some changes in the curriculum of entrepreneurship education and trainers/teachers with special knowledge. Rooms should be available for group discussions and the libraries should contain references which allow students to research for their PBL cases. Until now it was not successfully realised. Projects should be developed in this context.

### ACKNOWLEDGMENTS

This paper describes work within the on-going European project Archimedes

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